

Book reviews

Porter, I.H.; Hatcher, N.H.; Willey, A.M.: Perinatal Genetics: Diagnosis and Treatment. Orlando, Florida: Academic Press 1986.

As described in the preface, the book is based on the proceedings of the Fifteenth Annual Birth Defects Institute Symposium held in the autumn of 1984. The aim of the symposium was to clarify and rationalize certain aspects of diagnosis, genetic counselling, and management.

The book is divided in six sections which contain 17 papers from different authors. One section is devoted to several aspects of pregnancy loss (very early pregnancy loss, cytogenetic studies of spontaneous abortions, and repetitive spontaneous abortion). There are two sections with interesting contributions on prenatal diagnosis and treatment (e.g. prenatal diagnosis of fragile X syndrome and of fetal hydrocephalus, prenatal diagnosis by chorionic villus ampling, and fetal surgery). Another section contains papers on in vitro fertilization and embryo transfer, and H-Y antigen and sex determination. The fifth section deals with the relationship between environmental factors and the relative risk of birth defects, and with paternal age effects on offspring. The final section consists of ethical reflections on issues of the recently developed possibilities in perinatal medicine.

One can find many excellent reviews and also several original contributions in this book. As a whole, however, the book is somewhat disappointing as it is more a collection of interesting papers than a thorough and up-to-date overview concerning the broad and rapidly evolving field of perinatal genetics.

T. W. J. Hustinx, Nijmegen

Kahn, P.; Graf, T. (eds.): Oncogenes and Growth Control. Heidelberg: Springer 1986. 369 pp., 35 figs. DM 148,-.

Complaints about progressing specialization in science are very common. Sometimes, however, previously unrelated lines of research are seen to collide and merge.

From such rare but fortunate unions a wealth of new clarifying information can be expected. The simultaneous but independent discovery by two groups in 1983 that the *oncogene sis* codes for a product identical or almost identical to the B-chain of platelet derived growth factor (PDGF) was certainly an event in this category. It brought together the field of the oncogenes and that of growth factors and their receptors. Scientists with a past in either subspecialization will welcome the book "*Oncogenes and Growth Control*" edited by Patricia Kahn and Thomas Graf. It is a typical multiauthor book: 80 authors have written 47 minireviews on various aspects of this subject. There is a subdivision into six sections ranging from "Growth factors and proto-oncogenes in development and differentiation" to "Oncogenes in transgenic mice" which gives this complex conglomerate of papers structure and body.

The price (DM 148) is high but not unreasonable for a book written for specialists and departmental libraries. Its main advantage is the presentation of relevant recent work in a rapidly expanding field. A disadvantage is that it will be outdated after a few years. It should be noted that this book is

not unique: an overlapping set of authors are assembled in "Growth factors and transformation", part 3 of the Cold Spring Harbor Laboratory series on Cancer cells, an edition with more substance and authority.

H. P. J. Bloemers, Nijmegen

Szabo, G.; Biro, S.; Goodfellow, M. (eds.): Biological, Bio-medical Aspects of Actinomycetes. Proceedings of the 6th International Symposium on Actinomycetes Biology, Debrecen, Hungary, 26–30 August 1985. Symposia Biologica Hungarica, Vol. 32, also published as No. 34 of the FEMS Symposia Volumes. Budapest: Akademiai Kiado 1986. 884 pp., many figs. Hard bound \$ 85.00.

Although not mentioned in the title more than a quarter of the presentations concern the genetics of Actinomycetes. The cloning and sequencing of genes, gene expression and genome structure, selection of mutants and population analysis comprise more than half of the papers of the plenary sessions and mini-symposia of this two-volume proceedings. The material originates from the 6th of a series of scientific meetings held every third year on the biology of ray-fungi, which are of tremendous practical importance. The meeting attracted about 500 participants from 27 countries. Although a few papers have a review character, most of the others, as well as the posters, are technically oriented and arranged in 9 sections: Genetics, Physiology and Biosynthesis of primary and secondary metabolites, Biochemistry, Morphology and ultrastructure, Taxonomy, Pathogenicity and immunology, Ecology and epidemiology, and Differentiation.

Each expert will find something of interest in his particular field so that in a pointillistic way a picture is given of a group of microorganisms important in the antibiotic industry, in human and veterinary medicine, agriculture or in fundamental research. Progress has been very rapid since the discovery of streptomycin and has been growing ever since. Even more so because of the vast number and variety of pellicular compounds isolated from Actinomycetes. These are very different from those found in procaryotic bacteria and eucaryotic fungi.

The question of an interaction of Actinomycetes with higher crop plants should be kept in mind.

H. F. Linskens, Nijmegen

Campbell, A.; Herskowitz, I.; Sandler, L.M. (eds.): Annual Review of Genetics, Vol. 20. Palo Alto (USA): Annual Reviews, Inc. 1986. 724+viii pp., 71 figs., 27 tab. Hard bound \$ 34.00.

This volume of the Annual Review of Genetics rather adequately reflects the situation mentioned in the editorial preface: an evident shift of genetic research to the biochemical and molecular levels. This is true not only for the chapters dealing with microbial genetics (this would be trivial), but also for those devoted to higher organisms.

Since microbial genetics is somewhat out of the scope of TAG, I shall not discuss further chapters of the volume devoted to this topic (this does not imply in the least that the

quality is low). Of the rest, seven deal with mammalian and human genetics.

Recent developments in cancer genetics are described in two reviews. A.G. Knudson discusses general problems of cancer genetics (cytogenetics, repair disorders, hereditary predisposition to cancer and oncogenic mutations). Discussion of oncogenes structure in this review partially repeats M.D. Cole's discussion of structure and expression of *myc*-oncogene. R.R. Nussbaum and D.H. Ledbetter discuss recent data on fragile X syndrome in human-enigmatic genetic disease, its phenomenology, inheritance and models of expression. E.M. Eicher and L.L. Wahburn devoted their review to genetic control of sex determination in mice (including Y-chromosome organization at a DNA sequence level). Evolution of multigene families as exemplified by human haptoglobin genes is discussed in a review by N. Maeda and O. Smithies. Two reviews cover maybe the most important problem of genetics – genes and morphogenesis. One discusses recent exciting findings in molecular structure and function of homeogenes (W.J. Gering and Y. Hiromi); the other is devoted to genetic control of multicellular development in *Dictyostelium* and *Mixococcus* (D. Kaiser). The review of M.J. Jackson, A.L. Beaudet and W.E. O'Brien dealing with mammalian urea cycle enzymes has obvious interest for those working in the field of clinical genetics. Two reviews are devoted to the one of the most rapidly growing fields in modern genetics – analysis of genome rearrangements and mechanisms of rearrangement processes. The first is a review by E.H. Blackburn and K.M. Karrer on genomic reorganization in Ciliates; the other is that of H.-P. Döring and P. Starlinger on plant transposable genetic elements. The review of B. Ganetzky and C.-F. Wu deals with neurogenetics of *Drosophila*, particularly with mutations affecting neuro-membrane excitability. A chapter on adenovirus transcription regulation (A.J. Berk) is devoted to adenovirus as an excellent model for studying molecular biology of mammalian cells. L.A. Loeb and B.D. Preston discuss the possible role of apurinic/apyrimidinic sites in spontaneous and chemical mutagenesis both in bacterial and animal cells. The only chapter devoted to genetic engineering is that of R.D. Palmiter and R.L. Brinster on germ-transformation and gene expression in transgenic mice. The chapter dealing with pre-mRNA splicing has the heaviest bias towards molecular biology. Though it is difficult to settle the strict boundary between genetics and molecular biology, it seems to me more logical to see the article in Annual Review of Biochemistry.

Also, I should like to mention an introductory chapter by H. Roman about the early days of yeast genetics. Interest is heated both by the role yeasts played in development of eukaryotic molecular genetics, and by the fact that the author took an active part in the development of yeast genetics from the very beginning. Hence this history is a vivid story by a pioneer rather than a dusty collection of facts from student's manual.

In conclusion I should like to mention the following. The editorial preface to the volume states that the "present volume covers a diverse array of topics...". It is true with one obvious exception – only one (!) chapter is devoted to plant genetics (plus one other may be of interest to plant researchers – that by G.N. Gussin, C.W. Ronson and F.M. Ausubel in which genetics of dinitrogen fixation in *Rhizobium* is discussed). The above mentioned chapter by H. Roman is rather historical, and, besides, are yeasts really plants? I hope that following volumes will correct the situation. Also, some chapters on plant genetics appear in current volumes of Annual Review of Plant Physiology, cf. List of some related articles in other Annual Reviews in the volume reviewed.

L. R. Shlumukov, Kiev

Matsuda, R.: Animal Evolution in Changing Environments with Special Reference to Abnormal Metamorphosis. New York, Chichester, Brisbane, Toronto, Singapore: Wiley and Sons 1987. XVI + 355 pp., 6 figs. Hard bound \$ 59.50.

Matsuda, the author of "Animal evolution in changing environments" was a morphologist who died early 1987. His book discusses the driving force and the mechanism of evolutionary change. Leigh van Valen once explained evolutionary change by comparing organisms with the Red Queen in *Through the Looking Glass* who had to keep running just to stay in the same place. Similarly, organisms have to keep changing permanently in order to keep up with their competitors who do the same. In addition to this, evolutionists from Darwin onwards have recognized drastic changes in the environment, e.g. climatic changes, as an important factor in evolutionary change. According to Matsuda, though, such changes in the environment should have got more attention and it seems that he considers them to be the only force in evolution. The contributions of the various factors are at present a matter of opinion. However, Matsuda's exclusive stress on environmental changes is most probably erroneous.

Matsuda's second criticism of current evolutionary theory is that it does not recognize genetic assimilation. (The theory of genetic assimilation supposes that changes first occur at the phenotypic level and are then fixed in the genome by means of mutations which cause the same phenotypic effect.) As far as the present reviewer is aware, it has never been proven unambiguously that genetic assimilation occurs, and it actually seems to be an illogical mechanism: why would organisms adapt at the level of the genotype, when they are already adapted at the level of the phenotype? If genetic assimilation does occur at all, its role is probably very limited.

Matsuda discusses both criticisms in the first part of the book (approximately 50 pp). In the second part (approximately 200 pp), he summarizes present-day knowledge of metamorphosis throughout the animal kingdom. This is an excellent survey. It is a pity, however, that the book is without illustrations, especially as it is aimed not only at the specialist, and that Matsuda hardly discusses the results of molecular developmental biology.

G. J. de Klerk, Lisse

Sherman, F.; Fink, G.R.; Hicks, J.B. (eds.): Laboratory Course Manual for Methods in Yeast Genetics, 1st edn. Cold Spring Harbor (NY): Cold Spring Harbor Laboratory 1987. 186 pp., figs. Soft bound \$ 25.00.

With the initiation of yeast genetics in the mid-1930's by Winge and his co-workers, *Saccharomyces* gradually became for the biologist what it is today – an ideal eukaryotic microorganism for genetic and biochemical studies. Moreover, during the last years, yeast has become a useful organism for gene cloning and genetic engineering techniques by DNA transformation. On the other hand, genetic techniques involving *Saccharomyces* are different from those done with prokaryotic microorganisms, and thus there is urgent need of a modern course manual in this field.

The first part of the book contains 14 experiments, including, amongst others: isolation and characterization of mutants (auxotrophic, temperature sensitive, and UV sensitive), meiotic and mitotic mapping, nonsense suppressors, transformation, gene cloning by complementation, and chromosome separation by means of the OFAGE method. Each experiment begins with a clearly written introduction (comprising mostly several pages) and continues with the procedure. Not only are the day-by-day activities (some experi-

ments span several days) described, but also such technical specials as the preparation of a microneedle or construction of an inexpensive spectroscope are sketched. Each experiment is terminated by lists of materials as well references.

The second part of the manual (about 50 pages) is devoted to techniques and protocols, as staining methods, Southern blotting, isolation of nuclei and nucleic acids, colony hybridization, and many more. An appendix comprises recipes of media, lists of strains and sources (for the US market), micromanipulation, and a genetic map (1986).

In order to follow the course successfully, the reader should be well acquainted with both the proper use of the microscope and the methods of general microbiology; furthermore, she/he should have a solid basic knowledge of microbial genetics. For those who have these capacities, plus the ability to pay a lot of money for a soft-cover book with 11% empty pages (21 of 186), performing the experiments can only be a pleasure and will certainly help to better understand how (yeast) genes function.

C. K. Stumm, Nijmegen

Beridze, Th.: Satellite DNA. Berlin, Heidelberg, New York, Tokyo: Springer 1986. 149 pp., 78 figs., 23 tabs. Hard bound DM 148.00.

Prof. Dr. Thengiz Beridze, the author of this book, can be considered one of the pioneers in the study of the so-called satellite DNAs. His studies on plant satellite DNA have had a great impact on current ideas about their structure and properties. As outlined by Beridze, this extraordinary type of DNA has been studied for over 20 years. From initial comparative studies of DNA from different organisms, it was concluded that nuclear DNA can consist of fractions which differ in physical and chemical properties. Along with the "major" DNA, "minor" specific fractions were discovered. Although since then the physical and chemical properties of various satellite DNAs have been described, a clear-cut view on their origin or metabolic functions is still missing. As a result the author had to concentrate on the structural and functional heterogeneity of these DNAs and could only propose hypotheses on their origin, function and instability in the hope that this compilation of data and suggestions might stimulate more intensive studies on this subject. New developments in molecular biology have certainly facilitated these studies and both the formation pathways and functions of satellite DNAs are now being unraveled.

Satellite DNA is a revised and enlarged translation of the 1982 Russian edition. Literature up to 1983 is rather well covered but only a few references from 1984 are given. In this respect this 1986 international edition cannot be considered as being up-to-date. Nevertheless, it provides a comprehensive, thoroughly-arranged description of the physical and chemical properties of various satellite DNAs. Starting with the detection of satellite DNAs (ch. 1) and the evolution of the terminology (ch. 2), its distribution in animals and plants is presented (ch. 3). As a tool for the detection of repeats of different lengths, a simplification of the reassociation kinetics method is given (ch. 4). From the very short chapter on chromosomal location (ch. 5), it is clear that new developments in the field of molecular cytology are the missing links. The extensive chapter 6 is the "body" of the book. It gives a good overview on the structural features of the most thor-

oughly studied satellite DNAs. Protozoa, Arthropoda, amphibians, mammals, primates and plants are given as examples. For those who are interested in the chemical and physical properties of satellite DNAs this compilation of data might be the most useful part of this book. In the final chapters the author presents viewpoints on the structure of satellite DNA containing chromatin, their uniting features, their origin and the functional role of satellite DNAs. More questions are raised than answers could be given at the time of writing. The author cannot fully be blamed for this omission.

Satellite DNA can mainly be considered as a useful and inspiring guide and a source of data for both students and scientists who are interested in the structure and organizational principles of the eukaryotic genome. Furthermore, it could be a very good stimulus for geneticists, biochemists and cytologists to continue their cooperative efforts in obtaining more insight in the role of these DNAs, in the functioning of the genetic apparatus and in the evolution of the eukaryotes.

H. W. J. van den Broek, Wageningen

Fox, J.E.; Jacobs, M. (eds.): Molecular Biology of Plant Growth Control. Proceeding of the ARCO Plant Cell Research Institute – UCLA Symposium held in Lake Tahoe, CA, February 22–28, 1986. New York: A.R. Liss 1987. 427 pp., Hard bound £ 47.00.

"Molecular Biology of Plant Growth Control" consists of the proceedings of the ARCO Plant Cell Research Institute – UCLA Symposium held in Lake Tahoe, California, 1986, and covers recent advances in areas such as hormone-regulated gene expression with respect to plant growth control.

The book is divided into 6 sections dealing with the following themes: (1) Hormone-modulated gene expression, including chapters on auxin-regulated gene expression, gene expression in the barley aleurone layer, abscisic acid and ethylene-induced gene expression and others, (2) Methods to study the molecular biology of plant hormones, including a workshop summary on the application of mutants and monoclonal antibodies and a chapter on functional analysis of the T-DNA ONC genes, (3) Receptors and binding sites for plant hormones, i.e. auxins, gibberellins, ethylene and abscisic acid, (4) Second messenger in hormone action, i.e. calcium in the response of roots to auxin and gravity, (5) Plant pathogens and plant hormones, including hormone metabolism in *Pseudomonas* and plants transformed with *Agrobacterium rhizogenes* rhizogenes, (6) Light regulation of plant growth, i.e. with respect to chloroplasts and phytochrome.

The book is concluded by the keynote address on the hydroxyproline-rich glycoproteins.

Inevitably proceedings remain a concoction of presentations by many different authors, quite variable in presentation and the information provided, and invariable in the unbalanced treatment in some areas. The major part of the book is taken up by the sections on hormone-modulated gene expression and on receptors and binding sites for plant hormones, while the subjects of the remaining sections are clearly underexposed and haphazardly treated.

Nevertheless, this book provides valuable, sometimes detailed, information with regard to recent developments in molecular control of plant growth, with emphasis on the role of plant hormones.

G. Barendse, Nijmegen