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# Book reviews

**Perelson, A.S.; DeLisi, C.; Wiegel, F.W.: Cell Surface Dynamics, Concepts and Models, Receptors and Ligands in Intercellular Communication, Vol. 3.** New York, Basel: Marcel Dekker, 1984. XVII + 550 pp., several figs. and tabs.

This monograph is a turning-point in the history of cellular biology though the introduction of biophysics among its problems. This is a way of reasoning based on the research of mathematical concepts (theoretical and experimental) which leads to the elaboration of numerous and adapted membrane models. The result is an improvement in the understanding of problems set by the analysis of dynamics during the last decades.

A noticeable analysis states the determining influence of phase transitions on the physical and structural properties of the lipids which form the bilayers (synthetic membranes and biomembranes), their dynamic properties and those of the bilayer in which the impact of lipidic aggregates intervenes, different interactions (water – lipids), conformation and distribution of lipidic polar head-groups, proteic mobility (fluidity of transitions), and "zipering" – all which make the ligand – receptor binding possible. The authors have not rejected the difficulties shown by the analysis of cellular dynamics. On the contrary, their approach has led to a modelization adapted to the crucial problems shown by the biological studies. This comparison is presented in the 2nd, 3rd, 4th and 5th parts of the monograph. This modelization is based on mathematical concepts, a physical and biological methodology (X-rays, electron microscopy, DSC, NMR, fluorescent labelling). The understanding is made easier by the many illustrations (tables), by simple and accurate schemas, particularly those which put the models in concrete form. The bibliography is divided into parts. Only one negative remark can be made about the time lag between the bibliography and the publication of the book.

In using this book, biophysicians and biologists concerned by the here-above mentioned fields of application can meet and progress through a community of reasoning and language.

Pr. D. Coustaut, Lille

**Rollinson, D.; Anderson, R.M. (eds.): Ecology and Genetics of Host-Parasite Interactions. Linnean Society Symposium Series, No. 11.** London, Orlando, San Diego, New York, Toronto, Montreal, Sydney: Academic Press 1984. IX + 266 pp., several figs. and tabs.

This well-edited book contains fourteen articles based on contributions to an international congress in 1984 on the impact of parasite-host interactions on their respective populations. This volume is of importance not only to biologists but especially to those who are interested in infection epidemiology – medical and veterinarian – ("Parasite" is interpreted in its widest sense, including viruses, bacteria, protozoa, fungi, parasitic helminths and arthropods).

The book emphasizes the need for a synthesis of knowledge in disciplines varying from fundamental biology, genetics and immunology, to ecology and mathematical epidemiology. Especially when based on field observations, this might lead to a better understanding of the often still enigmatic, dynamic relationships between populations of parasites and their hosts. This above approach might be basic for the development of scientifically reliable strategies for immunization campaigns and "biological control" operations.

The nature of the contributions is varied and therefore a mutual comparison is difficult due to the differences in approach of the various subjects: the relationship in fish with ecto- and endoparasites; aspects of experimental and natural infections with helminths and protozoa in man, animals and intermediate hosts; bacteria and phages as models for the study of ecology and co-evolution of parasite as well as host; and the theoretical aspects of population dynamics and population genetics in these associations. The phenomenon that many parasites live in a commensal relationship with their natural host, as illustrated in the field observations by Gill and Mock, (Trypanosoma infected newts) is especially impressive.

This book offers an excellent starting point for the planning of biological and epidemiological observations of populations in the field and especially also for further pure scientific research in this field, where so many basic disciplines come together.

J. Meuwissen, Nijmegen

**Shivanna, K.R.; Johri, B.M.: The Angiosperm Pollen, Structure and Function.** New Delhi, Bangalore: Wiley Eastern 1985. XV + 374 pp., several figs. and tabs.

During the last 20 years, there has been an explosion of knowledge on pollen biology. In the book "The Angiosperm Pollen: Structure and Function" one can find the major aspects of studies on the structure and function of angiosperm pollen. Apart from the chapters on pollen development, pollen sterility, pollen viability, storage, pollen germination and pollen tube growth, a wide coverage has been given to the discussion of self- and interspecific incompatibilities and techniques to overcome the incompatibilities. This book is comprehensive in its scope and up-to-date in its information and should be considered as excellent in its approach to the studies of pollen biology as "Pollen: Biology, Biochemistry, Management" (Stanley, R.G. and Linskens, H.F. 1974).

As a text book "The Angiosperm Pollen: Structure and Function" is a good choice for the graduate students and a excellent reference book for research workers in botany, agriculture, forestry, horticulture and plant breeding.

Zhang Hong-qi, Beijing

**Campos-Ortega, J.; Hartenstein, V.: The Embryonic Development of *Drosophila melanogaster*.** Berlin: Springer 1985. 227 pp., 85 figs., 112 tabs.

This monograph of Campos-Ortega and Hartenstein on "The Embryonic Development of *Drosophila melanogaster*" appears at just the right time. This documentation of the main features of our present knowledge will be of great value to all those working in this field or desiring to obtain an overview of its present state.

I believe that the most important feature of this book is its excellent coverage of early development: whole mount pictures and histological sections of the different developmental stages are handily used and these are accompanied by

numerous explanatory and schematic drawings. The high quality of the photographs surpasses all prior documentations and will be the reference material for further studies and descriptions.

The various sections of the book include, after an initial summary of *Drosophila* embryogenesis, a detailed description of the early developmental stages, which extends earlier descriptions and introduces stages in addition to those defined by Imaizumi and Bownes. The next chapter gives a detailed description of histogenesis and organogenesis, which is organized according to organs. Though this is, for practical reasons, probably the best way of presentation, it would be useful to have a least a summary of the relationship of the various tissues with the three germ layers. Further chapters describe the patterns of embryonic cell divisions, morphogenetic movements, cephalogenesis, selected aspects of segmentation and the fate map of the blastoderm. It is not surprising that the authors pay much attention to the nervous system in many of these sections. The descriptions of segmentation and the fate map seem rather incomprehensive and do not attain the degree of precision as do other parts of the earlier topics. In view of the multiplicity of the subjects, however, it seems, unfair to criticize this as a shortcoming. It seems preferable to have the outlines of the book in the present form. This will allow gradual completion of the various chapters, possibly by additional coauthors, in later editions.

In my opinion, this kind of monograph is what is really required for research in *Drosophila*. Reviews as published in the "Ashburner" series are in general more of a short-living character. The treatment of directed topics, as in the book of Campos-Ortega and Hartenstein, is appropriate for long-term usage and can also conveniently be revised with new developments in knowledge. This book will be an essential course and handbook for anyone interested in the developmental biology and morphology of *Drosophila*.

W. Hennig, Nijmegen

**Ashburner, M.; Carson, H.L.; Thompson, J.N.Jr. (eds.): The Genetics and Biology of *Drosophila*, Vol. 3e.** London, Orlando, San Diego: Academic Press 1986. XVIII + 548 pp., several figs. and tabs. Hard bound $ 99.50.

This volume contains chapters 34 to 40 of the Genetics and Biology of *Drosophila*. About 25% of its contents is dedicated to various kinds of indices (author, subject, taxa, genetic variations, and two cumulative indices) covering all 40 chapters of this series. This may be an indication that the final volume is now available. Arriving at a final judgement on the entire edition will probably only be possible after a considerable period of time has passed when it will become evident which chapters have retained sufficiently informative value or have induced new lines of research. Compared to the relevance of the various papers collected by Demerec or the information provided by Patterson and Stone, the percentage of chapters from the present series achieving this scientific level will be low. Too many of the chapters are written as short-living reviews rather than as critically evaluating and judging contributions. Although for some chapters such an approach might have been exceedingly difficult because of the rapid progress of the field, there were areas where a more intense approache would have been valuable. A good example of this situation from the present volume is the accumulation of data on the chromosomal properties of species groups. Although molecular data on the same problem, the evolution of the species groups and evolution within the groups are provided, no integration of the data is achieved. The editors explicitly recognize that it is difficult for the reader of the various chapters to "to traverse the boundaries of the species groups". They "hope that this collection of reviews will inspire someone to undertake the reduction of these extraordinary biological data". I regret that such an integration of the data has not been induced in the context of this volume. A lost chance!

This situation raises the question whether the concept of "The Genetics and Biology of *Drosophila*" in the form realized was the most suitable concept. I would suppose not. A series of monographs, as, for example, recently provided by Campos-Ortega and Hartenstein on the embryonic development of *Drosophila melanogaster*, had in my eyes been preferable. A major advantage of monographs: the possibility to select those of particular interest to the researcher for his or her own library. The price of the "Ashburner" is inhibitive to many colleagues to have it complete on the private shelf. A series of monographs had also probably induced a more careful preparation of the various sections and it would have certainly induced a more integrative approach. Of course, such criticism is easy to make afterwards and may be not entirely fair.

Volume 3e covers mainly evolutionary aspects: chromosomal evolution within the family *Drosophilidae*, aspects of chromosomal polymorphisms from the view of the population geneticist, and protein evolution in the genus *Drosophila* and the Sonoran desert *Drosophilidae*, which besides the Hawaiian species (covered in an earlier volume) are particularly suited for studies of their ecology. Though the study of parasites is potentially of high interest for evolutionary considerations, the chapter on parasitic wasps of *Drosophila* shows that actual knowledge of this topic is insufficient to allow extensive discussion of ecological and evolutionary implications. Even though this chapter might be suited to induce extensive studies of this kind, it appears somewhat misplaced and unexpected in this volume. This emphasizes more generally that the various volumes are only superficially composed with respect to certain topics, but in their composition probably dependent on the arrival of requested reviews. The final chapter of vol. 3e updates the Catalogue of the World's *Drosophilidae:* an appropriate completion of this series. To achieve a general updating and integration of the various topics treated: Why not consider comprehensive supplementary issues, carefully edited according to distinct fields and according to the progress made in studies of these fields?

W. Hennig, Nijmegen

**Cold Spring Harbor Laboratory Symposia on Quantitative Biology. Molecular Biology of Development, Vol. 50.** Cold Spring Harbor: Cold Spring Harbor Laboratory 1985. 920 pp., several figs. Hard bound $ 140.–.

The 50th Cold Spring Harbor Symposium on Quantitative Biology was dedicated to probably the most rapidly advancing and, because of its richness in new perspectives, simultaneously most fascinating field in modern biology, the Molecular Biology of Development. After this symposium it is even more clear that the breakthrough in understanding the molecular mechanisms of development has not yet been achieved. But it is also clear that the experimental techniques, genetics, molecular cloning, transplantation techniques, immunology etc. are available which will finally permit a deeper insight into one of the major problems in biology – the ontogenetic development of an organism – and even more so, its evolutionary development, which is closely linked to ontogenesis. Of course, this idea is an old one in developmental biology but it has become more clearly emphasized by the recent developments.

It is not surprising that the crucial biological systems, which are treated in the more than 100 contributions, are *Drosophila,* mice and *Caenorhabditis.* Classical systems in developmental studies, such as amphibians and sea urchins, are scarcely represented; neither are plant systems. Some contributions deal with *Dictyostelium,* yeast or with the developmental capacities of cancer cells. The volume reflects probably rather precisely the relative distribution of actual experimentation in the different fields of molecular and developmental biology. This does not exclude that a disproportionate amount of space is dedicated to certain topics, as for example, homoeotic genes. There is little doubt that such genes are involved in basic regulatory processes in development and that they are most likely the first regulatory genes which may be understood in their function but that two out of 13 sessions are dedicated to homoeotic genes implies a lot of repetition.

Rubin stated in the splendid summary which he gave after the meeting that the gap which separates genetics and experimental biology has now been bridged. This is certainly true in the sense that the technical possibilities now permit genetic and molecular data to be related. But is this sufficient? This participant of the symposium left Cold Spring Harbor with the feeling that one very important aspect was missing: what is developmental biology? It is obvious that this field of biology has not yet found its basic concepts. It cannot be questioned that the studies of gene structure and (differential) gene expression as conducted in most laboratories supposedly working in "developmental biology", are insufficient. What about cell interactions or self assembly processes? Little attention has been dedicated to such questions and even classic knowledge of developmental biology is only gradually taken into consideration. Too many years – and generations of students – have passed where this knowledge has not been well retained. Now the progress in the molecular techniques requires this knowledge to find appropriate applications. It is an old problem in biology: the purely descriptive character of many fields in biology was inhibitive to attract inventive students to care about these fields since they were more attracted by the "precise" biological disciplines. This prevented many scientists from becoming aware that biological processes cannot easily be simplified and that their understanding requires knowledge of the width of phenomena in living organisms. This is only today gradually being recognized and the 50th Symposium volume provides ample opportunity to realize this situation.

No doubt the volume will have at least as much importance for the development of biology as earlier volumes for their respective fields. It is impossible to summarize details of the lectures in this review. Probably one of the most relevant news in the meeting was the conclusion from Solters experiments that both parental genomes are required during the early development in mice and that they are differentially expressed. Thus, developmental processes are, even during the first period of cellular differentiation in a growing organism, determined by long term regulatory events deposited at the genomic level. Very intriguing progress has also been made in developmental neurobiology. Unfortunately this field was only marginally presented at the symposium. These two remarks on topics treated during the symposium may examplify what the volume contains: selected aspects of a rapidly evolving field of biology which will stimulate anyone being exposed to them. Thus, the symposium is likely to fulfill its primary task: supporting the advancement of developmental biology and the search for an appropriate conceptual framework to understand more details of cellular development.

W. Hennig, Nijmegen

**Klingmüller, W. (ed.): Genforschung im Widerstreit (2. Aufl.).** Stuttgart: Paperback der Zeitschrift Naturwissenschaftliche Rundschau 1986. 209 pp., 44 figs. and 6 tabs. Soft bound DM 32,–.

The second edition of this well-acclaimed book was both long expected and necessary: especially in the field of modern genetics there has been much (and essential) progress since 1979. All the original articles have been completely rewritten and the make-up (figures, etc.), in my opinion, improved. The main areas of modern genetical research are covered by excellent comprehensive reviews: microbiology (Klingmüller), cell biology (Hahn), animal viruses (Sauer), and higher plants (Hess). In addition, sociological, theological, and administrative aspects are discussed (Amelung, Eibach, Binder); there are several controversial arguments but (and this is a main advantage of this work) they are dealt with in an objective and unemotional manner. This book came out just in time, and it hopefully will help to bring the discussion around modern genetics back to an objective basis. Because of its moderate prize it will certainly soon be as widely distributed as the first edition.

P. Tudzynski, Düsseldorf

**Bliss, F.A.; Dinus, R.J.; Dudley, J.Q. (eds.): Plant Breeding Reviews, Vol. 3.** Westport (Conn.): AVI Publ. Co. Inc. 1985. XII/442 pp.

This third volume of the new series maintains the same high standards which the first two volumes delivered. Nine review articles are preceded by an dedication to Glenn Williard Burton, the famous grassbreeder who has more than 600 papers to his career (although speaking honestly most of them are 2 or 3 page reports). Half of the volume is occupied by a treatise of D.H. Wallace on the physiological genetics of plant maturity, adaptation and yield. The chapter on advances in chemical hybridization is interesting because of the fact that for the first time so far as I am aware the term gametocide is submitted to a critical discussion. The author, D.H. McRae, prefers the use of the term "Chemical Hybridizing Agent" (CHA) for chemicals which suppress pollen formation a term which has the advantage that it can be used even in situations where clear cut male/female selective sterility has not been demonstrated. General topics such as protoplast fusion for crop improvement, the use of haploids in barley breeding and the mechanisms of formation and utilization of diploid and haploid gametes lead over to the more classical approaches of the breeding of *Coleus,* tall fescue, and semidwarf soy-beans. Finally, a most interesting chapter on the plant introduction and quarantine system in the US gives insight into the principles and regulations applied to protect the domestic sources of plant germ plasm from the importation of germplasm from foreign countries. No doubt those are necessary for reducing the pest risk, as long as they are not improperly applied. The new problems surrounding the introduction-quarantine procedure for tissue culture are mentioned. The volume, again sponsored by 4 national American breeders' societies, is very well edited and should be read with attention by breeders all over the world.

H.F. Linskens, Nijmegen