Book Reviews

Pedigree analysis in human genetics. Elizabeth A. Thompson. The Johns Hopkins University Press, Baltimore and London. 1986. Pp. xix + 213. Price £28.50.

Elizabeth Thompson is well known for her work on the statistical analysis of large and complex human pedigrees and she has here written a coherent and interesting summary of this work. The book grew out of a series of lectures to graduate students in statistics at Cambridge, but the mathematical formalism of the lectures has been considerably reduced to make it accessible to ordinary mortals. It is not bed-time reading, but the reader's interest is aroused and held by the interspersal of theory with data analysis, most chapters being motivated by the study of a particular data set.

The following problems are considered: reconstructing the genealogy of a Yanomama Indian population from genetic data, because of the unreliability of genealogical information; tracing the origin of a rare recessive disorder in Mennonite-Amish genealogy; inferring the blood groups of the ancestors of the present inhabitants of Tristan da Cunha, given a reliable genealogy (I must admit to doubts about the value of this exercise); linkage analysis between major genes and dermatoglyphic data in an isolated Habbaniite population; and a study of lymphoreticular malignancies in Western Newfoundland.

The statistical methodology is based on analysis of the likelihood function, and is described in sufficient detail to enable the reader to understand how it works. The book achieves unity through being written around the author's own work, but suffers from some consequent limitations and imbalance; there is little about quantitative genetics or linkage analysis, nothing about animal or plant populations, nothing about information provided by molecular genetic techniques.

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World animal science, volume A4. General and quantitative genetics. A. B. Chapman (ed). Elsevier Science Publishers, Amsterdam. 1985. Pp. xiii + 408. Price \$92.50 US, Dfl. 250.00.

General and quantitative genetics is Volume 4 of a planned 32 volume encyclopaedia intended to comprise a major global review of all aspects of animal science. The volumes of part A of the review, of which this is one, provide the basic biological background to the

anatomical, genetical, biochemical, behavioural, physiological and microbiological bases of animal production; while the volumes of parts B and C will cover, respectively, more practical aspects of production and details pertaining to each species separately. When evaluating this particular volume, one must consider it therefore both on its own merits and as part of the entire series.

Concentrated in the 408 pages of *General and quantitative genetics* is a summary of many aspects of genetics relevant to animal breeding. The book is divided into three sections, the first of which is a two-chapter summary of the rules of inheritance of autosomal Mendelian traits (by J. F. Crow) and of inheritance associated with sex (by W. D. Hohenboken). The second section on genetics at the population level is the core of the book and reviews the theoretical structure of quantitative genetics in relation to animal improvement. The first seven chapters of this section are written by W. D. Hohenboken and cover, in order, simple population genetics of single genes; models of inheritance of quantitative and threshold characters; heritability and repeatability; phenotypic, genetic, and environmental correlations; maternal effects; genotype-environment interaction; and prediction and measurement of response to artificial selection. The eighth chapter of this section is a discussion of selection index theory (by K. Rönningen and L. D. Van Vleck) and the last two review the theory of inbreeding (F. Pirchner) and heterosis (W. D. Hohenboken). The third section of the book is titled *Genetics at the level of the cell*, and in three chapters gives an overview of the subjects of mitosis and meiosis (D. L. Zartman), cytogenetics of domestic animals (N. S. Fechheimer) and an introduction to molecular genetics (M. A. J. Ansay and R. H. Hanset). The final section is a single chapter contributed by N. S. Fechheimer on prospects for genetic engineering in domestic animals.

I found this book rather difficult to assess, as I could not ascertain to what audience it was directed. Some of the chapters, particularly those on basic quantitative genetic theory, are excellent introductions to the subject at the undergraduate level, with the provision that the undergraduate in question has a very sound understanding of statistics, and in particular the analysis of variance! These chapters were very logically constructed and the theory clearly, although somewhat tersely, presented. In contrast to this, the chapter on selection indices in the same section is written at a higher level, and requires the reader to be familiar with more advanced quantitative genetic theory than was developed in the preceding chapters, as well as with matrix algebra. I doubt that a reader with no previous knowledge of the subject would gain much from this treatment, yet it provides a useful summary for those

with some experience in the field. The chapters in the third section of the book are more in the nature of mini-reviews of the subject, but as such require some previous knowledge; for example, the chapter on mitosis and meiosis relies quite heavily on concepts of molecular genetics which are not introduced until a later chapter ("DNA" being an obvious example). This arrangement would quickly infuriate the reader trying to use the book as a self-teaching tool, yet an expert in the subjects covered would for the most part find the treatments too elementary to be useful reviews. This volume is therefore in many ways a cross between a text book and a series of review articles which exhibits negative heterosis. I feel the situation would be much improved by the inclusion of an extensive glossary of terms, either after each chapter or at the end of the volume.

It is unlikely that this book will find a place in the student market; both the variable levels of presentation and the rather high price make it unsuitable for adoption as a text. It is more valuable for those researchers in animal science who wish to broaden their understanding of the subject, but who have a solid background in some aspect of the discipline already. As part of the larger series on world animal science, it gives a fair indication of the main areas of research in the genetic basis of applied animal breeding, and I would recommend that any library in the biological sciences add this and the other volumes of the series to its collection.

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Sequence specificity in transcription and translation.
Richard Calendar and Larry Gold (eds). Alan R. Liss, New York. 1985. Pp. xxv + 709. Price £67.00.

Sequence specificity in transcription and translation represents the proceedings of a conference from a UCLA symposium held in Steamboat Springs, Colorado, April, 1985. It is published under the auspices of the UCLA symposia on Molecular and Cellular Biology. This is volume 30 of the new series.

The general "flavour" of the Symposium volume is transcription-transcription, with especial emphasis on the regulatory sequences and factors involved.

The volume consists of ten sections that deal with prokaryotic and eukaryotic promoters, termination in *E. coli*, transcriptional regulatory proteins, translational initiation regions, regulation at the translational level, RNA processing, enhancers, complex circuits of gene regulation, and the heat shock response. There are also three workshop summaries on prokaryotic promoters and their regulatory proteins, the genetics and phylogenetics of ribosomal RNA, and eukaryotic promoters and enhancers. There is a good subject index.

A large proportion of the book, not surprisingly, therefore, is devoted to prokaryotes, in particular *E. coli*.

Most of the eukaryotic papers deal with yeast or viral systems.

The papers are of generally high quality (albeit different in style and typeprint) and are given by experts in their respective fields. As might be expected for a U.S. meeting, the majority of participants were American.

If I were asked to select a single paper, I would choose that of Ingles *et al.* who report conservation between the largest subunits of yeast RNA polymerase II and III and the β' subunit of *E. coli* RNA polymerase (supporting an earlier observation by Watson and Surzycki (1983) that λ dri^f18 hybridises with both nuclear and chloroplast DNA). The authors quite rightly suggest that the genes for the largest polypeptides of prokaryotic and eukaryotic RNA polymerases are members of a family which has evolved from a single ancestral gene.

On the flysheet, the symposium volume is said to be "of interest to researchers, postdoctoral fellows, and graduate students in the fields of molecular and cellular genetics, microbiology, biochemistry and immunology". A slight exaggeration in scope, perhaps, but certainly *Sequence specificity in transcription and translation* is a useful, up-to-date and well-prepared symposium volume. I fear, however, that few will be able to afford to buy it.

REFERENCE

WATSON, J. C. AND SURZYCKI, S. J. 1983. Both the chloroplast and nuclear genomes of *Chlamydomonas reinhardtii* share homology with the *Escherichia coli* genes for transcriptional and translational components. *Curr. Genet.* 7, 201-210.

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Quantitative genetics and selection in plant breeding.
Günter Wricke and W. Eberhard Weber. Walter de Gruyter, Berlin. 1986. Pp. xii + 406. Price: DM 198, \$79.50 US.

The authors start by saying "This book is a presentation of the principles of selection in plant breeding. It is intended for students in plant breeding and genetics, as well as plant breeders and applied geneticists". Although such an aim is laudable, unless German students (and even plant breeders) are wealthier than their counterparts in this country, the price of this book might put it out of their reach. Nevertheless, if the contents of the book are of sufficient merit there is always the library copy to rely on. Putting aside these considerations what does this book have to offer?

The answer is, unfortunately, little in the way of new ideas or approaches. It is sometimes claimed, with some justification, that plant breeding lags a long way behind the knowledge available from theoretical considerations, work on model systems and general research in quantita-