descriptors. Frankel (ch. 15), Burdon and Jarosz (ch. 17), Ladzinsky (ch. 18), and P. H. Williams (ch. 20) point out that performance and potential breeding value usually depend on multigenic effects in the genetic background, requiring prebreeding as well as simple evaluation of accessions. Evaluation is as much a question of physiology, pathology, entomology, and ecology as it is of understanding single gene functions. Since the utility of most traits sought by breeders depends on interactions within and among organisms, the level of organization at which gene effects must be studied is higher than the single gene. Especially for traits involved in biotic resistances where breeders may seek to influence the coevolution of host and pathogen, evaluation is not reducible to even the individual level. Therefore, by identifying evaluation as the major problem in the use of collections, plant breeders are implying that various forms of genotype–environment interactions and interorganism effects are important to understand and that molecular level reductionism is not sufficient for their needs. Examination of these interactions is an area in which breeders apparently need more genetical research.

This book is a valuable overview of the current uses to which collections of plant materials of the major crops can be put. Details in individual species are not provided, but opportunities and problems in the utility of collections are identified. Uses and structure of collections and problems in evaluation are constructive indicators of the next steps to be taken in more fully utilizing conserved plant genetic resources.

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Introduction to Quantitative Genetics, by D. S. FALCONER. Harlow, Essex: Longman Group UK, 1989. 438 pages. $14.95 soft cover. ISBN 0 582 016428. Also published in the United States by John Wiley & Sons, New York, as ISBN 0 470 21162 8.

This is the third edition of a well-known and long-running textbook, first published in 1960, revised in 1980 and now again in 1989. Quantitative Genetics, as most of us know, stems from the work of Fisher, Haldane and Wright in 1918–1921, and is concerned with the genetics of biometrical or quantitative characters, which form the main raw material of plant and animal breeding research and are also of primary importance in evolutionary theory. Many genes, of generally small effect which is overlaid by environmental variations during development, contribute to the end points forming these characters, so that the individual genes cannot be identified and mathematical analysis of means, variances, selection progress, etc. has had to replace the Mendelian genetic approach. This all makes it difficult for new students in this research area to find their way.

In the late 1950s Douglas Falconer, already heavily involved in long-term experiments on quantitative characters in mice and with colleagues working on similar problems in *Drosophila*, decided to set out his lectures to genetic students on quantitative genetics in book form for a wider audience. Taking a modest view of his own mathematical ability and that of his readers, he restricted himself to fairly simple algebra and standard statistical concepts, and the result was the first edition of the book under review. Its organization was so well chosen that it was possible for the two revised editions to retain the same structure down to the 20 chapter headings and most of their subheadings; references, paragraphs and sections have been added where they seemed appropriate.

Rereading the book in its new edition, I am struck by the clarity of the writing and the logical arrangement and interlinking of the topics, which make it a pleasure to read. The essence of the subtle mathematical concepts developed to relate the conjectural dances of the polygenes in their environmental soup to the characters which can be measured are very well explained; and the new reader should not have too much difficulty with coefficients of co-ancestry and inbreeding, effective population number, linkage disequilibrium (which, confusingly, applies to loci that are not linked), mutation rates affecting quantitative characters, analysis of threshold characters, and so on.

The main changes in this edition are 3 pages added on the effects of selection on variance in chapter 11, a brief discussion of the actual achievements of selection applied to farm animals in chapter 13, a revised and extended discussion of the effects of mutation in chapter 15, additions to the discussion of threshold characters in chapter 18 and a section on the origin of variation by mutation in chapter 20. Many up-to-date references have also been included.

After the second edition a set of problems was compiled and published separately, but I doubt whether many readers got to work on them. The new edition has these problems, probably with some new ones added, in their proper places at the end of each chapter. These 140 problems are often ingeniously designed to be of varying difficulty and their solutions are very amply explained at the end of the book so that they take up 56 pages. These seem to me excellent value and I trust that every reader will test his skill on them.

I think this book will have many years of useful life yet, in its new edition, particularly as the subject is acquiring new interest from the attempts of gene technologists to identify individual polygenes on the chromosome and gather them together to make much improved strains. We shall wait impatiently to learn how many of these genes have large enough effects for them to be transportable.

A point in the book which particularly caught my attention is Figure 15.1 on page 266. This shows 20

generations of sib mating in 10 lines of *Drosophila melanogaster*, the character being the total number of abdominal bristles on two sternites. This character, from studies by myself and others is considered to be under mainly additive genetic control with very little true environmental variance, so that there should be no inbreeding depression nor much fluctuation from generation to generation. Nevertheless all 10 lines drop sharply in mean at the start of inbreeding, and most of them show striking fluctuations over generations 15–20, when inbreeding should have eliminated almost all the genetic variation within each line. This does not fit in with expectation, and I hope that someone may be incited to repeat the experiment.

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Henderson's Dictionary of Biological Terms. 10th Edition. Edited by ELEANOR LAWRENCE. Harlow, Essex: Longman Group UK, 1989. 637 pages. Hard cover £17.95. ISBN 0 582 46362 9.

This book will be of considerable value to any biologist who ventures outside his own specialist field(s) – which probably means all of us. Revision of the previous ninth edition of 1979 was concentrated on bringing the dictionary up to date in the most rapidly advancing areas of biology, particularly biochemistry, cell biology, genetics and immunology. The 18000 or so definitions, or at least those I have read, are informative and appear to be accurate, and they are quite extensive. To take a few examples from random pages without giving the actual definitions, one finds *allometry* (without the logarithmic basis of its approach), *cribellum = cribrellum*, *critical group* (in taxonomy), *demilunes*, *disassortative mating*, *E face*, numerous words beginning with *eco-* or *ect-*, *F factor* and *F-primes* in *Escherichia coli*, *homeobox* or *homoeobox*, *exons* and *introns*, kappa particles; and moving on a few hundred pages we meet *Sewall Wright/effect* (defined under *genetic drift*) but not Sewall Wright's path coefficients, the *Shine-Dalgarno sequence*, *shotgun cloning*, *P face*, *P factors*, *reporter gene*, *lac operon*, *sphenosquamosal*, and so on. *k-selected* and *r-selected species* are defined; *Ti* and *Ri plasmids* of *Agrobacterium* species are explained along with their value in genetic engineering.

Gene symbols and most medical terms are sensibly omitted, but the more common human genetic diseases are briefly described. There is a particularly helpful listing of abbreviations and acronyms at the beginning of items under each letter of the alphabet, many of them necessary to understand recent research in immunology, biochemistry and cell biology. The book begins with its own list of abbreviations, units and conversion factors, SI prefixes, the Greek alphabet and common Greek and Latin noun endings; and it ends with 7 appendices giving selected chemical structural formulae, outlines of an up-to-date classification of living forms, and a list of the common chemical elements with their symbols, atomic numbers and atomic masses.

I am not clear whether Eleanor Lawrence is the editor or the main or sole author, or both, since no other names are mentioned. In any case she is warmly to be congratulated on her efficient handling of the 18000 terms and symbols and the very complete biological coverage achieved. I think this book will not only be very useful to all who get access to it, but it will also beguile many of them as it has beguiled me with the numerous terms they have never heard of. At the very reasonable price of just under £18.00, for a well-bound hard-cover book of such size, it should find its way into every biological library and onto many additional shelves. The diligent reader will come across quite a number of terms which the inventors might well have done without, though they are no doubt proud of them. I will mention just one, 'osmatic', meaning to have a sense of smell; or should we also dispose of 'to oscitate' for to yawn or gape?

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