resistance have been published, but McKenzie does not go into details about modelling evolution, nor does he discuss why such models may be inadequate. Most of the modelling efforts have been single-locus simulations done by non-mathematicians, and they are extremely crude. McKenzie does mention that genetic drift might be more important than hitherto realized. Mutation/selection balance probably determines the frequency of resistant genotypes in the population and, because resistance is usually selected against in the absence of insecticides, the resistant alleles may often be at numbers below which drift (and mutation itself, another stochastic factor) becomes important. There is quite a lot of recent activity in this area by theoretical population geneticists such as Lande, Gillespie, Kondrashev, Turelli, Barton and others; but, to date, these theoreticians have not stooped to try to recommend policies which might overcome the real problem of insecticide resistance evolution.

The skimpiness of the treatment of theory may reflect McKenzie's own preference for experimental, field work and resistance management practice. All the theory in the world won't get farmers and chemical companies to change their practices unless there is a clear political effort to change the dynamic between these two players and the independent, government sector. Whatever your political preference, it does seem that the original role of organizations like the USDA was a sensible use of taxpayers' money, to work for the long-term common good of farmers and consumers. If you ask your government-paid agricultural researchers to work for the chemical industry, or when you scrap the government research effort altogether, you will end up without an independent body to make recommendations. When I worked in the Mississippi State University Department of Entomology, my colleagues knew that double the amount of insecticide was being used on cotton than needed to control pests. The evidence came from experience with farmers and from experimental plots. One of the major pests of cotton, the tobacco budworm *Heliothis virescens*, was not known to feed on cotton until organic insecticides in the form of DDT appeared on the scene. Very likely, this species was controlled by its natural enemies until that time, and the enemies are less resistant to insecticides than the pest itself. But the political pressure in Mississippi and virtually everywhere else is now for applied entomologists to obtain funding from the very companies whose profits such research would reduce. An obvious conflict of interest. And yet the simplest conclusion from evolutionary biology is that, to slow resistance, we must reduce the selection pressure. All we need to do is to find a way to use less insecticides.

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The Genetical Analysis of Quantitative Traits. By M. J. KEARSEY and H. S. POONI. Chapman & Hall. 1996. 381 pages. Price £27.50. ISBN 0 412 60980 0.

Introduction to Quantitative Genetics. By D. S. FALCONER and T. F. C. MACKAY. Fourth Edition. Longman. 1996. 464 pages. Price £24.99. ISBN 0582 24302 5.

The study of quantitative genetics has been complicated by the existence of two rival research traditions, with their British centres in Birmingham and Edinburgh. Both schools study the statistical properties of continuous, quantitative characters determined by the interaction between multiple environmental and genetic factors, but they differ in their terms of reference. The interests of the Birmingham school are centred around the quantitative genetics of plants and its applications to plant breeding, and they study changes in the mean and variance in successive generations following a cross between two pure, inbred lines. This simplifies the analysis because there are only two alleles at each segregating locus and because the genotype frequencies in any generation can be specified from basic Mendelian principles. The Edinburgh school has concentrated on animal quantitative genetics and its applications to animal breeding and evolution. There may be an arbitrary number of alleles at any locus with arbitrary gene frequencies, the only possible simplification being that of random mating. Thus the two schools start from different assumptions and it is not surprising that there is little connection between their results. What connection there is has been obscured by their use of different terminology.

The textbook of the Birmingham school has been *Biometrical Genetics* (K. Mather, 1949; K. Mather and J. L. Jinks, 1982), which has been out of print for some years. Following the death of both authors of this classic text, Kearsey and Pooni, who have each made important contributions to the subject, have written a successor to it. Their book differs from that of Mather and Jinks in two main ways. First, they have generously abandoned the Birmingham in favour of the Edinburgh notation, so that notational differences need no longer be a barrier between the two schools. However, the reader should not be lulled into a false sense of similarity; the two schools start from different populational assumptions and their results are conceptually different even when they use the same symbols. Secondly, Kearsey and Pooni's book is written at a more popular level than that of Mather and Jinks. They have minimized the maths and statistics in order to appeal to a biological audience, and in places they go too far in sacrificing accuracy for simplicity; for example, on p. 42 they present a simple but erroneous method for testing homogeneity of variances. Nevertheless, this is a valuable introduction to the methods of the Birmingham school.

https://doi.org/10.1017/S001667230003408X Published online by Cambridge University Press

The corresponding Edinburgh text is *Introduction to Quantitative Genetics* (D. S. Falconer, 1960, 1981, 1989). This is also a popular book in which mathematical derivations take second place to examples and verbal explanations, but these explanations are amazingly lucid and deep, and the book has won a well-deserved reputation as an outstanding introduction to the subject. The main features of the new edition, written in collaboration with T. F. C. Mackay, are a new chapter on quantitative trait loci and an extensive revision of the chapter on natural selection, with fuller treatment of mutation and the maintenance of genetic variability.

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Discovering Molecular Genetics: A Case Study Course with Problems & Scenarios. By JEFFREY H. MILLER. Cold Spring Harbor. 1995. 700 pages. Price $59.00 cloth. ISBN 0-87969-475-0.

This book, as anticipated from a cover picture of Gregor Mendel in his garden reading a sequencing gel, is an innovative text. It is based on the syllabus for an imaginative course in molecular genetics given by the author at UCLA. Those teachers who were privileged to share the excitement of the early days of molecular genetics are likely to welcome it and hope that it will both enthuse and train contemporary students.

The book begins with an excellent selection of photographs of molecular geneticists and an historical perspective including the papers by Watson and Crick on the 'Molecular Structure of Nucleic Acids' and the 'Genetical Implications of the Structure of DNA'. The author then selects 'classic' papers to illustrate ten topics. Each topic, or unit, is prefaced by an anecdotal introduction to the key scientist(s), and an appropriate introduction to the relevant background material. The latter provide the essential information and concepts not only for reading the relevant papers, but for the general understanding and appreciation of molecular genetics. For example, the first unit entitled the 'Fine Structure of the Gene' introduces Seymour Benzer and the concepts of genetic selection in the isolation of recombinant progeny, the distinction between complementation and recombination tests, and the use of the Poisson distribution. The reader may then turn to the original papers armed with an understanding how the T4rII system may be used in the analysis of the fine structure of a gene by deletion mapping and in the elucidation by recombination frequencies of the topographical distribution of mutations within a gene.

All topics are provided with an ample supply of problems (with answers), some of which are set within contemporary scenarios that should stimulate student thinking.

Despite being limited to 10 topics, the course introduces most of the concepts basic to molecular genetics, other than those dependent on the 'Recombinant DNA Revolution'. The topics are not entirely molecular genetics; one features the studies of haemoglobin in the elucidation of structure–function relationships in proteins. While some of the topics and papers covered are inevitable choices for molecular genetics, including the paper by Crick *et al.* proving the triplet nature of the genetic code, others reflect the impact of the environment in which the author received his training. Most contemporaries of the author would have favourites that were not included. My own list would include papers on bacterial restriction and modification, particularly the classic of Arber and Dussoix demonstrating that modification was a DNA-based phenomenon maintained in semi-conserved DNA, but lost when both strands were new.

I very much appreciated this book and hope that it will be well and widely used. Unfortunately, I can't see it as a general text for large classes, but even in the context of large classes, teachers might find that some topics would form the basis of tutorials. I think it would also make a useful contribution to postgraduate education, particularly where students may be deficient in the basic discipline of molecular genetics.

The book is amply illustrated with entertaining photographs.

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Reinventing Darwin: The Great Evolutionary Debate. By NILES ELDREDGE. Phoenix Giant, Paperback Edition 1996. 244 pages. Price £9.99. ISBN 1 85799 508 2.

Some authors possessed by ideas seek agreement, while others reveal in controversy. Niles Eldredge comes very much into the second group. This book now reissued in paperback is, as one might expect, largely concerned with the debate about punctuated equilibrium which he and Steven Jay Gould have done so much to promote. But he makes it clear that, to him, this is only one aspect of a broader disagreement between 'naturalists' and 'ultra-darwinians'. In the former camp Eldredge includes himself, Gould and (by posthumous co-option) Sewall Wright. The opposition are exemplified by Richard Dawkins, John Maynard Smith and George Williams, a hostile lot apparently, much given to 'howls of outrage'. The odd thing is that both sides believe in the primacy of natural selection; there is no discussion here of Kimura and neutral theory nor, for that matter, any insights from molecular sequencing.

The evidence in favour of punctuated equilibrium – long periods of species constancy ('stasis') interrupted by short periods of speciation – comes, of course, from the fossil record. The examples of stasis