Report series is concerned. It comprises the proceedings of a meeting held in late 1989 which brought together many of the leading researchers in the field. Not surprisingly for a meeting based in New York only five of the 33 participants (rather than those with their names on the papers) are from outwith the U.S. There are four main sections covering genetic and environmental risk factors, neurobiological markers of risk, animal models and candidate genes, and linkage studies. The papers within these sections are generally good and well referenced. Many studies on alcohol seem to focus on father and sons, and this bias is continued here. In Scotland at least, nearly one in every three admissions for alcoholism are female. In any genetic disorder females must at least be carriers of the gene, and the identification of neurobiological markers common to both female non-alcoholics and male alcoholics would be of immense use in clarifying linkage analysis. Although Lander makes this point on several occasions in the text, it seems to have been addressed only scantily by the others. There is also little mention of the medical end-effects of alcohol abuse and their use in delineating more severe subphenotypes or inheritance patterns. I could only find one mention of Korsakoff's syndrome in the text, and none in the index. Most but not all papers have transcripts appended of the question-and-answer session related to them. Most but not all sections have transcripts appended of round-table-type discussions of the subjects raised. In all there are 121 pages with such transcripts, approaching one-third of the total length of the book. Thus I must presume the editors place great importance on our reading of these, but it was in doing just that that I started to wonder about the readership they hope to capture. To make sense of some of the comments made often involves mental acrobatics to interpolate from one statement to the next; ideas are introduced without previous exposure to the concepts behind them (e.g. after a good review of neurophysiological correlates of alcoholism risk by Begleiter the discussion suddenly turns to the amount of 'dipoles' he has found; the average psychiatrist or geneticist generally does not have a background that includes the various theories of cortical current sources involved in e.e.g. generation); and sometimes there are confusing mistakes which occur in any discussion but could have been corrected before that discussion when into print. For example, after a paper on aldehyde dehydrogenases we are told that ALDH2 (aldehyde dehydrogenase) is alcohol dehydrogenase, and later that aldehyde dehydrogenase resides on chromosome 4 (which is home for alcohol dehydrogenase). I found the open discussions much better, but why none for the first section of the book? I especially enjoyed the discussion at the end of the section on animal models and candidate genes, in which most of the problems of analysing complex phenotypes are raised with valuable suggestions on how to deal with them (heterogeneity, phenocopies, incomplete penetrance, multiple phenotype models and linkage analysis, size and type of families that are most useful etc.).

I personally liked this book. It is well produced. The researchers are in a field where often angels fear to tread, and there are lessons in here for all workers involved in the genetic analysis of complex diseases. However, for the reasons mentioned, I think that its readership may be limited by the type and amount of transcript material to those intimately involved with psychiatric genetics.

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Theoretical Population Genetics. By J. S. GALE. London: Unwin Hyman. 1990. 417 pages. £50.00 Hardback, ISBN 0 04 575 026 2; £17.95 paperback, ISBN 0 04 575 027 0.

Given that there are several excellent introductory and advanced textbooks on theoretical population genetics, I was rather sceptical that the latest offering, Gale's *Theoretical Population Genetics*, would have much new to offer. I was pleasantly surprised to find that this preconception was wrong. Rather than review the entire field, Gale focuses entirely on stochastic models in genetics. Such models, typically dealing with some aspect of genetic drift, form the basis of much of current population genetics theory. In particular, diffusion models underpin most of the theoretical (and empirical) work on molecular evolution. While there are several excellent advanced treatments of diffusion models (e.g. Kimura & Ohta, 1971; Maruyama, 1977; Ewens, 1979; Karlin & Taylor, 1981), the beginner faces a difficult task getting into this literature unless he or she has a fairly strong background in stochastic processes and partial differential equations. Gale's book is an attempt to provide such an introduction by focusing mainly on the simple probability models that are approximated by diffusion methods. Gale gives a nice review of classical applications of branching, Markov, and birth and death processes to genetic problems. Given the current temptation to jump straight to a diffusion model, it is refreshing to see alternative approaches covered in great detail. The power of these alternative approaches is that they can, in certain special cases, give exact results with which results based on diffusion approximations can be compared. Also, in many cases alternative approaches are biologically more reasonable than a diffusion approach. For example, a Moran model (a birth and death process model wherein replication of a randomly chosen genome is followed by loss of another randomly chosen genome) is a very natural model for examining drift within the multiple genomes that occupy a single mitochordion.

While Gale's book provides an excellent review, it is not without problems. The main one, which is at least partly a consequence of the task attempted, is that his

treatment is difficult to follow in places and is certainly not suitable for most as a general introduction. Another problem is coverage. Most of the results discussed apply to a one-locus two-allele model under pure drift or drift and mutation. Several important classical applications have been left out, such as Wright's multiple allele stationary distribution under rift, mutation and selection, and Alan Robertson's work on limits to artificial selection in finite populations. More recent applications to problems of genome evolution are only briefly discussed, and the powerful method of coalescents is not even mentioned.

True to his title, Gale goes into great detail on rather fine mathematical details while covering very little basic biology. His discussions of implication of theory for the neutralist/selectionist debate are very short, but even-handed. His main comment on the debate is that if effective population sizes are very large in nature, the neutral theory has difficulty because of the very long time required for substitution of new alleles. There are certainly a variety of mechanisms to keep effective population size orders of magnitude below the observed population size (such as rare, but severe, bottlenecks). An interesting mechanism, often overlooked, is that directional selection reduces the effective population size acting on loci linked to the site under selection (Hill & Robertson, 1966; Birky & Walsh, 1988). Thus, rather ironically, selective substitutions can increase the effects of neutrality at linked loci by lowering effective population size.

In summary, this book is a near miss. Gale provides a nice review of much of the classical literature on probabilistic modelling in genetics and is quite useful to someone with a background in stochastic processes. This book is especially useful if the reader wants to improve his/her appreciation of Fisher's genius for finding clever solutions to difficult problems. For the beginner wanting an introduction to stochastic modelling, Gale's book is a bit much. A second edition with more attention to recent applications and toned down a bit in places would be very welcome.

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A Dictionary of Genetics, 4th Edition. By ROBERT C. KING and WILLIAM D. STANSFIELD. Oxford University Press. 1990. 406 pages. Paperback £16.00, ISBN 0 19 506371 6.

Scientific dictionaries have been appearing in such abundance in recent years (see reviews in *Genetical Research* (1989), **54**, 164; (1990), **55**, 135 and **57**, 95; and that omits at least two not sent for review) that I said to myself 'Oh No! Not another'. But it is the most recent and is also (I think) the only dictionary dedicated specifically to the subject matter of genetics, so it deserves our attention.

It is the new edition of a dictionary last revised in 1985, and now has 7000 definitions with a good deal of cross-referencing, and various useful appendices. The terms and concepts defined cover the different branches of genetics and ancillary topics well, so that it will make a very useful addition to the library shelves and will particularly help students and those moving from one branch of genetics to another; and it is perhaps cheap enough to buy for one's own shelves.

The cross-referencing is of course necessary to fill out the information on a particular term; but this is often at the expense of forcing us to jump back and forth among the pages in order to grasp a single concept. As an example of this problem, I found *Shigella dysenteriae* defined as 'the dysentery bacillus. Many *E. coli* phages also attack this species.' *E. coli* is, surprisingly, not listed, so we look under 'phage', which leads us to 'bacteriophage', and there we find that three phages (P1, P2 and P4) attack *Escherichia coli* and *Shigella dysenteriae*. So we deduce that *E. coli* is short for *Escherichia coli.* The authors would say 'That should be obvious to everyone', which I doubt. However, there is another connexion here which seems to be missing in spite of its historical importance. *Shigella* should have referred us to R factors, since it was the new antibiotics made available to Japanese doctors at the end of the 1939–1945 war, for over-use against bacillary dysentery, which led to the development and spread of R factors carrying multiple (and multiply transferable) antibiotic resistance, and since then R factors have never lost their grip. We do find 'R factor' and have to look up 'resistance factor', defined as 'a class of episomes that confer antibiotic resistance to the recipient bacterium. See R plasmid.' R plasmid takes us to transposon and thence to retroposon and thence to retrovirus, which takes us to reverse transcriptase, oncogene, HIV and the central dogma. So we find ourselves deep in several major topics of molecular genetics. The term 'episome' gets its own definition, but I thought it had become obsolete because it does not have a useful place in modern plasmid biology.

This jumping back and forth in the dictionary is rather tiresome, and suggests to me that, when a number of terms are connected, one of the terms