the main principles to be covered. This is followed by attempts to relate each new subject to those already covered. Boxed messages are used frequently to highlight important concepts and each chapter ends with a concise summary which reinforces those concepts. Every chapter was followed by a large number of problems (some with, and some without, answers) to test comprehension of the material covered. In addition, a comprehensive list of references for each chapter was supplied at the end of the book, adjacent to the glossary.

Throughout the book, there was good use of straightforward examples to explain complex issues. I particularly liked the explanation of the Poisson distribution, using an example close to the heart of student readers — the free distribution of dollar bills in a class. I appreciated the greater emphasis placed on human genetics although the much simpler prokaryotic and eukaryotic systems studied by students were still described in great depth. Also most welcome, and appropriate, were the sections on the role and importance of genetics in society. These included discussions of its significance at individual and at population levels. Attention was given to topical concerns such as biodiversity, increased exposure to radiation and chemicals, recombinant DNA and social responsibility. These are important issues that are frequently overlooked.

The book gives equal priority to classical and molecular genetics with the first half covering mainly classical eukaryotic genetics. This provides a sound basis for the more complex issues and molecular genetics detailed in the second half of the book. On the whole, I felt the first half of the book was better designed for students than the second half. When reading the later chapters, I sometimes wondered whether the level of detail given and complexity of issues covered were a little too daunting for anyone other than a "serious fully fledged geneticist". Basic information was frequently neglected of trivialized while more complex issues were discussed at length. This could easily confuse and confound a student. In addition, the simple practical aspects of genetic analysis were rarely explained. Whilst not wishing for a book describing the methods of molecular genetics (there are many good examples of those already) I felt that simple explanations of the more practical aspects would have been of great benefit to the reader.

It is four years since the fourth edition of this book was published. Although the fifth edition follows the same format as its predecessor, it benefits from the reorganization and expansion of several chapters. The most extensive alterations are seen in the chapters on developmental genetics, due to the introduction of an additional author, William Gelbart. The addition of colour illustrations and photographs greatly increases the allure of this book to a potential buyer and, at £25.95, it is a worthwhile investment for anyone wishing to advance their knowledge of genetics.

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**The Human Genome (Bios Medical Perspectives Series).** T. Strachan. Bios Scientific Publishers, Oxford (1992). Pp. 160. Price £13.95, paperback. ISBN 1 872748 80 5.

In the preface, Strachan states that the book was written to provide a concise description of current knowledge of the human genome, and for the most part this has certainly been achieved. The book is organized into six short chapters and each chapter is clearly written and therefore easy to read and understand.

The first chapter gives a good overview of the sequence organization in the human genome. It includes useful tables and figures comparing the nuclear and mitochondrial genomes and outlining the highly repetitive nature of the human genome. It also includes essential information about the structure of human genes and the regulation of gene expression, using specific genes or gene clusters to illustrate the points. This forms the basis from which the non-specialist reader can understand the remaining five chapters. The second chapter, which describes the many mechanisms which generate polymorphisms and also contribute to the evolution of genes and gene families, is equally good and full of useful illustrations. However, the interchangeable use of *VNTR* with either *microsatellite, minisatellite* or even *satellite* is confusing and it would have been better to have limited the use of the term *VNTR* to an alternative description of a minisatellite. This confusion continues into the third chapter on the analysis of the human genome where the section on *VNTR-based RFLPs and DNA fingerprinting* is very misleading. The reader is lead to believe that Southern blot analysis of minisatellites or VNTRs requires the use of a unique flanking probe. This is completely unnecessary, as minor alterations in the hybridization conditions remove or significantly reduce any signal from cross-hybridizing loci with related but different repeat units. In addition, the section on the analysis of microsatellites does not include the use of end labelled primers, multiplex analysis of multiple loci, or resolution on automated sequencing apparatus. Some of these adaptations are new and this may explain why they have been omitted from the book. A number of sections in this chapter have been written in such a generalized way that they are of limited use to any reader.

The methods of mapping the human genome are again explained clearly although this chapter also needs updating to include recently developed (and useful) techniques, such as exon trapping, for identifying genes. The last two chapters outline the types of mutations which cause disease, their relative frequency at different loci, and their effect on protein production and clinical phenotype. The final chapter also covers genes which contribute to susceptibility to common diseases, such as diabetes and coronary heart disease. All of these topics are described very clearly and with plenty of references to particular genes and diseases.

Since the book was published in 1992 some significant advances have been made in our understanding of the human genome and how it might be studied. Therefore (as indicated above) some sections of the book already need updating to include, for example, a more extensive section on triplet repeats in genes, expansion of repeat arrays between genera-

tions and manifestation of the disease. Despite this the author has given a good overview of the human genome and included many very useful tables and even more useful illustrative figures. Overall, the book is good value for money.

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**Genetic Engineering (Bios Medical Perspectives Series)**. J. Williams, A. Ceccarelli and N. Spurr. Bios Scientific Publishers, Oxford. 1993. Pp. 132. Price £14.00, paperback. ISBN 1 872748 75 9.

After reading through the initial chapters, which cover the standard topics found in 'genetic engineering' books, I was pleased to discover an area which is new to me, namely the application of molecular techniques to the treatment of genetic diseases. The reason for this somewhat less than enthusiastic start to the review is that I feel the book is reiterating what can already be found in other books of a similar nature. However, I do concede that this book is intended for students and workers in the field of medical research who may feel that other 'genetic engineering' texts concentrate too heavily or even exclusively on plant and bacterial systems. In this respect the book may be long overdue and is therefore to be welcomed by medical researchers. Speaking from a plant background, the areas that I found interesting were those that dealt with the strategies available for counteracting the effects of a mutant gene. In this section, as indeed throughout the book, the text is well explained and therefore easy to understand. There is a logical progression from one chapter to the next. Another good feature is the diagrammatic representation, which proves to be a most useful aid especially in explanations of the various techniques and the underlying principles upon which they are based.

To start at the beginning, chapter one provides a brief but thorough résumé of gene expression which serves both as a refresher and as an introduction to the old- and newcomer, respectively. Examples from mammalian cells are used to illustrate the descriptions of gene structure and the explanations of gene regulation. Chapter two follows with a basic introduction to the classical techniques used in gene manipulation. The use of different techniques in diagnostic applications is explained with references to genetic diseases, for example RFLP analysis in sickle cell anaemia. Chapter three ventures into the area of gene banks and how they can be used in homology searches to provide clues as to the identity of a cloned sequence. The power of PCR over conventional diagnostic procedures both in terms of time and sensitivity is expounded. Such features obviously update the book. Chapters four and five give extensive coverage of the wide range of vectors available for cloning purposes. An outline of cloning and screening strategies is presented, the aim being to explain the principles behind the techniques rather than to provide technical guidelines. Chapter six discusses cloning in higher organisms and describes the routes used to produce transgenic animals. The final chapter deals with the gene therapy strategies that are being proposed and tested, some of which in realistic terms are expected to be successful.

In conclusion, I would say that this book provides a comprehensive and thorough guide to the molecular techniques that can be and are applied to mammalian systems. It will therefore prove to be useful to those wishing to acquaint themselves with molecular biological approaches in this area.

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**Exons Introns and Talking Genes: The Science Behind the Human Genome Project**. Christopher Wills. Oxford University Press, Oxford. 1991. Pp. 368. Price £8.99, paperback. ISBN 0 19 286154 9.

'How brave a new world?' — just how close has the human genome project brought us to Huxley's view of the future? This is how Christopher Wills sets the scene for his book which traces the history as well as the science behind the human genome project. As is often the case in 'big' science, there is every bit as much political as pure scientific ambition underlying the instigation and course of such a programme. This book sets both out in an interesting (if patchy) historical context heavily biased towards the US initiative and experience. It is, however, no *Eighth Day of Creation* — Judson's illuminating documentation of the phage group and the discovery of DNA. Nevertheless, one suspects that there is every bit as good a story to tell about the human genome project (and certainly no shortage of characters amongst the protagonists). Unfortunately, where Judson skilfully blended in-depth interviews, anecdotal comments from the leading practitioners and a sharp historical and scientific appreciation into an enlightened story which has inspired many young scientists to choose biology as their discipline, the same cannot be said of Wills in *Exons, Introns and Talking Genes.* Is this because of context, style and topic? Is this because the pace of progress and prize for 'winners' is now so great and the plight of 'losers' so desperate (particularly when it comes to screening competitive funding) or is this really 'small' science, a mere technical exercise? I suspect that there is no single explanation. In taking up the mantle guardian of the project, Jim Watson was uniquely placed and committed by history, as well as conviction, to quote 'Only once would I have the opportunity to let my scientific life encompass the path from double helix to the 3 billion steps of the human genome'. This is a singular goal of molecular genetics which will have most profound implications on molecular medicine and a host of spin-offs for basic biological research. Despite the initial furore from certain quarters about the allegedly