rudiments of embryology: on page 5 he will find that *determination* (not defined for another 90 pages) may depend on DNase 1-hypersensitive sites or possibly on DNA methylation. Other similar examples linking specific molecular mechanisms with particular embryological phenomena suggest the author has a well-defined group of students in mind; those already familiar with the basics of molecular embryology and able to separate speculation from fact.

We have already noted that the book is up to date, for among its 1300 references are some from early 1990. But this modernity has a price, since each topic tends to be treated as if it were a journal review waiting for the latest report to be spliced into it. Teachers will have to decide if the merit of having these facts outweighs the disadvantage that much has still to be digested before the text can be comprehensible to a student reading on his own. This is a general criticism which will not be repeated as we note below the topics covered.

The Introduction flows naturally into molecular descriptions of ovogenesis, of maternal mRNAs and proteins and their cytoplasmic localization, and thence to the description of mosaic and regulative systems. This, and the description of the molecular concomitants of later differentiation, are clearly outlined, though they are poorly supported by 'blackboard sketches' for diagrams. Systems open to experimental analysis start with three general vertebrate examples: myogenesis, which is used to contrast determination and differentiation; erythroid differentiation, to illustrate the function of gene organization for globin switching during development; and the hormonal regulation of vitellogenesis and of egg-white synthesis. These are all well-studied systems, which suggest some of the possible general mechanisms of gene expression during deuterostome development. All this is, surprisingly, in preparation for the study of the geneticists' two invertebrates, *Caenorhabditis* and *Drosophila*, which is the core of the book, occupying about two-thirds of its pages.

Caenorhabditis and *Drosophila* both lay mosaic eggs, though of very different sorts. The invariant lineage of the 550 cells of the *Caenorhabiditis* embryo implies the establishment of cell fates by the segregation of maternally transmitted determinants, and laser ablation of particular cells shows that none can be replaced by the regulation of others, except rarely. The work which takes the first steps in exploring this cell-by-cell determination, the subsequent role of the embryonic genotype in establishing the nervous system and somatic sex determination are all carefully described, and similarities to *Drosophila* genes are emphasized.

Since the first mitoses of the *Drosophila* egg create a syncytial blastoderm of nuclei of equal potential, maternal genes must establish differences in the egg cortex which activate gene cascades to create the metameric segmentation of the larva and the characteristic segment differences. This is a regularly reviewed, continuously growing subject, but the merit of this text is that it puts the details in context, and it qualifies as a chosen review for students to read. It finishes with the homeotic genes, and explains how the homeobox sequences have been used to probe for similar, related sequences in the mouse and *Xenopus*, in particular. Unfortunately, this section is so overloaded with facts that it is difficult to see the wood for the trees.

Finally, there is a review of sex determination in *Drosophila*, and this again is an actively pursued and often-reviewed subject. In this case there is no doubt that the latest review (Slee and Bownes (1990), *Q. Rev. Biol.* **95**, 175–204) is the text of choice, and not just because it is more comprehensive and approaches the problem, neglected by de Pomerai, of the expression of tissue-specific products, in this case of the yolk proteins made by the fat body and follicle cells.

This book would have been better if the CUP had insisted on more and better illustrations: ten pages without an enlightening diagram makes for dreary reading. But its major defects are two: the historical contexts of discoveries are ignored – the student would never guess that the *Drosophila* sex gene *transformer* was discovered in 1945 or the homeotic *Antennapedia* in 1949 – and there is no appreciation of the genetic logic which has brought us to the point of understanding what these, and other, genes do. The price of being factually up to the minute is that the book will not 'provoke reflection, stimulate questions, and even raise objections and criticism'. *Genes and Embryos* (1989), by Glover and Hames (IRL) will better fit that bill.

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Genetics and Biology of Alcoholism, Banbury Report No. 33. Edited by C. ROBERT CLONINGER and HENRY BEGLEITER. Cold Spring Harbor Laboratory Press, New York. 1990.

Thomas Clouston, in the 1904 edition of his *Clinical Lectures on Mental Diseases*, introduces us to an alcoholic patient with the following words: I shall now show you a typical dipsomaniac, F.B. His mother has been melancholic at one time, and her family was a neurotic [one].' We no longer issue diagnoses of dipsomania or melancholia, and even neurosis is falling into disuse, but study after study since then has shown that alcoholism tends to be a familial disorder and that at least some of the propensity to alcoholism is under genetic control. A great deal is known of the social, medical and economic harm generated by alcohol dependence itself, but our understanding of the factors, genetic and otherwise, that cause some people to become alcoholics in the first place and others not is both lacking and confused. It is with such issues that this volume of the Banbury

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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

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