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Book Reviews

Genes. By B. Lewin. Chichester: John Wiley. 1984. xiii + 715 pages. Cloth £27.85. Paperback £13.95 ISBN 0 471093165

In its structure this excellent book is a third-generation text and illustrates quite beautifully the rapid progress made recently in genetics. In the beginning, first-generation textbooks were concerned with concepts, crosses and chromosomes. Some of the earliest of the first generation – for example, Sturtevant and Beadle's *An Introduction to Genetics* – remain as classic examples of clear, precise, scientific writing. Second-generation genetics books were born out of the discovery of the structure of DNA and were structured differently. In these, one or more early chapters were devoted to the nature of the genetic material. Classical genetic experiments returned in later chapters when they could be interpretated in the light of the structural information about DNA and its organization. We have now arrived at the third generation, in which the conceptual side of genetics has been largely displaced by 'reverse genetics', whereby access to the phenotype of the DNA can be obtained directly. Lewin writes in the preface to his book '*Genes* is simply about genes, recognizing what amounts to a new field whose extraordinary progress has all but overwhelmed the traditional discipline of genetics.' This book is not, then, a genetics book in the traditional sense, which is why it is accurately entitled *Genes*; it is of the new generation and will surely stand as a magnificent example of its type.

In his style the author is very successful in providing detailed experimental evidence to support a particular idea without disrupting the flow of the narrative. This uninterrupted flow is achieved by omitting detailed references in the text. Instead, key references are provided at the end of each chapter. A short description of each key reference helps the reader to choose those that are relevant. I particularly like the way in which hypothesis and observation are clearly separated. Any reservations about an hypothesis, arising perhaps from a conflict in the data, are clearly noted and described.

In its content, the book is comprehensive and covers all aspects of genomic analysis. It is divided into 10 parts, totalling 39 chapters, each chapter is subdivided into headed sections. There is also a comprehensive index. An outstanding feature of the book, which we have come to expect from American textbooks, is the quality of the illustrations, which are carefully designed and beautifully drawn. The book gives an account of developments in the revolution that has hit genetics with the advent of cloning techniques. Different facets of the progress of that revolution can be seen in the way in which different subjects are dealt with in the book.

Application of sequencing techniques results initially in a 'natural history' phase in which a description of a particular sequence is of considerable interest and is the objective of the experiment. This descriptive phase gives way to critical, hypothesis-testing experiments in which the biological significance of particular descriptions is tested. This book contains many examples, of which cloning centromere sequences is one, which show that the natural-history phase is suprisingly short.

When a problem has been tackled by both old and new genetic methods, then, as you might expect, this book does not give equal weighting to both approaches. So, the genetic analysis of the mechanism of recombination which led to the formulation of hybrid DNA models and to the idea that recombination events were initiated at specific places in the genome takes second place to the description of recombination intermediates visualized more directly.

Another aspect of the relationship between the old and new genetics can be seen in those topics where the new genetics has still to provide answers to some questions raised by the traditional approach. For example, McClintock, in describing controlling elements, emphasized the important role which she considered they had in the control of normal development. Although in particular cases, such as yeast mating-type switch, the role of movable sequences in gene regulation has been recognized, it remains to be seen whether or not controlling elements do play a major role in development. The approach to controlling elements adopted in this book emphasizes their known mutational role, but remains agnostic on their putative developmental role. In this respect the approach contrasts with Federoff's review in *Mobile Genetic Elements* (ed. Shapiro), which stresses the McClintock view. It will be interesting to see whether the accumulation of new evidence will require a change of emphasis in future editions.

I do have minor criticisms of the book. Chapter 1 is not a very sound chapter, perpetuating some common errors and ambiguities, and students would be advised to start reading at chapter 2; there are also a number of typographical errors; but these criticisms should be considered in the light that all reviewers like to think themselves critical! – I looked hard for faults but at the finish found I had enjoyed a very readable and thoroughly recommendable book.

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Lambda II Monograph 13. Edited by ROGER W. HENDRIX, JEFFREY W. ROBERTS, FRANKLIN W. STAHL and ROBERT A. WEISBERG. Cold Spring Harbor Laboratory, Cold Spring Harbor, NY 11724. 1983. About 700 pages. Cloth: U.S.A. $68, elsewhere $81.60. ISBN 0 87969 150 6.

Due to a happy conjunction of circumstances, this is a quite outstanding book, which should find a much wider readership than its 1971 predecessor, the now classical monograph: *The Bacteriophage Lambda*. These circumstances include the remarkable sophistication of the control system which channels lambda into a lysogenic or lytic cycle, the fact that the last thirteen years have seen the solution of most of the major problems left by the 1971 volume and have begun to focus attention on the interactions of regulatory proteins with their DNA sites of action, the many ingenious techniques used to solve these lambda mysteries, and finally the generally high quality and clarity of the articles in the book, which make it a pleasure to read.

The 1971 volume was a half-and-half mixture of state-of-the-art reviews (and the art was still difficult to grasp for outsiders) and papers on current research. Lambda II differs in being essentially a series of reviews in depth of current understanding of all aspects of lambda biology, plus additional papers aimed at the beginner, the evolutionist and the biotechnologist, and ending with 141 pages giving the complete (annotated) DNA sequence of the 48514 base pairs of the phage. Much additional information is also given in appendix tables, including a molecular map and a list of the restriction sites for 96 enzymes. In general, these articles are written with the not-so-expert reader in mind, though the improved understanding of all aspects of the lambda lifestyle certainly makes the reader's task easier.

For the beginner, Arber's article, 'A beginner's guide to lambda biology', tucked away near the end of the book, is very clear and will help in following the more difficult review articles. I also think that 'Experimental methods for use with lambda', by Arber *et al.*, is a valuable inclusion, taking trouble to explain the basis of particular technical details. Murray's article on molecular cloning with lambda derivatives I found difficult, and think this large and highly technical subject needs more space, for the benefit of those who