Fundamentals of Genetic Epidemiology. Muin J Khoury, Terri H Beaty, Bernice H Cohen. (Pp 283; £35.00.) Oxford: Oxford University Press. 1993.

This is the first book which attempts to pull together all aspects of genetic epidemiology from the design of family studies through to linkage mapping and association studies. The major problem with producing a book on genetic epidemiology is to decide on the approach; either a single author could produce a detailed treatise on one aspect (as did Elizabeth Thompson, for example, in *Pedigree Analysis in Human Genetics*) or multiple authors might venture to produce a broader span. These authors (an epidemiologist, a statistical geneticist, and a human geneticist) took the latter approach and produced a largely seamless, readable volume where topics flow easily from one to another (and presumably from author to author). The book covers four broad areas: background and fundamentals of genetic epidemiology, population studies of genetic traits and genetic factors in disease, family studies (including segregation and linkage analyses), and applications of genetic epidemiology in medicine and public health. Many topics are covered in impressive detail, for instance, the case control study focusing on family history and the methods of segregation analysis. This probably represents both the strength and the weakness of the book (depending upon the reader's interests), the strength because of the detail of the methods but the weakness is that, in some instances, the text "catalogues" without giving indications of the reasons for choosing one method over another (for example, when to study extended families instead of nuclear families for segregation analysis).

Overall this is an admirable effort which should make many graduate student's life easier. There are few places where most of the covered topics are reviewed in any more detail than presented here, and this volume effectively ties the topics together. The one person that this book probably cannot help is the scientist who has performed a study and is having trouble interpreting the results of complex analyses as in perhaps segregation or linkage analysis; such detail is beyond even this volume.

D T BISHOP

The Calculation of Genetic Risks: Worked Examples in DNA Diagnostics. Peter J Bridge. (Pp 208; £37.00.) Baltimore: Johns Hopkins University Press. 1994.

At first glance this looks rather an old fashioned book. Flicking over the pages gives a powerful flavour of a time when almost all DNA diagnostics required an informative pedigree, typed for one or two two-allele markers, with a hard sum at the end. No PCR dot blots in those days, you had to really understand the genetics! A happy few people developed a great skill at reducing almost any genetic problem to a Bayesian calculation, done by hand on a suitably large piece of paper. Like people who can do the foxtrot, they are to be envied for their accomplishment – but isn't it all a little obsolete?

Not at all, says Peter Bridge. To use a computer package intelligently and safely, you need to have in reserve the ability to do the calculation by hand, at least approximately,

so as to appreciate which factors contribute to the risk. And the current computer packages cannot cope with several factors which can crucially affect the final risk, such as germinal mosaicism or the risk of maternal cell contamination. So there are chapters on Bayesian risk calculations for X linked and for autosomal diseases, using the pedigree alone or including biochemical or DNA data or both. There is also a chapter on linkage and lod scores which, characteristically, concentrates on showing how you can work the scores out by hand in suitable pedigrees.

The numerous worked examples raise most of the issues which need to be appreciated by anyone reporting genetic risks, whether they use a pencil or a computer to derive the numbers. It is not a general manual for genetic counsellors, being almost entirely focused on mendelian diseases where linked markers can help, nor does it deal with zygosity or paternity testing. Looking at the competition (and there is not much), Young's *Introduction to Risk Calculation in Genetic Counselling* (OUP 1991) covers a wider field, but has only 30 pages on using linked markers. Within its chosen area, Bridge's book is very thorough. Every combination of pedigree structure and marker data is discussed, with numerous tables showing the result of systematically varying one or more parameters. To me it has a strong flavour of somebody who has achieved total familiarity and total command of Bayesian methods through blood, sweat, and tears, and is now setting out his wealth of rather homespun lore for the benefit of non-mathematical readers.

Thus what you get is closer to a bench cookbook than an illustration of the intellectual outlines of the subject. There is a tendency to produce rules which work, rather than principles. For example, I don't think Bayes's hypothesis is ever formally stated, though it underpins the whole book. Whether you like this or not is a matter of taste, but it is no doubt a deliberate choice of emphasis, to make it user friendly to non-statisticians. If you worked your way through, you would undoubtedly build up a very substantial competence in risk estimation. And even in these days of direct mutation analysis, experience shows that you need genetic knowledge to understand what the result means. So the body of knowledge about how genetic markers should be used, which has been built up in DNA diagnostic laboratories over the past 10 years, is by no means obsolete, and this book does a service in codifying it.

ANDREW P READ

Chromosomes: A Synthesis. Ed R P Wagner, M P Maguire, R L Stallings. (Pp 523; \$89.95.) New York: Wiley-Liss. 1994.

Books on chromosomes can generally be classified into two categories: those written by biologists not working with human chromosomes in which the biological part is well presented, but data useful to those interested in medical and human cytogenetics are scarce or lacking, and those written by experts in human chromosomes in which the fundamental genetic part is absent or insufficiently presented. The present book falls into the first category. Written by well known experts, it is what it says, a synthesis of the knowledge of chromosomes in general. It is subdivided into the following chapters: (1)

Basic Chromosome Structure; (2) Chromosome Organization; (3) Chromosomes and the Cell Cycle; (4) Genetic Recombination; (5) Variations in Chromatin Organization and Amount; (6) Transcription and Its Regulation; (7) Chromosome and Gene Activity in the Interphase; (8) Gene Linkage and Chromosome Maps; (9) Organization of Genomes and their Chromosomes; (10) The Evolution of Genomes and their Chromosomes.

Each chapter contains a historical introduction, a box or boxes highlighting the main points, instructive illustrations, and a short summary. The medical genetics reader will especially enjoy the chapters on genetic recombination, transcription, and organisation of genomes. I found the chapter on the interphase not sufficiently up to date and lacking important newer aspects relevant to medical genetics. Likewise, the linkage and mapping paper does not deal thoroughly with chromosomal mapping methods, such as microdeletion mapping, phenotypic mapping, candidate gene approach, and mapping through structural chromosomal rearrangements. Among structural chromosome rearrangements, for example, no mention is made of the rare types of unbalanced segregation and of insertions. The impact of chromosome aneuploidy on the phenotype is not discussed. The new molecular methods recently introduced for the study of cryptic chromosome aberrations and aberrations which cannot be fully clarified with the traditional techniques are not appropriately dealt with to enable researchers to use them in cytogenetic laboratories. The rate of 1:200 for unbalanced chromosome aberrations in man is probably too high (p 274); likewise, the statement that deletions and duplications occur at random in all chromosomal segments (p 285) is most likely not true in man.

The nomenclature used is in many parts not that common and generally accepted in medical genetics. I found only very few typing errors and obvious errors in the field of medicine. The references in general are up to date to about 1990.

To summarise, the present book is useful for medical geneticists wanting to obtain an introduction to chromosomes in biology. It is not a standard book for cytogenetics, including human cytogenetics, and it is also not of high value for biologists wanting to learn medical aspects of cytogenetics. For such a work which would consider the rapid progress during the last years, medical cytogeneticists will still have to wait.

A SCHINZEL

Genes V. Benjamin Lewin. (Pp 1272; £29.95.) Oxford: Oxford University Press. 1994.

Previous editions of *Genes* will be familiar to most readers of this journal. The text is widely used in undergraduate teaching as well as by those of us who need to update our general knowledge of molecular biology from time to time. The author suggests that "studying genetics essentially means dealing with DNA, and in many respects *Genes* could be viewed as a textbook of modern genetics". For the editor of *Cell*, it is eminently logical to consider that what is going on inside the cell is paramount. The basic organisation of the