

## Book reviews

**Franza, B. R. jr.; Cullen, B. R.; Wong-Staal, F. (eds.): The Control of Human Retrovirus Gene Expression.** Cold Spring Harbor: Cold Spring Harbor Laboratory Press 1988. 324 pp.; 13 figs.; 106 tabs. Hard bound \$ 55.00.

The volume under review contains 24 papers that were presented at a Banbury conference of the Cold Spring Harbor Laboratories on the topic of control of gene expression of human retroviruses. This topic is receiving growing interest from biological and medical researchers, especially with reference to understanding the basic mechanisms of the human immunodeficiency virus (HIV) infection leading to acquired immunodeficiency disease syndrome (AIDS). The volume represents an actual summary of experimental data and discussions on the remarkable complexity of the HIV genome and the apparent subtle cellular and viral regulation of the expression of HIV genes delivered by one or more members of virtually all the major laboratories working in this field. This outstanding collection should contribute to the effort to therapeutically interrupt the AIDS cascade. The reader is aided in his orientation in this rapidly expanding field of research by the inclusion of appendices in the form of a small glossary, an entire author index and a detailed subject index. M. Wehnert, Greifswald

**Lönnig, W. E.: Artbegriff, Evolution und Schöpfung. Dokumentation und Diskussion der verschiedenen Auffassungen.** 3rd edn. Köln: Lönnig 1988. 622 pp. DM 58.–.

The author is a geneticist of the Max Planck Institute (Cologne) and an expert in the cross-breeding of peas. For 20 years he has been in doubt whether mutation and selection – the cornerstones of Neo-Darwinism – provides adequate explanation of the “origin of species”. His final conclusion, based partly on an extensive study of molecular, genetical, cytological, physiological, taxonomic, palaeontological and ethological facts, is: no! The first question of his well-wrought account is: “what is a species?” Quite clearly this question should be the first one to be settled by anyone interested in the origin of species. The common practice is, however, quite different, and Mr. Lönnig is an exception in tackling the first question at the beginning. The first half of his book is dedicated to an inventory and criticism of morphological, Darwinian, genetical, palaeontological and creationist definitions of the species. When these definitions are used to estimate the total number of species, the outcome fluctuates between 2 and 20 million.

Some interesting topics of his inquiry are, for example: (1) is individual hybrid sterility decisive or does it result from the reproductive isolation of populations? (2) How do isolating barriers arise and function? (3) What is the proportion of genetic and epigenetic barriers? (4) Is genetic information stored in the nucleus (DNA) only or in the cytoplasm as well? (5) what do we do with sibling species? The author offers no hope on evolutionary progression by chromosomal reshuffling (polyploidy, gene duplication, inversions, deletions, transposons) that seem to be mere evolutionary noise. Such mutations destabilize the genetic balance, increasing indeed the variability, but not seldom is the balance restored by recurrent mutation. To cope with the diffi-

culties of the species concept, the distinction of primary and secondary species is introduced; primary species are not hampered by gene-chromosome- and genome-mutations, which are distinctive features of the secondary species.

The reader of this book is kept in touch with 1,400 plant and animal species and with about 2,000 authors, the latter often quoted to a large extent. As far as I know, a better reference book on the species problem is not to be found anywhere. The conflict with Neo-Darwinism is, of course, inescapable: facts against a theory. While Mr. Lönnig is far from being the only non-Darwinian evolutionist, he deserves a special place in the assembly. Neo-Darwinism will, however, keep upright, until an alternative evolution model comes ready for use. The author also pays attention to the Creator of species. His call will certainly be welcomed by the believer, but offers no alternative to the evolutionist. The third edition of this book is not expensive, badly printed and yet recommendable as an original, instructive and reliable contribution. H. van Waesberghe, Zeist

**Düzgünes, N.; Bronner, F. (eds.): Membrane Fusion in Fertilization, Cellular Transport, and Viral Infection.** Current Topics in Membranes and Transport. Vol. 32. New York: Academic Press 1988. 384 pp. Hard bound \$ 79.00.

This book appears as the 32nd volume in the series Current Topics in Membranes and Transport. Again, the editors of this prominent series have succeeded in assembling a volume that focusses on an important current topic in membrane research, namely membrane fusion and the underlying steps of this process. As the title indicates, the book examines the event of membrane fusion in three major areas: fertilization and development, cellular transport as exemplified by endocytosis and exocytosis, and the mechanisms by which viruses penetrate cells and cause cell-cell fusion. The book contains 11 chapters, each written by experts in the field. The first 3 chapters are a comprehensive survey of cell-cell fusion. In chapter 1 the various steps leading to sperm-egg fusion are reviewed, and special attention is given to the conditions and mechanism of that event. The ‘calcium trigger’ and the regulatory role of G-proteins in cortical granule exocytosis is analyzed in the second chapter. The third chapter describes the process and muscle cell fusion and discusses proposed mechanisms of myoblast fusion. It is made clear that as yet no consensus model exists for myoblast fusion.

The second part of the book opens with a lucid contribution of the late Peter Baker. In this chapter clues to the mechanism and physiological control of exocytosis are discussed, and it is shown how the use of permeabilized cells have permitted some features of exocytosis to be elucidated under conditions where normal physiological controls have been bypassed. The next 4 chapters deal with some important mechanistic and bioenergetic aspects of intracellular transport. Chapter 5 describes how after their fusion with the plasmamembrane, the membranes of intracellular vesicles are retrieved by the cells. A detailed structural analysis of the events in endocytosis and exocytosis, illustrated with revealing EM pictures is given in chapter 6. In chapter 7 the “chemiosmotic hypothesis of secretion” is shown to be no

longer tenable, at least in its totality. The last chapter of this part of the book discusses the use of fluorescent dyes as fusion markers and artifacts that may occur.

The final section of the book begins with a discussion of the mechanisms by which viruses bind and ultimately penetrate target cells. The following chapter reviews the use of Sendai virus for fusing mammalian cell membranes. In chapter 11, the final one of the book, cell fusion mediated by the influenza virus is described, and it nicely illustrates how genetic and molecular biology approaches, together with the use of biophysical techniques, may provide substantial information on cell fusion on a molecular level.

The book gives a good overview of recent progress in research on membrane fusion in fertilization, cellular transport, and viral infection. All of the chapters in the book are informative and clearly presented. The purchase of the book for libraries and for workers in the field is recommended.

A. P. R. Theuvenet, Nijmegen

**Birge, E. A.: Bacterial and Bacteriophage Genetics.** An Introduction. 2nd edn. Berlin Heidelberg New York: Springer 1988. 414 pp., many illustrations and tabs. Hard bound DM 78.–.

The book is a revision of the first edition published in 1981. Its organization is similar to that of the first edition. Two chapters (2 and 10), however, have been completely rewritten, and the former chapter two has been repositioned as an appendix. Because of the great increase in our knowledge of genetics, not only of prokaryotes and viruses but also of eukaryotic organisms, the author frequently discusses results obtained with *Saccharomyces cerevisiae*. By demonstrating similarities and differences between bacteria and yeast, the book gains a broader basis and loses its strong specialization, which is unfavourable at this level of scientific education. Nearly all chapters have been modified to increase clarity and to add new concepts (from "amplification" to "Z-DNA"), and the number of pages have been increased by 55. Each chapter contains a short summary and a list of both general and specific references that have been adequately updated. The subheadings and especially the bold-face terms distributed throughout the text make the material easier to read and understand.

The initial chapters of the book cover prokaryote molecular biology and genetic processes and procedures; with this background in mind, the student will be able to comprehend the theory of what is called "genetic engineering". These introductory chapters also provide a basis for studying the genetic mechanisms functioning in microorganisms. A concise, well-organized chapter on mutation and mutagenesis is followed by chapters on T4 and other temperate bacteriophages, temperate phages, transduction, genetic transformation, conjugation in *E. coli* and other bacteria, plasmid molecular biology, regulation, and repair and recombination of DNA molecules.

The last chapter is devoted to applied bacterial genetic principles. In a succinct manner, DNA splicing techniques and their related technologies are presented. The book closes with an appendix on the laws of probability and their application to prokaryote cultures. In summary, I find the new "Birge" well organized, well illustrated, and easy to read. The price is reasonable. I recommend the book to all students in microbiology, biotechnology, and genetics – and to their teachers.

C. K. Stumm, Nijmegen

**Philipps, W.-D.: Biologische Bekämpfung von Pflanzenkrankheiten.** 1st edn. Stuttgart: Ulm 1988. 248 pp., 42 figs. Soft bound DM 58.–.

Genetics and breeding are, in 40 pages, just a sideline in this book that concentrates in the other nearly 200 pages on the biological control of microbial pests. This includes (a) basics of the biology of microorganisms, (b) protection against soilborne pathogens of the roots, (c) protection of the phyllospheric plant, (d) admission of biological agents, and (e) chances and risks of microbial protectants. The aim of the author is to inform the layman and to provide some orientation to the expert. Due to a subjective evaluation of available literature, it has become a rather subjective book. Furthermore, such a large number of ideological views are presented that it becomes more than a textbook; e.g., it begins with a chapter on ethical reasons for the need of easy plant production.

In the genetical part itself, an unorthodox description of plant breeding is once again given, which is surely of interest to someone familiar with the subject, but a young student will find it difficult to incorporate the views given here with the information learned in the breeding disciplines. While the intention is to explain complex sequences simply, unusual phrases and poor pictures make understanding sometimes difficult. The citations concentrate predominantly on review articles or textbooks. The advantage that a reader normally has – easier access to such sources – is counterbalanced by the fact that latest developments are missing – particularly in the field of biotechnology.

In summary, this book provides quite a bit of valuable information on a topic of increasing importance. For someone familiar with the field, the subjective views are interesting and stimulating; as a textbook, this subjectivity is a weak point. Style (long and complicated sentences) and layout (very few illustrations) are below today's standard. It is a book which can be recommended for reading as a supplement to scientific textbooks in which the hard data are given.

G. Wenzel, Grünbach

**Levitan, M.: Textbook of Human Genetics.** 3rd edn. New York Oxford: Oxford University Press 1988. 475 pp., 167 figs., 86 tabs. Hard bound £ 30.00.

This new edition of *Textbook of Human Genetics* (second edition published in 1977) represents an up-to-date textbook in this field. In comparison to the previous editions, the chapters on classical human genetics are condensed, and new chapters molecular genetics and polygenic inheritance are added.

The present edition begins by introducing the basic features of Mendelian inheritance in humans, including the study of pedigrees. This is followed by a discussion of chromosomal background and chromosomal abnormalities. A chapter on the relationship between gene and phenotype is followed by a chapter on basic molecular biology. This is succeeded by a chapter devoted to modifications related to sex, especially X-linkage. A series of chapters then emphasize the classic, mathematically related aspects of the field, with the discussion first centering on problems of the single locus and then on multiple loci. Related to the latter is a chapter on gene interactions, including a detailed look into our new understanding of thalassemia and a chapter on polygenic inheritance. Three chapters deal with immunogenetics, the genetics of tumors, and genetic counselling.

This book is well illustrated. The exercises provided at the end of each chapter is well chosen. This up-to-date textbook will satisfy students of medicine and biology and non-geneticist physicians.

F. H. Herrmann, Greifswald