

Book reviews

Grierson, D.; Covey, S.: Plant Molecular Biology. Glasgow, London: Blackie / New York: Chapman & Hall 1985. vii+176 pp., several figs. and tabs. Soft bound £ 8.95.

Good books on the molecular biology of plants are particularly welcome, since they deal with a relatively new discipline which developed for a great deal only after the molecular biology of animals and microorganisms had been well established. As a result of this time lag, many plant scientists are somewhat unfamiliar with molecular approaches and are not completely aware of the great impact molecular biology has, and will have in the future, in the fields of plant physiology and plant genetics. The book of Grierson and Covey is highly convincing on this point. It not only shows what exciting discoveries have been made in plant science by the use of the techniques of molecular biology, but it also demonstrates how studies on plants can contribute to a better understanding of gene regulation. A unique example of such regulation in space is the coordinate action of three genomes, in the nucleus, the mitochondria and the chloroplasts, in one single green cell. Plant development offers excellent opportunities for studying regulation in time because of the dependency of many developmental processes on external factors which can be manipulated. The first three chapters of the book deal with the techniques, terminology and major achievements of molecular biology in general although all features are consequently illustrated by examples from studies on plants. In the other chapters special topics are discussed which, taken together, give a good overall view of the field. The final chapter is devoted to the prospects of genetic engineering in plants.

The two authors form a fortunate combination for more than one reason. They are very much fascinated by their subject and they succeed in transmitting this fascination to the reader in every single chapter. Although the matters discussed are mainly at the molecular level, the problems and their answers are placed in the context of the whole plant throughout. This makes the book attractive for a large circle of students and scientists with interests in botany. The book provides a wealth of information presented in a very condensed form. The text is clearly written and the illustrations effectively clarify difficult points. Some elementary knowledge of molecular biology is required as would be expected in a tertiary level biology book. A.F. Croes, Nijmegen

John Innes Institute: Seventy-Third Report Covering the Two Years 1983–1984. Norfolk (1985). 234 pp., 94 figs. Soft bound £ 5.00.

This biennial report of the institute marks its 75th year of existence. Although the director's report contains a certain melancholy, partly because a number of the staff which have brought such distinction to the institute by their scientific work have retired – J. J. Harrison, Bob Horne and Norman Sunderland – and partly because others have died – Cyril D. Darlington, Leonard F. La Cour and Morley B. Crane, the scientific aspects show an institute in full activity. The studies on pea remain a central object of research, with emphasis on reserve proteins. Plant cell development is approached from many

angles: the cytoskeleton, lectins, leghaemoglobin and chloroplasts. A branch of *Streptomyces* molecular biology is developing, as well as molecular pathology of *Xanthomonas*. *Rhizobium* genetics remains a central pillar of the scientific program of this world-wide recognized institute, which shows an increasing (approximately 15%) dependence on industrial and industrial-related support. H. F. Linskens, Nijmegen

Reid, R. G. B.: Evolutionary Theory, the Unfinished Synthesis. London, Sydney: Croom Helm 1985. 405 pp., Several figs. and tabs. Hard bound £ 25.00.

In the last paragraph of the *Origin of species*, Darwin wrote that there was "grandeur" in the view that from a simple beginning "most beautiful and most wonderful" forms had been evolved. For Darwin, the main mechanism of evolution was natural selection. However, according to numerous biologists natural selection did not do justice to the complexity of living systems and they proposed various alternatives. In the period between 1880 and 1940, the non-Darwinian theories flourished and Darwin's natural selection theory had only a few supporters both among biologists and laymen. The book under review surveys these alternatives: It deals with saltationists, emergentists, neo-Lamarckists, neo-vitalists, holists, etc.

The Synthetic Theory of Evolution imposed silence upon most heretic voices and Darwinism became the orthodoxy. The author of the book, Robert Reid, was a student and teacher of comparative physiology when the Synthetic Theory had its highest euphoria, at the time of the 1959 *Origin* centenary and the decade thereafter. In the Introduction of the book, Reid confesses that he never came to terms with the Synthesis because he saw a number of zoological problems. For this reason, he initiated a historical study on alternatives to natural selection. Reid argues that the critics had something to say and that nowadays the criticisms are becoming incorporated into evolutionary theory resulting in a new Synthesis: Adaptations are now more and more considered in the context of life cycles and body-plans and are not regarded as isolated reactions to the immediate environment.

Many readers of the book will feel that the later critics argued against a simplistic version of Darwinism, which is probably only found among population geneticists, while the earlier critics came too close to introducing non-natural factors. In addition, most of the speculations were not based on experimental data, but only on a supposed insufficiency of Darwin's natural selection. Therefore, reading the book one does not get very excited about the scientific merits of the critics. Accordingly, the book is only of interest for historians and philosophers of biology although in this regard, Reid's survey seems to be too superficial. He does not try to find the deeper reason(s) of the controversies on evolutionary theory. Although he speaks on several occasions of the different epistemological frameworks of the Darwinists and their critics, Reid does not try to identify these frameworks in detail.

In spite of these criticisms the book is, nevertheless, readable since Reid covers an important area in the history of evolutionary theory which is otherwise only dealt with from an orthodox Darwinian point of view. G. J. de Klerk, Canberra

Brownlee, G.G.; Glover, D.; Gurdon, J.B. (eds.): Aspects of Gene Expression and Its Control. Philosophical Transactions of The Royal Society of London. B. Biological Sciences, Vol. 307, No. 1132. London: The Royal Society 1984. pp. 215–351, several figs. and tabs.

This volume contains a collection of papers that evolved out of a two-day discussion on the different aspects of gene expression and its control. The eighteen contributions are mostly presented by several authors and are quite different regarding subject. The discussed topics deal with the role of complex structures that regulate eukaryotic genes, the induction influence on mRNA by human interferon and the expression of the alpha genes of the same protein. The analyses of gene regulation using natural disorders of human globulin as models, the use of erythroleukaemia cells for the study of transcription and the regulated expression of globin genes are three other topics. For the insect *Drosophila* the dissection of P transposable elements, chorion gene amplification and the expression of a heat shock protein of treated nuclei of this animal in mammalian cells are described. Other subjects focus on the beginning and the end of the message of sea urchin histone genes, the analysis of embryonic induction by cell lineage markers and synthetic RNA polymerase III promoters. Discussion about the gene transfer into the germ line of mice and growth hormone fusion genes of the same animal are presented. Other titles are high efficiency gene transfer into mammalian cells and the activation of cellular genes in transformed cells.

Each paper has a well-documented and readable introduction and discussion. This volume is therefore also of interest for researchers whose work does not deal directly with the presented subjects. J. A. M. Schrauwen, Nijmegen

Tice, R.R.; Hollaender, A.: Sister Chromatid Exchanges. Part A the Nature of SCEs, 25 Years of Experimental Research, Basic Life Sciences, Vol. 29A. New York, London: Plenum Press 1984. LI–491 pp., several figs. and tabs.

This book is comprised of the contributions presented at a symposium organized by the Biology and Medical Departments of the Brookhaven National Laboratory, to honour the 25 years of the first observation of SCE by J. Herbert Taylor, to whom this volume is dedicated. A total of 35 articles about the nature of SCE, preceded by two introductory papers about the historical perspective of SCE, are included in the first part of the book. This book is an important contribution to the current knowledge, main trends and perspectives of research about the phenomenon of SCE and the use of SCE technique in cytogenetic research. The relation between the amount of BrdU incorporated into the DNA (a necessary step to differentiate sister chromatids) and the yield of SCEs as well as the frequency of SCEs in DNA substituted with halogenated pyrimidines other than BrdU are critically analysed through the use of different experimental systems in 7 articles in the first section. The induction and characterization of SCE, the modulation of its induction, as main subjects of the second and third parts of the books are extensively treated in 17 papers. The correlations between the induction of SCE and the normal and modified composition of DNA as well as the relation between SCE and other biological end points such as chromosome aberrations are analysed in 6 articles in the fourth section. Finally, in the last section, the methods for statistical analysis of frequencies of SCEs in different systems are described in 5 papers.

In the last three years, two other books on SCE (one edited by A. Sandberg and the other by S. Wolff) have appeared. The

authors of the chapters of the present book have contributed to those two books. However, the present volume contains lots of new information gathered from diverse publications, presented in a concise form. It is beyond the scope of this paper to review individual contributions in detail. Most of them are of excellent quality.

A compilation of papers in a volume like this has the usual disadvantages. There is no uniformity with regard to the presentation of data in the papers. Some are like reviews, some are full length papers, and some are short notes. Some have summaries and some not. Each author uses his or her own style of references. What we would have liked to see in a volume like this is a synthesis at the end of each section: for example, when different models for SCE formation are discussed an uninitiated reader would like to know as to which one is currently favoured? Similarly, one would like to know as to what is the view about the contribution of incorporated BrdU on the SCE induction? Does it exaggerate the effect? What type of statistics one should apply to evaluate SCEs? Is there a common consensus?

The book should be very valuable for researchers working on SCEs and should find a place in the library of every cytogenetics laboratory.

F. Dulout and A. T. Natarajan, Leiden

Willemsse, M.T.M.; Went, J.L. van: Sexual Reproduction in Seed Plants, Ferns and Mosses. Proceedings of the 8th International Symposium on Sexual Reproduction in Seed Plants, Ferns and Mosses. Wageningen: Pudoc 1985. 206 pp., several figs. and tabs. Soft bound Hfl. 70.00.

In August, 1984, the 8th international symposium on sexual reproduction in seed plants, ferns and mosses was held in Wageningen, the Netherlands. Of the participants, many are well-known in the field. This proceedings volume of the symposium covers a wide range of research interests and deals with research mainly in seed plants. It comprises 3 parts with 87 lectures and posters: 1) microsporogenesis, microgametogenesis, anther and pollen germination in vitro; 2) stigma, incompatibility and pollen germination in vivo; 3) megasporogenesis, ovary, embryo sac development, fertilization and embryo and endosperm development. Mainly ultrastructural and biochemical methods were used. In some cases, a combination of structural and biochemical or quantitative approaches were offered. In comparison with the preceding symposia, some new methods are introduced: the use of fluorochromes, immunological techniques, quantitative measurement of pollen, thin layer chromatography – bioassay and the pollen tube test system, image analysis systems and ultracytometry, etc. Many new results of the study of male sterility and the use of hybridizing agents, incompatibility, apomixis, the in vitro embryoid formation and the data on sperm-cell composition are of importance or of interest in plant breeding.

The research on sexual reproduction in higher plants is a very complex topic and there is still a long way to go. In some sense, this book is a summary of the main contributions in the field in the recent 2 or 3 years and is of interest to botanical specialists and to plant breeders. Zhang-Hong-qi, Beijing

Saier, M.H.; Jacobson, G.R.: The Molecular Basis of Sex and Differentiation, A Comparative Study of Evolution, Mechanism, and Control in Microorganisms. Berlin, Heidelberg, New York, Tokyo: Springer 1984. 560 pp., 100 figs. Hard bound DM 98,—.

This volume presents three principal experimental approaches of the physiologist, the biochemist, and the geneticist

on understanding sex and differentiation at the molecular and cellular levels. Topics discussed in 14 chapters can be accordingly divided into three parts. Chapters 1–5 emphasize conceptualization of developmental processes, including the development of mortal somatic cells and immortal germ cells from a single fertilized egg. Chapters 6–10 reveal the functions influencing or regulating cellular behavior at the molecular level. Chapters 11–13 illustrate the detailed knowledge about processes controlling gene expression. Chapter 14 presents a brief conclusion and perspective.

In this book, it is clearly described that three fundamentally different molecular mechanisms, i.e. chemical, electrical, and macromolecular regulatory mechanisms, control cell physiology, sex, and differentiation. These are centered on the functions of morphogens and pheromones, transmembrane pro-

teins and protein complexes, and cell surface glycoproteins. The more interesting concept presented is the regulation of gene expression by intracellular and extracellular chemicals, mediated by ligand-binding proteins and five distinct “switch” mechanisms which are considered as controlling gene expression.

The authors stress meanwhile that “unity principle in biology” is possibly the most important concept for the modern-day biologist. The integration of the information concerning sex and differentiation into the evolutionary framework could be recognized through the chapters. Therefore it is well worth while for microbiologists, cell physiologists, developmental biologists, molecular biologists and geneticists to read this volume.

Li Yi-qin, Beijing

Announcement

The 20th International Conference on Animal Blood Groups and Biochemical Polymorphisms will be held in Espoo/Helsinki in Finland from 28 July to 1 August 1986

The scientific programme will consist of

Main sessions on 1. The nature and role of the major histocompatibility complex (MHC), 2. Protein polymorphisms, 3. Assessing immune competence in farm animals, 4. Marker genes in selection, 5. The implications of hypervariable DNA-regions for animal identification.

There will also be a Round Table discussion on “Future trends in animal genetics”.

Poster Sessions on MHC in farm animals, Protein polymorphisms, Immune competence, Relationships between marker

genes and production, Gene mapping and linkage, Blood groups in farm animals.

Workshops on BoLA. A full day workshop on Bovine Lymphocyte Antigens will be held on 27 July, ISABR Horse Comparison Test 1985, ISABR Cattle Comparison Test 1985.

Registration forms must reach the Organizing Committee (conference arrangements) in Finland before May 1, 1986.

Information: Prof. Jan Rendel, Swedish University of Agricultural Sciences, Department of Animal Breeding and Genetics, P.O. Box 7023, S-750 07 Uppsala, Sweden (scientific programme). Phone: 46 18 171000

Mr. Bo-Göran Holmström, Central Association of A. I. Societies, Blood group laboratory, P.O. Box 25, SF-01301 Vantaa, Finland (conference arrangements). Phone: 358 0 831905