Genet. Res., Camb. (1991), **58**, *pp.* 261–264 *Printed in Great Britain*

Book Reviews

Genome Analysis, Volume 1: Genetic and Physical Mapping. Edited by KAY E. DAVIES and SHIRLEY M. TILGHMAN. Cold Spring Harbor Laboratory 1990. 189 pages. Cloth $40 ISBN 0 87969 358 4.

Molecular biology in general, and genome analysis in particular, are extremely fast moving fields – so much so that it can be very difficult even for the mainstream participants to keep up with developments in their own field. There is a constant urgency to produce new data so that standing back and thinking about the aims and optimal methods of achieving them often have low priority in day-to-day life. Well, here is a book that provides much food for thought in less than 200 easy-to-read pages. There are five chapters on: fluorescence *in situ* hybridization (FISH); producing ordered clone sets for mapping and sequencing; yeast artificial chromosomes (YACs) for cloning, and gene manipulation; deletion mapping in the mouse for identifying new, functionally important loci; and lastly a discussion of simple sequence repeats, now so prominent in genetic mapping strategies.

Each chapter covers a growth area. The technology in each case is sufficiently advanced to be considered 'established', but the full spectrum of uses has not yet been exploited. Accordingly, the experimental methodology is only discussed in broad outlines, but is reasonably well referenced. Most of the text deals with the wider potential or possible pitfalls of the technique. For example it is clear that FISH is currently the method of choice for defining the position of chromosomal breakpoints, both translocations and deletions, although it must be said that the idea has not spread yet to the mouse, if chapter 4 is anything to go by. I am sure it will: having had good success in man we are just about ready to try deletion analysis in the mouse. The problem is that there is often a better genetic than molecular map in the mouse, but probes can be generated for example by utilising the known syntenic regions between species, a concept barely touched upon in the relevant chapters here.

The chapter on hybridization fingerprinting is a thought-provoking departure from the most entrenched approaches to producing ordered clone sets which eventually make up the maps. The authors discuss in simple numerical terms, but without any off-putting maths, the fastest route to establishing order and deducing some sequence. I have heard the arguments on previous occasions, but it is more convincing in printed form absorbed at my own pace. The YAC cloning chapter too gives insights into the versatility of this tool, the many different ways in which it can be utilized, for example for exon mapping in large genes and eventually for assessing function by transferring YACs into embryonic stem cells and eventually analysing them in transgenic mice.

The description of how to identify polymorphic microsatellite sequences (often referred to as $(CA)_n$ repeats) efficiently in specific regions is clearly essential reading for anyone engaged in generating new markers for genetic mapping. Sufficient numbers of perfect, imperfect and compound repeats have been analysed by the author to allow the drawing up of general guidelines for which sequences to pursue and which to abandon as unlikely to yield informative results – obviously worth investing time and effort to read this in order to save both on following up uninformative repeats.

A book like this would be sound investment for the library in any genetics laboratory. It could well inspire its readers to design more efficient and powerful approaches to solving their genome analysis problems. I wish I had got round to reviewing it faster, but each chapter has remained fresh and topical over the weeks the book lay on my desk. And that is a real achievement in this field. My appetite is whetted for volume 2 in the series which promises further fashionable topics.

VERONICA VAN HEYNINGEN
MRC Human Genetics Unit
Edinburgh

Genes and Genomes. By MAXINE SINGER and PAUL BERG. Blackwell Scientific Publications Ltd. 1991. 929 pages. £27.50. ISBN 0 632 02879 3.

Genes and Genomes is one of those large and lavishly produced American books appearing on the market at a price equivalent to about 50 units of *Taq* polymerase. It has nearly 1000 pages and two-coloured illustration by a talented team of scientific artists led by Charlene Kornberg. Perhaps it should be Singer, Berg and Kornberg, so integral to the material of the text are the 700-plus figures. It is in fact a mouth-

watering book and having deposited the review copy in our library, I went out and bought my own. I have never discovered how American publishers manage to produce these wonderful texts at such competitive prices; perhaps the size of the college market in the USA is an important factor.

As the title suggests, *Genes and Genomes* is about molecular biology. Part I is an historical overview of the status of molecular genetics in the early 1970s, that dimly remembered era before the advent of the recombinant DNA concept. Part II describes the tools for and the products of DNA manipulation; it is not quite Maniatis level but there is much more detail and better explanations than you will find in Old and Primrose. Part III moves on to the anatomy, expression and regulation of eukaryotic genes. Part IV is concerned with understanding and manipulating biological systems. This last is the weakest part of the book, as though, after 850 pages of densely argued material, the authors became exhausted.

I presume that the book is primarily directed at graduate students in the USA, and will be used in the course work that features in the first year of an American Ph.D. In this country, with its greater degree of student specialization, the book is more likely to appeal to the specialist researcher. But at £27.50 for the paperback version, it could be on any scientist's shelf. Genes might still be largely the property of geneticists but genomes are not, and I would encourage anyone in the biological sciences to buy this book and to dip into it periodically to get a sense of the discovery and excitement that runs through the molecular biological world.

D. J. A. BROCK
Human Genetics Unit
University of Edinburgh

Fundamentals of Molecular Evolution. By WEN-HSIUNG LI and DAN GRAUR. Sinauer Associates Inc. 1991. 284 pages. £16.95. ISBN 0 87893 452 9

This is a nicely sized tome of eight chapters covering most of the major areas of molecular evolution. The first two chapters are introductions to the two disciplines that molecular evolution brings together, the molecular biology of genes and population genetics. Both chapters are thorough but err on the dry side with no examples. It might have been interesting for instance to illustrate the different types of mutation with examples from human diseases.

The third chapter covers some of the methods by which the amount of evolutionary change in a sequence is estimated. However, neither the title of the chapter nor the first section mentions 'estimation'. Instead we are treated to some simple models of the evolutionary process which although useful later, I found unhelpful with no mention of the ultimate intent. There is also no discussion of the assumptions made in estimating the number of nucleotide changes. However, there is an excellent section on estimating the number of insertions and deletions which rightly emphasizes the subjective nature of such estimations; and more than competent introductions to estimating divergence from restriction enzyme work and DNA–DNA hybridization.

It is in the fourth chapter on the 'Rates and patterns of nucleotide substitution' that the book starts to come alive with the first data. All aspects of rate variation are covered except, sadly, the intriguing differences in the rates of X and autosomally linked genes, and rather criminally, the variation in rate during time.

The fifth and sixth chapters, covering molecular phylogeny and evolution by gene duplication and exon shuffling, are both excellent introductions illustrated with good examples. The seventh chapter deals with transposable elements and is good except for a very weak section on the control of transposable element copy number. Finally genome organization and evolution are covered in the eighth chapter.

Overall the book is factually very strong and will serve well as an introduction to the molecular side of Molecular Evolution. However, the population genetics aspects of the subject are short changed. There is no real discussion for instance of the neutralist/selectionist debate, of episodic clocks and mechanisms which control transposable element copy number. These are weaknesses which I hope will be remedied in the next edition, which I hear is already in preparation.

ADAM EYRE-WALKER
ICAPB
Zoology Building
University of Edinburgh

Chromosome Anomalies and Prenatal Development: An Atlas. Oxford Monographs on Medical Genetics No. 21. By DOROTHY WARBURTON, JULIANNE BYRNE and NINA CANKI. Oxford University Press. 1991. 104 pages. £65.00 ISBN 0 19 505145 9.

Intended by its authors for those who are interested in abnormal prenatal development either as a research pursuit or as applied to clinical practice, the atlas is based on material collected over a period of twelve years as part of a study of spontaneous abortion. The gross morphology of all specimens was recorded systematically. Dissection procedures were standardized but a full necropsy was performed routinely only in the last third of the study.

The book comprises five chapters, a reference list and index. The first section details the background and study methods, source of cases, the results of cytogenetic analysis and the definitions used for morphological classification of the abortion material. The proportions of different types of specimen are depicted as histograms according to karyotype and some clinical information is presented in the same format. The authors present much of their data as