Book Reviews

Gene Structure and Expression. By J. D. HAWKINS. Cambridge University Press. 1985. 173 pages. £20.000 hardback, £7.95 paperback. ISBN 0 521 25824 3

In any University course of teaching in biological sciences, and probably indeed in any other subject, we have a concern to teach a selection of current beliefs about our subject, the 'facts', and also something of the process of investigation and reasoning which has led to those current beliefs. Different academics will inevitably hold different opinions about the balance between the product of scientific investigation and the process of scientific investigation. This book comes down rather heavily on the side of the product. It is a closely written account in 162 pages of text which begins with the structure of DNA, its replication and transcription, and then deals with the methodology of molecular genetics. About thirty pages are devoted to prokaryotic gene organization, expression and operons and about fifty pages to eukaryotic genes, with emphasis on a number of examples such as haemoglobin genes and immunoglobulin genes. The mitochondrial genome is also considered. These chapters are mainly concerned with telling us the 'facts'. No references are given in the text, but at the end of the book there are reading lists, chiefly of reviews written between 1981 and 1984, about a half a dozen for each chapter. There is a good index.

The book is described as 'designed as a textbook for various students in the fields of genetics, biochemistry and microbiology, particularly those followed by medical students...'. I would hope that an honours course in science might be rather more concerned with the nature of the evidence and the intellectual pathways from the experimental data to the conclusions drawn from them. The exploration of these pathways is perhaps best carried out by studying original papers and discussing them in seminars and it is probably unrealistic to expect a textbook to be a tool in the process. This book provides a good overview of modern molecular genetics which would be useful to a student before beginning a more intensive study and as a revision afterwards, though the reading would require close attention. The constraints of time in a medical course might not permit such an intensive study and this book might then play a more central role. The objectives of science and medical teaching are, after all, distinctive.

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Milk Production from Pasture. By C. W. HOLMES, G. F. WILSON, D. D. S. MAC-KENZIE, D. S. FLUX, I. M. BROOKES and A. W. F. DAVEY. Sevenoaks: Butterworth. 1985. 319 pages. £24.95 paperback: ISBN 0 409 70140 8.

Some explanation of why a review of this book should appear at all in *Genetical Research* is clearly in order. It deals with not just the methods and principles of dairy-cattle husbandry but also the relevant basic science of nutrition, lactation, reproduction and genetics. Approximately one-quarter of the book is devoted to the last of these, comprising one short chapter which discusses the breeding of a single herd, and a major section of five chapters and appendix on principles of genetic improvement.

The authors are all from Massey University and the book is set in the New Zealand scene. Indeed, a useful feature of the book is that it provides a source on dairy-cattle

practices and statistics in New Zealand and, in the genetics section, the definition of terms such as the New Zealand breeding index and information on rates of genetic improvement in the national herd. There is no doubt that the New Zealand dairy-cattle population has been improved by a coherent programme run by their Dairy Board and, as the authors point out, in terms of fat yield the New Zealand Friesian is the best or close to the best in the world. None of the authors have, however, been very closely involved with the design and operation of the programme.

The genetic principles are presented early but, because of the limited space, the pace is likely to be a little too quick for many students. In the appendix on biometrics, for example, the authors cover such basic statistics as mean and variance, less straightforward topics such as intra-class correlation and regression, and then move on to path coefficients and selection indices, all in ten pages. Some of the material in the chapters proper is of classic textbook nature, such as computations of inbreeding coefficients and relationships, some is found only in animal-breeding texts, such as that on selection indices, and the rest is information on the New Zealand methods, which I found the most interesting. A student of animal breeding is likely to want the basic material presented with more explanation, and an undergraduate in agriculture will not want all the detail.

The animal-breeding section seems free of obvious errors, although the treatment of generation interval on pages 270–272 is, at best, misleading: it is not correct to add up ratios of response per generation to selection differential for each path of improvement through sire and dam to son and daughter. The authors deal primarily with the contemporary comparison system used in New Zealand. Although they mention that BLUP is likely to be introduced, it is moot whether their readers who have just grasped the idea of mean and variance will find the concepts of statistical models with fixed groups and random sires at all clear.

I am not aware of any other book dealing in so much depth with both science and husbandry of any aspect of animal production. It provides a useful and coherent whole.

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A Dictionary of Genetics. Third edition. By R. C. King and W. D. Stansfield. Oxford University Press. 1985. 480 pages. £15.00 paperback, £25.00 hardback. ISBN 0 19 503495 3; ISBN 0 19 503494 3

This dictionary defines genetics as 'the scientific study of heredity' and gives a definition of heredity that occupies six lines. In practice the authors of the dictionary have taken a wide view of the subject and included a great deal of biochemistry, molecular biology, medicine and evolutionary biology within its scope. It does, however, remain a dictionary and avoids the tendency to become an encyclopaedia. Terms are generally defined concisely. Some terms do, however, require comparatively lengthy explanation and half a page of text and half a page of diagrams are used to define 'Holliday model' for instance.

I used this dictionary while editing proceedings of a conference on gene expression and found that in general it provided definitions of most of the terms that arose. One of the problems facing the compilers of a dictionary in this area is the way in which usage of terms develops. An instance of this is to be seen in the term 'enhancer', which this dictionary defines as 'a 72 bp sequence in the DNA of virus SV40 that enhances the transcriptional activity of genes present in the same molecule', and then gives four more lines of explanation. However, by mid 1985 the term has come to be used in a wider sense by many authors. Some other definitions also seemed to be more restrictive than current usage. For example, LD 50 is defined entirely in terms of radiation dose, ignoring its use