with data. Whether an algebraic commentary is to be seen as the nourishing root, the supporting trunk, the protective bark, the flower, or the fruit, is likely to depend on the reader's background and established prejudices.

Notwithstanding the stated aim of a simple account for the non-mathematical biologist, the reader needs either knowledge of integrals, exponentials, differential equations, and matrices, or a willingness to take these on trust. Sometimes the formulations are needlessly complex, as in handling the symmetrical relationship of dominance and recessivity without using both p and q when $p+q=1$. This complexity has led to a misleading and erroneous crossover of the lines on figure 1.3. Some other graphs are difficult to follow, and rather roughly drawn. A computation leading to negative gene frequencies could have been omitted, or explained in more than three lines (p. 181).

The book provides a useful numerical *vade mecum* to an extensive anthology of observations and experiments, mainly on butterflies, moths, and snails, and discusses various parameters of selection. However, due to the force and lucidity of E. B. Ford's 'Ecological genetics', the author has attempted a difficult task, and a calculus which restricts organisms to one locus, two alleles, and a large drift-free population undisturbed by inbreeding may seem of more value as a deductive than as a descriptive system. The author's scope is further limited by the nature of big effects for, by definition, these can be captured without weaving gossamer traps from differentials and variances. The use of gene, allele, and locus as synonyms adds a further simplification at the cost of reality.

One serious logical trap into which Dr Cook invites further victims is the carrying out of significance tests to see if an effect is 'real', followed by an estimation procedure to see how big it is (chapter 9). This is following in distinguished footsteps, but is nevertheless a most serious and evident source of bias, guaranteed to make big effects bigger. The evidence for substantial selective forces hardly needs the help of concordant sampling errors.

The production is good; the paperback good value, and, however difficult the challenge, a numerical treatment of a field rich in prose, intuition, and data is to be welcomed. The more advanced mathematical treatments are rarely germinal to the ideas, and can be bypassed without making the book useless to those biologists who prefer to restrict themselves to methods they can understand. For those who feel more secure with numbers than words, the book provides a good introduction well integrated with reliable data. There is a useful genetical and numerical glossary.

J. H. EDWARDS

Molecular Genetics. An Introductory Narrative. By Gunther S. Stent. (Pp. xii+650; 282 figs. £5·10.) Reading: W. H. Freeman. 1971.

This very readable book is the result of 16 years' lecturing at the University of California, stretching over the whole period of the rapid development of molecular genetics. It is neither a finished didatic text, like Watson's 'Molecular biology of the gene' nor a scholarly history of the discoveries of the last 25 years, but a narrative, proceeding logically step by step from problem to problem and including just enough biographic and collateral material to prevent readers' fatigue. A happy medium is also struck in the description of experiments, which is neither too detailed for an introductory book, nor on the other hand too superficial. The references are mostly to books and review articles.

Present molecular genetics has been developed by men trained in chemistry and physics working on such prokaryotypes as plagues, viruses, and bacteria and only little by work on protein in structures of eukaryotes, including mammals and man. The text is accordingly predominantly concerned with experiments on lower organisms. In the last, 21st, chapter entitled 'Ramifications' an attempt is made to redress this bias. But though the 34 pages devoted to the exercise are more adequate than 8 pages, which an earlier book by a molecular biologist devoted to the same purpose, this last chapter is by far the weakest part of the book.

However, hardly anybody, least of all a medical geneticist will read the book for the sake of this epilogue. For him the preceeding 20 chapters are indeed an excellent introduction to the kind of general genetics, which must form the basis of his man-directed studies and work.

H. KALMUS

Probability Models and Statistical Models in Genetics. By Regina C. Elandt-Johnson. (Pp. xviii+592; tables. £11·75.) Chichester: John Wiley and Sons. 1971.

This is not a book for the clinician or the biologist, but it should provide a useful reference work on statistical methods and their application for the statistical geneticist. It presents most of the conventional topics of quantitative genetics in a rather formalized mathematical manner, with definitions and theorems—and with an average of more than two formulae per page. The presentation of each topic is thorough with the assumptions, details, and steps all well explained so that the methods are easy to follow and understand. The methods of deriving the results, and the generality of the methods used, are stressed rather than using the shortest derivation for the simple case and accepting the generalization. The book differs in this respect from the book of Crow and Kimura (1970)—which covers much of the same ground—and in the fact that the biological implications of the results are less well developed and discussed.

The book has 19 chapters, 7 of which are essentially on statistical methodology but with genetical examples and 12 chapters developing mathematical theory on genetics. There are two short appendices; on matrices and on maximization. The subject index is divided

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into genetical and statistical sections. Most of the examples used in the book are taken from human genetics. Moreover there are separate chapters devoted to special topics in human genetics such as segregation analysis (simple and complex), human blood groups, linkage analysis, histocompatability testing, and single-locus versus several-loci models. Each chapter has a series of problems for the student but unfortunately no results are given. Despite the size of the book (592 pages) the coverage of the field is not complete and some topics are discussed only briefly. For example the effects of genetic drift and small population size, assortative mating, mutation and selection in evolutionary genetics and the methods of analysis for quantitative traits are some important subjects which are treated rather briefly.

The book is well presented with very few errors, despite its complexity and size. Since much of the material presented is available elsewhere, it may not be an essential book for the statistical geneticist, but it should be a very useful reference text, especially for the statistical human geneticist. I have no hesitation in recommending it to anyone interested in these topics.

CHARLES SMITH

Cytoenzymology and Isozymes of Cultured Cells. By P. J. Melnick. Progress in Histochemistry and Cytochemistry, Volume 2, No. 1. (Pp. 77; 30 figs. DM. 44·00.) Stuttgart: Gustav Fischer. 1971.

This short book is essentially two reports of different aspects of the author's recent work on enzymes of cultured cells.

The first part deals with cytoenzymology, which is defined as the application of histochemical techniques to free-living cells. There is a clear description of how the many problems—such as finding conditions in which substrates are able to penetrate cell membranes and yet soluble enzymes and reaction products are prevented from diffusing out—were overcome. Activity in all 28 hydrolytic and oxidative enzymes studied was successfully demonstrated and our attention is drawn to two significant observations: firstly, that the product was almost always seen to be granular. If this is really an indication of the sub-cellular organization of these enzymes as the author speculates, a powerful new tool for the study of activity-structure relationships could become available. And secondly, that the extent of reaction is very variable in different cells of the same preparation. This would also be important if, as is suggested, it was found to correlate with the growth cycle of the cell. Even if these speculations are incorrect and the observations are simply due to the unusual conditions used and the technical difficulties encountered, the author has shown that enzyme activity can be consistently demonstrated in living cells. It is therefore likely that cytoenzymology will eventually become useful in the study of the effect of environmental and other changes on cell enzymes in conditions nearer to physiological than those more commonly used.

Though cytoenzymology may hold some distant promise, the more familiar subject of isoenzyme separations by gel electrophoresis, which is the theme of the second part of this book, is of more direct application. When the isoenzyme patterns for several of the 18 enzymes in each of the 5 cell lines studied are compared, they are seen to be quite different and, therefore, of use in cell line identification. The extension of such studies to many more cell lines will obviously be worthwhile.

This book is recommended to those doing experimental work in the fields discussed but the general reader will want to wait until the promises have been fulfilled.

R. B. ELLIS

Hereditary Sensory Radicular Neuropathy. By David C. Wallace. (Pp. 114; illustrated + tables.) Sydney: Australasian Medical Publishing Company. 1970.

Dr Wallace describes a large Australian family who have the condition where a distal sensory neuropathy, often involving the legs only, is associated with recurrent ulceration of the feet. The dominant form, present in this family, develops after puberty, is only slowly progressive, and is severer in males. As the author points out, the main interest in the family lies in describing the range of clinical manifestation that may result from the same mutant gene. The disorder varies from females who have no symptoms (but where sensory abnormalities will be detected by a medical examiner) to a male, with a distal neuropathy, both sensory and motor, mutilated feet from recurrent ulceration and osteomyelitis, and secondary amyloidosis. Useful radiological and pathological information are also given in this book and genetic data are adequately discussed. However, little that is new is revealed.

SARAH BUNDEY

Chemical Mutagenesis in Mammals and Man. Edited by F. Vogel and G. Röhrborn. (Pp. xiv + 519; 95 figures + tables. $34·10.) Berlin, Heidelberg, and New York: Springer Verlag. 1970.

The induction of mutations following exposure of mammals, or mammalian cells, to chemical agents is a topic of considerable importance; all the more so because of the increasing exposure of our own species to a wide variety of noxious chemical agents in our general environment and to the increasing use (and misuse) of an ever widening variety of pharmacological products. The present volume would therefore appear to be timely, and in their preface, the editors remark that the book is particularly designed for those who are interested in the problem of chemical mutagenesis in relation to man. The aim is laudible. Unfortunately, the execution leaves much to be desired.

The volume in fact contains papers presented at a

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