

## Book reviews

**Cloninger, C. R.; Begleiter, H. (eds.): Genetics and Biology of Alcoholism.** Banbury Report No. 33. New York: Cold Spring Harbor Press 1990. 380 pp. Hard bound.

Since the realization of ethnic differences in alcohol sensitivity in the 1970's and the studies of twins with respect to substance abuse the etiology of alcoholism has made great progress. In the USA the National Institute on Alcohol Abuse and Alcoholism initiated a multisite study on the genetics of alcoholism. This was the stimulus for the Banbury Center to organize a meeting for the critical evaluation of the current state of knowledge of alcoholism, and more specifically, the feasibility and design of genetic linkage studies for alcoholism. The proceedings of this conference appear at a time when there is a crucial juncture in the development of psychiatric genetics. The following main areas are covered: genetic and environmental risks; neurobiological markers of risk; animal models and candidate genes; quantitative studies on genetic linkage analysis in alcoholism. The evidence for genetic factors in the transmission of alcoholism is strong, and evidence for the involvement of aldehyde dehydrogenase (ALDHs) is convincing. The inactive ALDH2 (a mitochondrial allele), which is associated with flushing and reduced alcohol intake, is one of the three functional polymorphisms in the ethanol pathway. The discovery of mouse and rat strains with an abnormally intense alcohol-seeking behavior opens the way for molecular studies. Specific genes that influence specific behavior are now available, and the search for genes that underlie motivated behaviors like alcohol abuse has begun in earnest.

A very positive point of this report is the contribution of the participants that is reflected in the stimulating discussion rendered in full length (for more than 100 printed pages).

H. F. Linskens, Nijmegen

**Bennett, A. B.; O'Neill, S. D. (eds.): Horticultural Biotechnology.** Proceedings of the Horticultural Biotechnology Symposium held at the University of California, Davis, Calif., August 21–23, 1989. Plant Biology, Vol. 11. New York Chichester Brisbane Toronto Singapore: Wiley-Liss 1990. 387 pp. Hard bound \$ 72.50.

Herbaceous horticultural crops are more amenable to tissue culture and genetic manipulation than wood and other agronomic plants. Tomato became a popular model system, while ornamental plants like *Petunia* are in the focus of biotechnological application, e.g., for modification of flower color and form. The advances that have been made in applying biotechnology in horticultural plants became very evident during the forum presented in these proceedings, which focussed on applications towards commercial goals. In the 39 lectures, assembled in nine sections, experts give an excellent overview of the present state of the art. Topics like germ plasm resources, gene transfer and isolation, and genome structure emphasize molecular aspects. Flower development, ripening and senescence, and biotic and abiotic stress are more in the direction of biological aspects. In the section on commercial applications it becomes evident that anther culture and RFLP (restriction fragment length polymor-

phisms) technology are the most advanced techniques in horticultural biotechnology. Consumer-driven attributes like taste and texture, pigments, seedlessness, shelf stability, nutritional value as well as pesticide residues and processing characteristics are the most important breeding goals attractive to biotechnology. Great perspectives for plant breeders.

H. F. Linskens, Nijmegen

**Campbell, A. (ed.), Baker, B.S.; Herskowitz, I. (associate eds.): Annual Review of Genetics, Vol. 22.** 1st edn. Palo Alto, Calif.: Annual Reviews Inc. 1988. 704 pp., 61 figs., 15 illustrations and tabs. Hard bound \$ 38.00

It is impossible to evaluate a publication like the Annual Reviews of Genetics which contains 22 contributions from different authors, all concerning different topics in genetics. There is neither a "red thread" nor any organization with respect to organisms, topics or problems. The reviewer has the impression that various topics concerning genetics are lined up in the order the authors sent their contribution to the editors. The quality of the papers differs widely. Some of the authors have just lined up the content of the papers concerning their topic, but most authors have tried to evaluate the papers and to work out their essence. In many cases this aim is supported by tables or drawings in order to increase in readers' understanding.

The following topics are dealt with:

- Basic processes underlying *Agrobacterium*-mediated DNA
- HLA disease associations: models for insulin-dependent diabetes mellitus and the study of complex human genetic disorders
- Mechanisms of the effects of aneuploidy in mammals
- The mechanisms of conservative site-specific recombination
- Control of antigen gene expression in African trypanosomes
- Differential imprinting and expression of maternal and paternal genomes
- Recombination between repeated genes in microorganisms
- DNA double-chain breaks in recombination of phage and of yeast
- Mechanisms of X-chromosome regulation
- The genetics of bovine papillomavirus type 1
- Linked sets of genetic markers for human chromosomes
- Classical and molecular genetics of tomato: highlights and perspectives
- Mendelian hyperphenylalaninemia
- Mammalian genome organization: an evolutionary view
- Maize Developmental genetics: genes of morphogenesis
- Spliceosomal snRNAs
- Foreign genes in plants: transfer, structure, expression and application
- Dissecting multistep tumorigenesis in transgenic mice
- Phylogenies from Molecular sequences: inference and reliability
- Biological regulation by antisense RNA in prokaryotes
- Genetics of Duchenne muscular dystrophy
- The heat-shock proteins.

K. Esser, Bochum

**Adams, J.; Lam, D. A.; Hermalin, A. I.; Smouse, P. S. (eds.):** *Convergent Issues in Genetics and Demography*. New York Oxford: Oxford University Press 1990. 361 pp. Hard bound \$ 49.95.

Source material for the chapters comes from an international congress held at the University of Michigan at Ann Arbor in 1988. This volume consists of a discussion of the issues and questions common to the disciplines of population genetics and demography. Upon reading the book, it becomes evident to this reviewer that neither discipline has a problem with communication. The articles, discussion-modified lectures, are organized into four sections, each representing a major point of congruence of the included disciplines. The first section covers the use of historical information, specifically pedigree and genealogical data concerning migration, genetic differentiation and demographic behavior. Section II deals with heterogeneity, phenotypic variation and frailty, and their analysis in both fields; section III, genetic epidemiology. In Section IV includes a variety of topics, such as population models and vital rates.

For population geneticists the fundamental interest in social science in the same phenomena, existing independently from each other and approaching with quite different methods is evident.

H. F. Linskens, Nijmegen

**Kingsman, A. J.; Chater, K. E.; Kingsman, S. M. (eds.):** *Transposition. Forty-third Symposium of the Society of General Microbiology, held at the University of Warwick, April 1988*. Cambridge New York: Cambridge University Press 1988. 375 pp., many figs. and illustrations. Hard bound \$ 75.00.

This volume, comprising 17 articles written by leading researchers in their fields, describes the state of present-day knowledge of mobile genetic units – their mechanisms, regulation, genetics, and population dynamics – in the classical prokaryotic and eukaryotic microbes *E. coli* and yeasts. The somewhat less studied systems of the gram-positive bacteria *Staphylococcus*, *Streptococcus*, and *Streptomyces* are also covered in the articles. DNA rearrangements linked with the effectiveness of pathogens, as phage Mu, a bacterium and trypanosomes are included. Two chapters deal with I-factors and P-elements in *Drosophila* and their use as vector systems. The introduction of the term non-viral retrotransposons in plants is quite remarkable. Apparently the DNA-mediated transposition of insertion elements can become of value for species' evolution in plants because novel regulatory units upon insertion and/or sequence diversity within a gene upon the excision of plant transposons create a playground for subsequent selection. Plant transposition elements can therefore be considered to be tools for protein evolution.

H. F. Linskens, Nijmegen

**Baj, Y. P. S. (ed.):** *Biotechnology in Agriculture and Forestry, Vol. 11. Somaclonal Variation in Crop Improvement I*. Berlin Heidelberg New York: Springer. 685 pp., 105 tabs., 158 figs. Hard bound DM 578.00.

According to Bajaj the definition of somaclonal variation is "any genetic variability brought about by in vitro culture". Bearing this definition in mind, one can understand the size of the book (and its price) and that of others to follow. Variability brought about by cell and callus culture as well as variability brought about by other in vitro systems is included in this volume. In 29 articles written by experts in their particular field, many various aspects are dealt with. In section I general aspects

such as genetical, chromosomal and molecular variability, gene amplification, mosaic and chimeras, variability for tolerance to salinity, and nematode resistance are treated. Section II covers some of the cereals (rice, maize, barley); section IV, a selection of vegetables and fruits (potato, tomato, egg plant, cucurbits, sugar beet, chicory, strawberry, peach); section IV; an arbitrary selection of ornamentals and one forage plant (*Pelargonium*, *Fuchsia*, carnations, *Haworthia*, *Weigela*, *Nicotiana sylvestris*, alfalfa). It is not surprising that there are many omissions and overlaps. For example, the Preface could be deleted – it is a repetition of page 3 with other words. Articles on the use of zymograms for elucidating the origin of somaclonal variation (Ball) and the optical techniques for measuring genetic instability (Berlyn et al.) are most interesting. It becomes apparent the somaclonal variation no longer represents a nightmerry for the tissue culturist, but can be used for extended selection of genetic variability. By the way, what is "peridic subculturing"? There are many printing errors.

H. F. Linskens, Nijmegen

**Knutson, L.; Stoner, A. K. (eds.):** *Biotic Diversity and Germplasm Preservation, Global Imperatives*. Beltsville Symposia in Agricultural Research, Vol. 13. Dordrecht Boston London: Kluwer Academic Publ. 1989. 53 pp., 35 figs., 47 tabs. Hard bound Dfl 250.00.

The need for maintaining biotic diversity and preserving germplasm is recognized by breeders, even though knowledge on the diversity of living organisms is still quite limited. An estimation of the actual number of species varies between 5 and 10 million. The vital concern of researchers for the preservation of biotic diversity is reflected in this proceedings, which includes the invited papers of a Beltsville symposium held in 1988. This symposium was sponsored by various national and international agencies. The topic is introduced with a presentation of its ethical and political implications; this is followed by a discussion of the material in four sections: Basic research and germplasm status; Germplasm utilization; Germplasm collection and data management; International issues and linkages. John A. Pino, the project director of the Committee on Managing Global Genetic Resources of the National Academy of Sciences, Washington, summarizes the situation in an excellent overview. His starting premise is that diversity must be seen in the broad context of natural systems as a fluctuating property and not as a stable one. Changing niches result in evolution and co-evolution. And, we must not assume that if an organism is not of immediate interest to mankind it has no purpose: the loss of a species is the loss of genes specific to that species. Therefore, concern must go beyond the immediate needs of breeders. Nature itself exerts a selective toll on living organisms during the adaptive process for new niches and the extinction of old ones.

Germplasm conservation is especially important to developing countries. So long that it is not possible to preserve isolated genes for a particular trait, there is still a critical need for in situ conservation, especially in areas of diversity. There are more than forty plant gene banks throughout the world, but the global task is not yet complete. More efficient preservation would avoid duplicate sampling, overlapping collections and, consequently, result in better management. Incipient programs for the conservation of animal germplasms are needed.

This book provides a good sketch of present-day activities as well as describing the needs of the future. Now is the time for the policy makers to react.

H. F. Linskens, Nijmegen

**Smith, J.M.: Evolutionary Genetics.** Oxford, New York, Tokyo: Oxford University Press 1989. 325 pp., 2 plates, several figs. and tab. Soft bound £ 16.95.

While a number of significant premises for explaining the genetic foundations of evolution are on the whole accepted, a great many problems remain unsolved, and these give rise to more or less questionable hypotheses. In order to succeed in understanding evolution, further experiments with a distinct purpose are necessary. Only scientists who understand the known results and the open questions are able to close the gap in our knowledge. It is, therefore, very important to have an informative book dealing with essential facts on the one hand and presenting different opinions on the unsolved problems on the other hand. This was the intention of the author of this book.

In only about 300 pages the author presents an excellent overview on the tendencies in evolutionary genetics by combining information from molecular, classical and population genetics; a background knowledge in classical recombination genetics, gene action, replication, recombination in prokaryotes as well as in some elementary algebra and statistics is assumed. Each chapter ends with hints to "further reading", mostly in the form of "problems" (and answers at the end of the book) as well as "computer projects". In this review only some of the diverse interesting points of the contents will be cited: neutral molecular evolution, synergistic selection, evolution of transposons, evolution of the eukaryotic genome, consequences of sex, and macroevolution.

It is a very informative book for those students and scientists who wish to extend their knowledge of biological reactions and evolutionary steps not only by means of new genetic facts but also by mathematical calculations.

E. Günther, Greifswald

**Fristrom, J.W.; Clegg, M.T.: Principles of Genetics, 2nd edn.** New York: W.H. Freeman and Co 1989. 796 pp., 523 figs., several tabs., Hard bound.

With this second edition the authors present a comprehensive modern textbook that is excellently illustrated with many photographs and instructive, colour and black-and-white schemes. The remarkable and attractive feature of the book is that it combines classic and molecular genetics as much as possible.

The different subjects of genetics are dealt with in a logical sequence. Thus, in the first part nucleic acids and chromosomes are described; in the second, gene transmission, DNA replication and some general aspects of recombination. Part three, which is on gene function, includes protein synthesis as well as genetic engineering, mutations, molecular mechanisms of recombination, genome structure and regulation, and a comprehensive and modern presentation of the genetics of development, cancer and immunology. The fourth part focusses on interesting facts about molecular evolution, especially the problems of the molecular mechanisms of evolutionary changes.

The following critical comments are intended as a help for the preparation of the next edition and not to diminish the value of this really very good book. In contrast to other recombination processes transposition receives only a very brief explanation. With the exception of the description of procaryotic transposons in the chapter "bacterial genetics", comments on eukaryotic transposable elements are only to be found in the chapter "mutations", and even I do not agree with the authors' opinion that transposition is replicative in most cases and with the unusual symbol  $tn_{10}$  instead of  $Tn_{10}$  (p 473). In the chapter

"transformation" it should be mentioned whether transformation is a natural process or only possible in combination with  $Ca-Cl_2$ -treatment. *Pseudomonas aeruginosa* is not a good example of transformation because it has not yet been proven if the transformation of chromosomal genes occurs in this species.

The book can be recommended to all those who wish to obtain fundamental and comprehensive knowledge, and the clearly written text and excellent figures will promote an understanding of the way genes determine the molecular process of life and development.

E. Günther, Greifswald

**Watson, J.D.; Hopkins, N.H.; Roberts, J.W.; Steitz, J.A.; Weiner, A.M.: Molecular Biology of the Gene. Volume I and II.** 4th edn. Menlo Park, Calif.: Benjamin/Cummings Publ. 1987. 1163 pp., Several figs. and tabs. 8 plates. Hard bound.

This fourth edition is not only a very informative textbook, but is also a solid handbook that excellently explains all of the important aspects of molecular biology. It is superior to some other books because it combines the explanation of facts with the demonstration of methods. Numerous clear and impressive schemes, electron micrographs, and illustrations of DNA sequencing and gels facilitate understanding. A detailed summary, a bibliography that includes general and cited references at the end of each chapter as well as an excellent index are useful additions to the text. It is a very interesting source of knowledge, and comprehensively reproduces the rapid progress being made in this field.

The contents are dispersed over two volumes: the first one includes "General principles" and the second one "Specialised aspects". The fundamentals of basic molecular biology and genetics are presented beginning with classical genetics, the biochemistry of the cell, metabolism of bacterial cells, protein synthesis, weak chemical interactions (from H-bonds to self-assembly), gene mutations and fine structure of the gene and the chromosome of bacteria and viruses (238 pp).

Subsequent chapters of the first volume are written in an admirable instructive manner. They transmit to the reader a profound understanding of molecular genetics and intensify the knowledge acquired by studying the introductory chapters. Not only are facts and methods presented, but also critical opinions, unsolved problems and suggestions for future research are dealt with. These chapters contain all of the known important information on DNA, replication, homologous and site-specific recombination, mutability and repair, protein synthesis and regulation. In the following chapter "Replication of bacterial viruses" both the multiplicity of replication and other interesting processes such as regulation or development are discussed. The specificity of eukaryotic gene function and the organisation of chromosomes are presented in a special chapter on yeast and in chapters on other eukaryotes (separated by a chapter on recombinant DNA).

The second volume presents the molecular biology of development (including microinjection of genes and T-DNA transfer into plants), of immunology, and of cancer. In a discussion of the molecular biology of the gene it would also be useful to explain the nomenclature of genes in different organisms. How difficult it is to use the correct terms is shown in Fig. 19-3. In Fig. 1-4 the term "metaphase II" for the early anaphase of mitosis may lead to misunderstanding, particularly because in Fig. 1-5 this term is correctly applied to the stage of meiosis II.

These pleasantly readable books are to be recommended for any one who is interested in molecular biology and should be present in each library.

E. Günther, Greifswald