areas of epidemiology of congenital abnormalities and routine screening, DNA analysis, cytogenetic and biochemical disorders, special techniques (two sections, including a review of intrauterine therapy), counselling, economics and ethical issues, and service provision. In the latter section there is a detailed description of the financial and operational basis of the system in the Netherlands (H Galjaard). Here, perhaps, an opportunity was lost to appraise this critically and speculate in the light of the radical changes now threatening our working practice in Britain. In other chapters there are detailed discussions of heterozygote screening for cystic fibrosis, cardiac ultrasound scanning, and the karyotyping of chorionic villi; there are also thoughtful essays on psychological, economic, and ethical aspects of prenatal diagnosis (the latter contains a memorable rebuttal of George Steiner's airing on television of the argument that prenatal diagnosis would have deprived us of Beethoven, in the author's words, Steiner's 'ode to joy'). Finally, there are several reviews which draw attention to new techniques such as preimplantation diagnosis and magnetic resonance imaging.

Given the list of distinguished authors, sustained excellence in content was assured, but for me an additional bonus was the sheer ease with which the book could be read from cover to cover. The editors are to be congratulated on this count, also for getting the book published so promptly and for providing us with edited transcripts of the discussions which followed papers. Many interesting points emerge from these discussions, for example, a scientist wonders how couples can be made anxious by a negative test result, the psychologist argues that the process of prenatal testing causes anxiety in women who do not realise they are at risk (presumably we are dealing with low risks here), and later on in the book a professor claims that in his region it takes four or five weeks to get an amniocentesis result and he spends 20 to 25% of his time on the telephone to patients justifying the delay! Now, if you are itching to discover who these people are or where they work, then you'll just have to read the book. At £60 it is perhaps only painlessly affordable to an obstetrician; perhaps your local one might be persuaded to purchase an extra copy for those who work in the laboratory. The contents of this book certainly qualify as essential, extremely pleasurable reading for everyone whose clinical work is in the field of antenatal diagnosis.

JOHN TOLMIE

The Colonization of the Pacific. Ed Adrian V S Hill, Susan W Serjeantson. (£45.00.) Oxford: Clarendon Press. 1989.

A curious title for a book chosen for review in *Journal of Medical Genetics*? In content, only 23 pages out of the 294 of text touch on topics of clinical relevance (the haemoglobinopathies and thalassaemia) and, apart from malaria in this context, there is barely a mention of any other disease, genetic or otherwise. Yet no justification is necessary, for the book is fascinating as well as informative, and will leave the clinician whose primary concern with DNA is diagnostic very aware of the much wider range of uses to which modern techniques can be put. The sheer physical difficulties of the colonisation of the Pacific

islands, of surviving and making a landfall in primitive canoes after hundreds or thousands of miles of ocean, challenge the imagination. The technical advances of genetics in recent decades, that provide the data used in this book to trace colonisation routes, are parallel if different types of achievement.

Increasing knowledge in the last couple of centuries of the islands and their peoples stimulated enquiries in many disciplines – biology, ethnology, oceanography, oral history – and, in the opening chapter, Bellwood summarily reviews the evidence other than genetic: anthropometry, osteometry, dentition, fossil remains, linguistics, archaeology. Here the only criticism is one of regret at the omission of any mention of the classic work of early investigators, for example, Te Rangi Hiroa; other than to Cook's exploratory and Wilson's missionary voyages at the end of the 18th century and the maverick Heyerdal in 1952, the earliest reference is 1962, by which time the general outlines of the colonisation of the Pacific had become clear. But this chapter is by way of an hors d'œuvre to the main work of appraisal of genetic data. Each of the next six chapters is devoted to a particular set of polymorphisms.

Kirk, with his characteristic thoroughness, reviews the data on red cell antigens, serum protein, and enzyme systems. For the blood groups he deals not only with the widely used polymorphic systems, but also shows the utility of the very rare antigens unique to this region. For the proteins he deals comprehensively with 24 polymorphic systems, draws attention to others for which there are few or no data, and incorporates previously unpublished results.

In chapter 3 on HLA, class I and II antigen distributions in Pacific populations are reviewed in detail for the serologically defined HLA-A, B, C, and DR antigens. Restriction fragment length polymorphisms in class I genes have not yet been explored in Oceania, but those of class II, the RFLPs associated with DR and DQ, are given detailed treatment since they show an unexpected heterogeneity among Pacific populations. The linkage disequilibria among the several loci not only show many haplotypes that are unique in Oceania but give an extra dimension to the definition of population affinities, additional, that is, to those described by gene frequencies alone. The principal surprise is not that the molecular data show greater diversity among groups than serological studies predict, but that such a small segment of the human genome provides such an accurate summary of the history of the colonisation of the Pacific.

The complement components (chapter 4) are less informative, since several are less polymorphic, with fewer available alleles or more extreme frequencies, though again there are alleles unique to the Pacific. There are few data on immunoglobulin allotypes (chapter 5), but then chapter 6 on mitochondrial DNA and chapter 7 on nuclear DNA of the globin gene region clearly show the potential for DNA markers in population studies. They show once again the extreme position of the highlanders of Papua/New Guinea, characterised by low frequencies of single α globin gene deletions, and the striking difference between highland and coastal New Guinea populations. In Melanesia the distribution of high frequencies of $-\alpha$ deletions as well as β thalassaemia shows a clear relationship to malarial endemicity, the two commonest $-\alpha$ deletions being either rare or absent outside Oceania. In Polynesia no hae-

moglobinopathies and no β thalassaemia had been reported, but the DNA analysis of the globin gene clusters shows clear evidence of ancestry from south-east Asia (high frequency of the Ia and the IIa α globin restriction enzyme haplotypes) and with Melanesia (a particular α deletion). On their journeys out from south-east Asia the ancestors of the Polynesians seem to have acquired genes from the Melanesian populations through whom they passed. The Micronesians also show affinities with south-east Asia but less, though unequivocal, genetic evidence of some Melanesian gene flow into Micronesia.

The final chapter draws together the material in the previous chapters. Though each deals with only a small proportion of the human genome, all produce conclusions that are surprisingly but satisfyingly consistent, and provide substantial support for the general interpretation from archaeological and linguistic evidence. The new DNA techniques obviously provide more refined genetic analyses than was previously possible. Apparent phenotypic similarities sometimes mask subtle differences at the DNA level, as shown for the HLA-DR antigens. The non-coding regions of DNA that are less subject to the evolutionary forces of selection provide an additional source of variation. Closely linked markers, sometimes within a gene, permitting analysis of haplotype frequencies and linkage disequilibrium relationships, are indicators of population affinities more useful than most single variants. Yet the more traditional serological techniques make a most important contribution, because larger sample sizes are possible.

This is a book to be recommended. Maintaining the high standards of the series in which it appears (Research Monographs on Human Population Biology), this book is highly professional and informative. It is, moreover, philosophically satisfying as a reminder of what man can be capable of, ourselves today with our sophisticated modern techniques and our earlier forebears without them.

D F ROBERTS

Introduction to Risk Calculation in Genetic Counselling. I D Young. (Pp 158; £12.50.) Oxford: Oxford Medical Publications. 1991.

Many doctors and their colleagues shudder at the thought of genetical statistics and this introduction to the subject should both reassure and educate them. It was designed for those who come across genetic risks, either in a clinical situation or in a laboratory setting. The text is simple, clear, and accurate. Risks for dominant disease are discussed together with the subjects of reduced penetrance, variable expression, and gonadal mosaicism; those for autosomal recessive diseases together with consanguinity; those for X linked diseases with discussion of different mutation rates in the two sexes and gonadal mosaicism. Empirical risks are given when theoretical risks are uncertain. Examples of realistic situations are worked through with figures and lucid calculations, and once the reader has understood the basic argument, a further question is asked to test his/her understanding. Are the risks different if the couple already has two healthy children? How do the risks change if the couple are first cousins instead of second cousins? The

impression is that Dr Young thoroughly enjoyed constructing this book and his pleasure is transmitted to the reader.

What other subjects might be included under the title? There are sections on linkage analysis, linkage disequilibrium, linkage heterogeneity, metabolic interference, imprinting, mitotic crossing over, and mitochondrial inheritance, all growing points of genetics. I was surprised by a chapter on balanced chromosome rearrangements and an appendix on prometaphase chromosome lengths and considered that the excellent account of empirical recurrences risks for chromosomal rearrangements was more useful than efforts to estimate risks through the sizes of the unbalanced chromosome progeny that might be produced.

There is no doubt that this will be a popular book because it gives confidence and satisfaction to its readers. It will be valuable to doctors on the fringe of genetics, to nurses, and to other members of a clinical genetics unit. However, clinical geneticists should not consider that this 'introduction' absolves them from the need to study texts that consider linkage, heterogeneity, and recombination in more depth.

SARAH BUNDEY

The Identification of the CF (Cystic Fibrosis) Gene: Recent Progress and New Research Strategies. Ed L C Tsui, G Romeo, R Greger, S Gorini. (Pp 409; \$92.50.) New York: Plenum Press. 1991.

In September 1989 three papers appeared in *Science* reporting the cloning of the CF gene. They included a description of the putative encoded protein product, the cystic fibrosis transmembrane conductance regulator (CFTR), as well as the fact that some 70% of CF chromosomes carried a mutant allele with a specific three base pair deletion ($\Delta F508$). This represented the first example of positional cloning (or reverse genetic cloning) of an autosomal gene, without recourse to assistance from a chromosomal aberration and without knowledge of the nature or even the tissue distribution of the gene product. As such it was a considerable scientific achievement and finally put paid to any residual doubts that might have existed about the powers of 'new genetic' technology. It is now quite acceptable to assert that any gene responsible for a mendelian disorder, or major susceptibility gene in a multifactorial disorder, can be cloned by similar methods.

Seven months after the *Science* papers appeared, a conference on CF was held in Sestri Levante, the proceedings of which are published in this book. The conference was organised by Giovanni Romeo, whose own conclusion from pedigree analysis that CF was a single locus disorder predated the establishment of the first genetic linkage in 1985. Most of the major groups who had participated in various mapping and cloning consortia were represented, as were the equally important groups who had pioneered the investigation of ion transport phenomena in appropriate CF cells. As Francis Collins recently remarked, "until the cloning of the CF gene the worlds of molecular biologists and cellular physiologists were in collision; now they are in fruitful collusion".

I would normally view the publication of conference proceedings as an unnecessary extra burden on the stretched resources of

medical libraries. In this case an exception can be made. The cloning of the CF gene was of such importance to the world of medical genetics that some record of how it was done and what it is likely to mean is appropriate. This book is a very adequate tribute to the extraordinary collaborations that made this event possible.

D J H BROCK

Catalog of Chromosome Aberrations in Cancer. 4th ed. Felix Mitelman. (Pp 2056; \$250.00.) New York: John Wiley. 1991.

This catalogue is a vital reference for all cytogeneticists and geneticists working in the field of oncology. The fourth edition comprises 14 141 cases collected from 3496 references. The dramatic increase in data since the publishing of the first volumes has required the information now to be published in two parts.

The major difference between this and the previous three editions is that data on unpublished cases have been excluded. This is because of the much larger amount of published information now available.

The overall format remains the same as the previous editions, providing karyotypes, morphological classification of the neoplastic condition, tumour site, and references. Molecular studies performed on cancer associated chromosome aberrations are presented at the end of each section. The morphological diagnoses have been considerably extended and are now presented in a more logical order which makes the retrieval of information on specific tumour types easier.

An overview of the information on the database is presented in relation to lists of journals from which the information was retrieved and the number of cases within the different disease entities. Precise details on how to use the Catalog are also given.

These volumes provide the cytogeneticist and geneticist with a rapid and easy to use comprehensive review of publications for all previously reported chromosome abnormalities in cancer. They provide vital information on the importance of each abnormality in relation to disease type for use in both research and service laboratories.

CHRISTINE J HARRISON

Genes, Brain and Behavior. Ed Paul R McHugh, Victor A McKusick. (Pp 251; \$119.00.) New York: Raven Press. 1990.

This book promises much. It is edited by an eminent psychiatrist and a famous medical geneticist. Most of the contributors of the 16 chapters are well known for important contributions in their fields and the book is attractively produced. It is disappointing, therefore, that it does not quite live up to expectations. The reason for this is probably because the editors have attempted a nearly impossible task for, as they say in the first sentence of their preface, their aim has been to produce a "course of instruction and a forum for presentation of recent findings". Attempting to sit upon both these stools simultaneously is a hazardous exercise for all but those with the most impeccable sense of balance. Here there is more than an occasional wobble.

The book begins with four chapters on basic genetics, the most interesting and useful of which for readers who already have a background in the subject is a historical survey of advances in medical genetics over the past 30 years by McKusick. However, most of the content of this volume consists of 10 chapters focusing on particular psychiatric or neurological disorders. In the middle of these are two chapters on topics of considerable interest and relevance but where the amount of space allotted is hardly appropriate to the theme of 'brain and behaviour'.

Mitochondrial genes get 20 pages and the whole of behavioural genetics is squeezed into just 16. Although individually most of the chapters are of high quality there is a fair amount of variation in the levels at which they are pitched. Presumably in an attempt to maintain equilibrium between technicality and the general readers' needs, the editors have asked all authors to produce a brief glossary of genetic terms at the end of each chapter. Inevitably these definitions are terse, sometimes approximate, and very occasionally downright misleading.

In its favour this book does contain much useful information and conveys much of the excitement of new developments in a rapidly expanding field where difficult problems are becoming tractable because of the availability of new techniques. However, in attempting to cover recent advances and at the same time provide the elements of a basic introductory text, the editors have failed in their aim of producing "an essential resource for all neurologists, psychiatrists, and neuroscientists".

PETER MCGUFFIN

Genome Analysis. Volume 1. Genetic and Physical Mapping. Ed K E Davies, S M Tilghman. (Pp 189.) New York: Cold Spring Harbor Laboratory Press. 1991.

The average clinical geneticist and even their molecular cousins may initially be slightly confused by some of the terminology in this book. For example, they will find that the proband is not a distant relative of a patient coming for counselling, as they might have guessed, but the component, in a hybridisation, which is fixed to a solid support. In other words, this is a serious book of techniques and protocols for some of the most advanced mapping technologies currently available, but there are also some examples for the clinical and molecular geneticist which are likely to revolutionise their trades over the next few years. Volume 1 of the series *Genome Analysis* is devoted to Genetic and Physical Mapping. The topics covered are fluorescence in situ hybridisation, with particular reference to nuclear organisation, hybridisation finger printing, yeast artificial chromosomes, germline deletion mutations in the mouse, and DNA polymorphism based on length variations in simple sequence tandem repeats.

The chapter on simple sequence tandem repeats, concentrating on (dC-dA)_n(dG-dT)_n polymorphisms, is written by James L Weber, one of the originators of the analysis of this type of polymorphism. The chapter can be thoroughly recommended for the excellent mix of theoretical background, practicalities, and useful examples.

The chapter on Yeast Artificial Chromosomes by Philip Hieter and colleagues is