

Book Reviews

Riley, R.; Bennett, M.D.; Flavell, R.B. (Eds.): A Discussion on the Meiotic Process. London: Royal Society 1977. 193 pp., 37 figs., 30 plates. Soft bound £ 17.60

The time-honoured English Academy proved to be able to attract the attention of a broad spectrum of the scientific community to actual scientific problems. Hot topics were presented in semi-public discussion meetings of high standards. Such a discussion was held on 10 and 11 december 1975 on meiosis, the compensation process for fertilization in the life cycle of both sexes and all organisms. The development of sexual reproduction in evolution depends on the value of meiosis in exposing the results of genetic recombination to natural selection. Meiosis lies at a cross-roads where processes of many kinds meet, as C.D. Darlington mentions in an introductory speech. In 15 discourses of most competent investigators in the field concerned gave an up-to-date exposé on many relevant aspects; the included discussions show not only the actual interest of a great number of the attendants, but also the still open and controversial problems. Those were already mentioned in the first view of the meiotic process by R. Riley and R.B. Flavell. They were also the only authors who mentioned explicitly the fundamental and still unsolved problem of the mitotic-meiotic switch, as well as the question of the dependence of the meiotic process on environmental effects. It is surprising that e.g. the work of Oehlkers and his many students was not mentioned in any one of the contributions. M.D. Bennett gave an excellent review on the temporal sequence and duration of meiotic stages. Again looking round the corner is the problem of the regulation of meiosis, the dependence of induction in hermaphrodite organisms.

The contrast of intra-chromosomal recombination in male and female meiocytes is discussed by H.G. Callan and P.E. Perry. Chromosome pairing and synaptonemal complex get a detailed treatment by B. von Wettstein, M.P. Maguire, L.F. La Cour, B. Wells, G.A. Dover and R. Riley.

The mechanisms of chromosome distribution get some new light from cell hybridization experiments, although conclusive proof is still missing (R.B. Nicklas). The investigation of the biochemistry of meiosis (H. Stern and Y. Hotta) still remains almost exclusively restricted to lily. The admirable cytochemical analysis of nucleic acids and enzymes involved restricts itself to chromosome pairing, crossing over and, perhaps marginally, to disjunction. In the experimental approach it is hard to exclude the further differentiation of the meiotic products into functional gametes. To include mutations with distinct disorders in the meiotic process would strengthen ideas on the succession of mediating metabolic phases, which are postulated. Genetics of meiosis gets some attention in *Drosophila* (D.L. Linsley, L. Sandler), and the genetical evidence of the interference on the course of meiotic chromosome pairing in plants is only slightly treated (G.A. Dover, R. Riley). The bridge to other cellular organelles, especially membrane systems and ribosomes, is built by H.G. Dickinson and J. Heslop-Harrison.

It becomes clear that during microsporogenesis changes in the organelle populations, in cycles of

dedifferentiation and redifferentiation are characteristics of the fundamental reconstruction of meiotic cells, but are not a prerequisite of meiosis. Meiosis in *Momyx mori* females is described by S.W. Rasmussen, which showed an extreme asynchrony within and between bivalents of synaptonemal complex formation. An apomictic yeast strain appeared to have a maintained meiotic prophase, but one of the two meiotic divisions is suppressed. A new model on recombination was presented by R. Holliday, which makes matching and stabilization of matching a single process.

This meeting showed that combination of fine structure analysis, genetics and following of biochemical parameters in synchronized material offers the potential perspectives for discoveries, which bring more light on the meiotic process.

H.F. Linskens, Nijmegen

Hughes, N.F.: Palaeobiology of Angiosperm Origins. Problems of Mesozoic Seed-Plant Evolution. Cambridge: Cambridge University Press 1976. 242 pp. Hard bound £ 9.50

The author of this book presents in a new light the old problem of the evolutionary origin of angiosperms. He suggests that in spite of the innumerable difficulties, a solution to Darwin's "abominable mystery" is entirely possible. This is because several great developments in the last two decades in the study of fossil pollen have made a truly interdisciplinary approach possible from both geology and botany, whereas the previous trials have been predominantly botanical.

This is an up-to-date survey of the newest information presented by a prominent palaeontologist in an easily readable book. It is particularly useful for breeders, plant growers, and other workers in specialized fields who have no easy access to the chaotic number of original publications outside of their own field.

In six chapters Hughes reviews available information on the early Mesozoic floras and faunas, fossil evidence, current theories on angiosperm origin, the crustal plate movements, and continental drift. Hughes suggests that none of the so far known pre-Cretaceous fossils represent angiosperms. True angiosperms might have appeared in early Cretaceous, somewhere between Barrenian and Albian, about 120-130 million years ago.

In spite of his interdisciplinary project, Hughes still remains faithful to his beloved palaeontology and palynology, which he treats skillfully. On the contrary, extensive literature on the floral evolution and pollination ecology is scarcely cited and fossil imprints of flower types, except a *Magnolia* petal, are not mentioned. Parallel to the intensive study of fossil pollen during the last two decades, several sensational discoveries were also made on the sensory physiology of pollinating insects that have changed our basic concept on the origin and evolution of flowering plants. Without pollinating insects, birds, and their "zielbestrebte" selection pressure on the floral evolution, we would not have flowering plants as we see them today. Even so, Hughes' book remains an

important compendium on the palaeobiology of angiosperms, until the new information on the floral evolution and pollination ecology is incorporated into the interdisciplinary concept of angiosperm evolution.

E. Leppik, Beltsville (USA)

Sachs, L.: Statistische Methoden. Ein Soforthelfer.
3. Ed. Berlin-Heidelberg-New York: Springer 1976.
100 pp., 5 figs., 25 tabs. Hard bound DM 9,80

This practical booklet presents simple methods of modern statistics mostly in very clear recipes. The author tried to compose the recipes in such a way that they can be applied with a minimum of arithmetical trouble. The application conditions are well observed.

Four introductory chapters treat the foundations and objectives of statistics, average values, variability and frequency distribution and normal distribution. In 2 further chapters confidence intervals, classical tests for the mean, variance and relative frequency are treated. The concluding chapters discuss some aspects of the number of observations, correlation, regression and a quick method for comparing several mean values.

Unfortunately we missed important non-parametric methods, e.g. Wilcoxon's tests for one and two samples. The important theory of point estimation is only mentioned in one sentence. Instead methods of minor importance are described, e.g. 3 (!) different tests for the hypothesis $p = 1/2$ in paired samples of alternative data, as well as a combined test of independence in several fourfold tables. Tables in the text and a large unfolding table at the end of the book contain all numerical information required for the application of the methods treated in the book. But we missed a complete table of the normal distribution function.

In general it can be said that there are no crucial mistakes in the book. But in places the reader may misunderstand the terse text. For instance: from a sentence of section 7.3 one might wrongly arrive at the conclusion that the required number of observations for a test could be established from a table of critical values.

The author is not always consistent in his formulation, e.g. concerning the comparison of two mean values he states (p. 44) that the nullhypothesis (equality of means) is tested, but with respect to the median test (p. 70) he writes that it tests the inequality of the medians (e.g. the alternative hypothesis).

In spite of these minor shortcomings this little book may be a useful help for everybody conscious of the limitations of a recipe book.

Ph. van Elteren, Nijmegen

Ford, E.B.: Ecological Genetics, 4 Ed.
London: Chapman and Hall 1975. 442 pp., 12 figs.,
16 tabs. Bound £ 12.50

The fact that this textbook is published in the fourth edition is in itself a proof of its quality and the demand for such a book. The special value of *Ecological Genetics* is due to the matter that the author is an expert in this field for more than 50 years (the book was planned in 1928) and mainly deals with experimental fieldwork in the natural surroundings of

the organisms partially combined with laboratory research.

The contents are "Numerical Changes in Animal Populations", "Genetic Drift and the Founder Principle", allopatric and sympatric evolution, the different forms of polymorphism (about 200 pp), mimicry, melanism, "Isolation and Adaptation". Ford discusses some forms of polymorphism hitherto insufficiently explained to be based on the effect of "switch-genes" or "super-genes". As the author himself is a zoologist he preferentially uses zoological objects. That will be possible because he wants to illustrate principles but not to write a compendium. As many of the described experiments were carried out or seen in progress by the author himself, completed by personal information of colleagues, it is written in a very interesting manner, so that it will be a pleasure to read.

For all scientists interested in population genetics, evolution, ecology, or quantitative genetics the book will give some remarkable facts. In the first line the genetic and ecological factors that influence the evolution are described whereas the ecological conditions important for plant breeding are mentioned only briefly.

E. Günther, Greifswald

Kiefer, J. (Ed.): Radiation and Cellular Control Processes.

Berlin-Heidelberg-New York: Springer 1976. 321 pp.,
176 figs. Bound DM 72,--

This book contains the proceedings of a conference on Radiation Biology held at the Strahlenzentrum der Justus Liebig Universität, Giessen, Germany. The conference was aimed at discussing fundamental aspects of modern radiation biology. Over the years, radiation research has developed into a powerful tool in the unraveling of details of many regulation processes in cells. A large number of these processes can be differentially attacked by radiation when the right conditions are applied. This sometimes gives insight in the interactions of the disturbed mechanisms. Other cellular activities such as repair of radiation damage can only be studied after irradiation. The contributions to this conference, which have been very carefully and rigorously selected, are grouped in three chapters: I. Radiation and metabolic key processes; II. Repair and recovery; III. Cell division and differentiation. Not all papers are concerned with radiation research. Some of these, especially in Chapters II. and III. present basic details about the repair systems and about the molecular biology of cell division, which have not been obtained by radiation studies. They nevertheless fit perfectly into the picture.

The majority of studies presented here have been carried out on lower organisms, especially bacteria and fungi. The number of papers on yeast is remarkably high. The rapid progress made in radiation of biology is well documented in this book; the radiation technique emerges from it as a very selective and sophisticated instrument for the induction of subtle changes in cellular metabolism and its regulation.

The book is recommended to every biochemist and molecular biologist who wants to know what type of results can be obtained by application of this technique. It possibly may provide him with a new approach to his research project.

A.F. Croes, Nijmegen

Mayr, E. : Evolution and the Diversity of Life. Selected Essays.
Cambridge, Mass. : The Belknap Press of the Harvard University Press 1976. 721 pp. Bound £15.00

At a time when the speed-reading syndrome is spreading through the behavioral repertoires of scientists, and when computerized lists of titles and key words are dominating our information intake, it is a relief, once in a while, to get one's faith restored in absorptive reading. Mayr's collection of essays is eminently suited to do this. It brings together a wide variety of writings spanning a lifetime of research by one of the truly holistic biologists of our time. The 47 essays, chosen from among the more synthetic and theoretical papers, are grouped in nine chapters the titles of which may convey the breadth of the spectrum: Evolution, Speciation, History of Biology, Philosophy of Biology, Theory of Systematics, The Species, Man, Biogeography, and Behavior.

Should one edit such papers and add explanatory comments? I suppose this is a perennial dilemma confronting an aging scientist when re-issuing his earlier prose. Personally I find it unnecessary, in fact disturbing, to insert recent references in an essay from fifteen years back. It is like adding some jet contrails to a Tintoretto sky to make it more relevant. Retrospective explanations may be illuminating, too, but are never retroactive and will at best be viewed as another time-bound perspective, reflecting the uniqueness of the moment and its ingredients. It is one of the attributes of classical papers, perhaps the crucial one, that they seem to age gracefully. Several of Mayr's essays prove the point. Ad fontes!

R.F. Stettler, Seattle

Tedeschi, H. : Mitochondria: Structure, Biogenesis and Transducing Functions.

Wien: Springer 1976. 164 pp., 18 figs. Bound DM 89,--

The monograph includes chapters on structure (18 pages), assembly (38 pages) and transducing functions of mitochondria (52 pages) as well as a bibliography (50 pages, about 1200 references) and a short subject index. The book was completed by October 1974, but several sections were attempted to update by November 1975. It is carefully produced and makes aesthetic enjoyment. For the reader, who is not as the referee specialist in this field but deeply interested in it since working in a neighbouring area, the monograph is not easily or even pleasantly readable because it is a condensed, handbook-like compilation of data without presentation of background information and interconnecting ideas. On the other hand, the information given in the special chapters are frequently not detailed enough or are even earnestly incomplete and faulty (e.g. under Na⁺, K⁺-ATPase) to allow an evaluation by the reader. The chapter on transducing functions involves one of the most complete compilations of arguments against the correctness of the chemiosmotic hypothesis of oxidative phosphorylation, but a constructional viewpoint is not presented by the author. In general, the book is not well organized and not fairly balanced with respect to the selection, integration and evaluation of the available data. Hence, the referee feels that the author missed his aim to present a comprehensive and coordinated review. The monograph may be useful as a data and reference source.

K.R.H. Repke, Berlin-Buch

Thompson, E.H. (Ed.) : International Symposium on Marine Natural Products. Plenary lectures presented at the International Symposium, Aberdeen, Scotland, 8-11 september 1975.

Oxford: Pergamon Press 1976. 48 pp. Bound \$ 8.00

This is a collection of 5 reprints, first published in Pure & Applied Chemistry vol. 48, no. 1, bound in a hard cover. Selected topics of a rapidly growing area of wide interest are treated by experts, most of the laboratories active in this field throughout the world were represented. Natural product research on Australian marine organisms is reviewed and the structure of many secondary metabolites is reported. A systematic search for constituents of marine sponges has yielded over 100 new compounds, closely related to sesquiterpenoids. This type of compound was also found in soft corals and their biological origin, distribution and their biological significance was described. The most striking marine natural products are the halogenated ones, which are based on bromine ion initiated cyclisation reaction. Their biomimetic synthesis is treated. Most interesting from the biological point of view are the toxins of sea hares, gastropod mollusks of the family Aplisiidae. Under the influence of ethanolic acetic acid the aplysiatoxins rearrange with retention of all C atoms. After all: a reprint collection, which is not necessary to buy for libraries with a standing order of the journal, where they can be found. H.F. Linskens, Nijmegen

Moore, D.M. : Plant Cytogenetics.

London: Chapman & Hall 1976. 64 pp., figs. 69. Soft bound £ 1.50

The series is conceived to give a short but authoritative introduction to those areas of modern biological research, which are either not dealt with in standard introductory textbooks or are not dealt with in sufficient detail to go on from them to read scholarly reviews with profit, assuming that the reader has read and remembered a textbook, and to go on to read more detailed reviews and articles to which reference is made. It might be wondered why animals and plants have been considered in separate volumes. The author gives two reasons for this: There is now so much cytogenetical information on plants and animals that any attempt to even outline the subject in a slim volume would result in an unacceptable superficial treatment. Secondly, whilst acknowledging the common cytogenetical and chromosomal endowment of all organisms, stemming in part from the virtually ubiquitous material, DNA, it is sometimes forgotten that plants and animals possess different evolutionary opportunities and, in many instances, have utilized their common genetical and chromosomal endowment to adopt different evolutionary strategies which are reflected in their patterns of variation. Thus, those features of the structure and behaviour of chromosomes are outlined, which still encompass the central enigmas of cytogenetics, and are then continued by looking at various chromosomal mechanisms found in plants and their role in generating and canalizing variation. The volume contains 6 chapters: The beginning of cytogenetics, chromosome structure, division and behaviour, chromosome changes in structure and number, chromosomes and plant evolution. It is written in an excellent comprehensive and compact style and illustrated by many representative examples to encourage the reader to consult the original sources

which permit an appreciation of the work that has already been done and of the great task still ahead. It may, however, be mentioned that scarcely a paper is cited, which is not written in English. Nevertheless, the volume can be recommended as an excellent guide book for graduate students as well as for undergraduates in their final year.

Gertrud Linnert, Berlin-Dahlem

Melchers, F.; Rajewsky, K. (Eds.): The Immune System. 27. Colloquium der Gesellschaft für Biologische Chemie, 29. April - 1. Mai 1976 in Mosbach/Baden.

Berlin-Heidelberg-New York: Springer 1976. XII, 299 pp., 104 figs. Cloth DM 72,--

Immunology achieved a tremendous progress in recent years both in fundamental knowledge and in clinical application. The structural basis of antibody variability is now understood in principle and the interrelationships between amino acid sequence and three-dimensional structure on one side and the function of immunoglobulins on the other become rapidly translucent. The genetic basis of antibody diversity, predominantly the question of how the structural genes code for antibody molecules and how they are arranged and expressed in the genome of the immunocompetent lymphocytes, is still unresolved, but is vividly under investigation and will presumably be clarified in the near future. The world of the lymphocytes became an attractive subject of research not only for immunologists but also for biochemists, molecular biologists, electronmicroscopists, embryologists and others, who initiated complex research programs about recognition of antigen, triggering of cell division and regulation of lymphocyte differentiation.

To the fundamental achievements in this field belongs the discovery of the origin and the functions of the two cell populations, the T and B lymphocytes;

the T cells being responsible for the cellular immunity and for the regulation of the functions in the T and B cell compartment and the B cells representing the precursors of the antibody producing cells.

The 27th Colloquium of the Gesellschaft für Biologische Chemie, which was held from April 29th to May 1st 1976 at Mosbach/Baden (FRG), made full allowance to the rapid progress of the field. On this basis, the Editors are able to present an extremely useful, comprehensive book, with a reasonable price, of our present understanding and perception of the immune system. The volume includes 23 lectures by internationally wellknown investigators and is subdivided into five major sections: 1. Antibody structure; 2. Antibody structural genes; 3. Immunocompetent cells; 4. The major histocompatibility complex and cellular recognition; 5. General aspects of the immune systems.

The volume provides an exciting overview and gives deep insights into this rapidly expanding field. In less than 300 pages the reader becomes informed about the newest achievements in the investigation of the spatial structure of immunoglobulins, the mechanism of antibody action, the genetics of antibodies, the immunoglobulin mRNA and the differentiation of immunoglobulin genes as well as the life histories of B and T lymphocytes, the mechanisms of their activation and differentiation, the functions of macrophages, the network of lymphocyte interactions and the structure and biological activities of histocompatibility antigens.

The Organizers and Editors can be congratulated upon this successful symposium and its outcome. This report is really a concentrated treatise about modern immunology and can therefore not only be recommended to specially interested experts but also to all those working in biology and medicine, as well as to science and medical students for expanding their knowledge in a field coming into age and demanding increasing attention.

E. Hofmann, Leipzig