BOOK REVIEWS

ESSENTIALS OF HUMAN GENETICS. S. M. Bhatnagar, M. L. Kothari and L. A. Mehta.
Kothari Medical Publishing House, Bombay, 1977. Pp. 188. Price: Rs. 22.50.

Most medical school curricula now include medical genetics, but the competition for time with other well established specialties in an overcrowded course usually means that the medical student has little opportunity to study the subject in depth. He turns to a brief elementary text in an effort to cram sufficient facts to satisfy the examiners. A number of excellent introductory books are now available and there seems little need for yet another. However, the authors claim in their preface that there is nothing available which is sufficiently compact or easy to understand. The result is a paper-back which clearly owes a great deal to these earlier books. The historical introduction seems to be a précis of the introduction to McKusick's *Human Genetics*, and the plagiarism extends even to the use of unacknowledged illustrations from this book and others. Imagine the surprise of this reviewer on turning the page to be faced unexpectedly by a thinly-disguised photograph of one of his own patients!

There is thus nothing original about this book. It follows the usual pattern of contents, taking care to avoid anything that the student might find difficult to understand, yet mentioning almost everything of importance that the other books mention. With such a simplistic approach it is not surprising that the reader gets no sense of excitement about either the growth of knowledge of human genetics or the potential value of the application of genetics to medicine. I doubt if this book will stimulate any student to take an interest in medical genetics, although he may be tempted to buy it as an aid to passing his examinations.

M. A. FERGUSON-SMITH,
Department of Medical Genetics, University of Glasgow, Scotland

THE ELEMENTS OF GENETICS. I. H. Herskowitz. Collier Macmillan Ltd., Middlesex, 1979. Pp. xxii + 442. Price: £12.75.

This book was written for students of biology, nursing or health science, who have some prior knowledge of genetics, and it is appropriate, therefore, that genetic principles are illustrated whenever possible by examples from human genetics.

Herskowitz begins his book with a discussion of the nature of genetic material in viruses and cells and follows this with a clear description of the structure of nucleic acids and their organization in viral, bacterial and eukaryotic chromosomes. The author then deals with the functioning of genetic material. Replication, transcription and translation are each allocated a chapter and comparisons between these processes in prokaryotes, eukaryotes and viruses are made whenever appropriate. All three chapters contain up-to-date information and the chapter on transcription incorporates the processing of primary gene transcripts including the recently discovered phenomenon of RNA splicing. Minor weaknesses are a

strange use of the term, *de novo*, e.g., "*de novo*—synthesized RNA is made independently of all nucleic acid" (thus it is confined to poly A) and a reluctance to describe the polarity of nucleic acids using the 5'-3' convention. The generation of genetic variability by means of mutation and recombination, and the distribution and transfer of genetic material between cells and organisms is considered next. It can be argued that the chapter entitled "Genetic Recombination Between Viruses" is one of the most important chapters in the whole book because it is here that the reader is first introduced to the concept of genetic recombination. It is unfortunate, therefore, that this chapter, more than any other, is likely to confuse rather than enlighten those who are not already familiar with the notion of recombination. The reason for this stems mainly from an over-involved, rather than factually incorrect, account of the mechanism of recombination in the T-even bacteriophages. The book continues with several chapters on regulation of the replication and expression of genetic information in viruses, prokaryotes and eukaryotes. Although control of gene expression at the level of transcription is emphasized, translational control is also covered adequately. A separate chapter is devoted to considering the role of heterochromatization in regulating the expression of eukaryotic genes mainly by reference to dosage compensation in mammals and V-type position effects in *Drosophila*. The possibility that transposable controlling elements in maize exert a spreading suppressive position effect on neighbouring genes by cytologically undetected heterochromatization is also examined. The author describes in a very clear way the interactions between alleles, between non-alleles, and between genotype and environment, which determine the phenotype of an organism. He includes at this point a chapter on differentiation and development and their regulation in multicellular organisms. A short account of some of the general features of development, which might have been expanded usefully, is followed by an examination at greater length of two specific developmental phenomena in man. Differential gene heterochromatization as a means of regulating gene expression in eukaryote development is possibly given more prominence in this chapter and indeed in the book as a whole than can be justified by the available supporting experimental evidence. The next major section of the book begins with a chapter on the evolution of the first organism containing nucleic acid as genetic material and continues with a consideration of the genetics of populations, first describing the Hardy-Weinberg equilibrium and the factors which disturb it and then dealing with the amount of genetic variability in populations, its disadvantages and advantages, and its role in the evolution of new species. The final part of the book is concerned with the application or relevance of genetics to agriculture, ecology, animal and human behaviour, social and political issues and medicine. It contains much that is interesting including good accounts of two controversial and emotive subjects: race and intelligence, and recombinant-DNA technology and the potential benefits and hazards associated with it. A minor criticism is that this section of the book is rather too encyclopaedic: the chapter on applications to agriculture and ecology, for example, becomes at one point little more than a catalogue of man's achievements in the improvement of stocks and crops by genetic means.

The text of this book is illustrated by numerous helpful diagrams and plates which are of a consistently high quality. There is an extensive

bibliography and a very useful and complete glossary of terms at the end of the book. Each chapter ends with a set of varied, imaginative and thought-provoking questions and problems which provide a valuable opportunity for the reader to test his comprehension of the genetic principles introduced. It is a pity that the final problem in the book is a crossword puzzle with 144 rather trivial clues, few of which have any bearing on genetics. Coming at the end of 391 pages of genetics including 426 other questions and problems, I suspect that the crossword puzzle will appeal to only the most intellectually masochistic reader. Herskowitz's approach is, in general, factual rather than deductive and this is possibly the book's major weakness. Nevertheless the book does provide a clearly written, accurate and up-to-date account of most aspects of genetics. As well as being a suitable companion textbook for university students taking introductory courses in genetics it should be extremely useful to more advanced students wishing to revise and update previously acquired knowledge.

N. W. ASHTON

Department of Biology, University of the West Indies, Barbados

GENETIC AND MOLECULAR BASIS OF PLANT PATHOGENESIS. J. E. Vanderplank.
Springer-Verlag, Berlin, Heidelberg, New York. Pp. xi + 167.

Dr Vanderplank's ideas on host-pathogen relations in crop plants have been developed in four books. In this, the fourth, he develops further his genetical ideas on the interactions, and introduces a theory of the biochemical mechanisms involved. Although as stimulating and controversial as ever, this is perhaps the least satisfactory of the books because some of the author's basic ideas are here pushed to an extreme.

For example, Dr Vanderplank's thesis depends on his valuable earlier concept, that there are two distinct types of interaction, vertical and horizontal. Vertical resistance (VR) in the host is resistance which is effective against some pathogen races, but not against others; virulence, or vertical pathogenicity, is the converse in the pathogen. In other words, VR is characterised by differential interactions between host and pathogen races. Horizontal resistance (HR) is resistance which is manifested in the same way against all pathogen races; aggressiveness, or horizontal pathogenicity, is the converse in the pathogen. There may be different levels of HR in host varieties, or of aggressiveness in pathogen races, but there are no differential interactions. Dr Vanderplank's concept is clear, but it is theoretical; translating it into practical reality leads to a problem of logic. Experimentally, it is relatively easy to demonstrate the occurrence of verticality or the absence of horizontality in an interaction, using particular host varieties and pathogen races. It is impossible to demonstrate the absence of verticality or the presence of horizontality. To do so would necessitate testing the host varieties in question with all conceivable pathogen genotypes, or *vice versa*, to be certain that the next genotype did not cause a differential interaction. It is possible only to demonstrate *apparent* horizontality for the range of host varieties, pathogen races and environmental conditions used. Even in the largest tests of all, that confirm a host resistance as being durable (Johnson, 1979) through exposure to a particular pathogen over many years on an agricultural scale, it can only be