FBI laboratory division it is very reliable for getting a confession from a criminal suspect using a straightforward question such as 'Did you take the money?' or 'Did you shoot so-and-so?' Neufeld remarks that in the 1960s and 1970s the primary developers of voiceprint analysis, using sound spectography, 'literally barnstormed the courts'. Criticism of the technique by other types of speech scientist led eventually to a study by the National Academy of Sciences in 1978, which concluded that the technique was acceptable only 'under certain circumstances'!

Section 1, on Legal and Social Issues, contains five important papers of very general interest: Arno Motulsky on Societal Problems in using DNA Technology, Dorothy Nelkin on The Social Meaning of Biological Tests, Alan F. Westin and Philip Reilly, both on Privacy Issues, and Joseph L. Peterson, who describes the uses and effects of forensic science evidence on the adjudication of criminal cases up to 1986. All these, and the lively discussions of each, I recommend to the reader. A general question which arises here and in other discussion sections is that of the future use of DNA databases and DNA analysis. The dramatic success of Alec Jeffreys' first foray into forensic science in England led to calls for DNA to be collected from all new-born babies for future use, and more specifically for DNA samples from all persons charged with a crime to be preserved. It is not clear whether complete DNA samples of suspects are being stored by the FBI or the private companies in the United States which undertake forensic tests for police forces, but it is certainly claimed that merely to keep the banding patterns using current probes will make it impossible to apply the improved methods in the pipeline to compare new and old unsolved crimes.

Should we all deposit our DNA in the emerging mega-databanks, so that in a few years or decades mega-insurance companies and employers will be able to determine our survival value (first-, second- or third-class life) and job suitability by reference to the giant database which HUGO (the Human Genome Organisation) is aiming at? It should be noted that the 1990 edition of *Genetic Maps* lists 550 human disorders for which the mutation has been mapped to a particular site, and this is only a beginning. Should we not be considering who is to get our DNA, in what form, and what they should be allowed to do with it – and, much more difficult – how to prevent it getting into the wrong hands? This will be a very serious question for our descendants.

As a final note, let me draw your attention to *Nature* (1989) issues of 11 May, page 89 and 8 June, page 408, and (1990) 9 August reporting on new arguments about the forensic use of DNA fingerprinting in the USA and its smoother passage in the UK.

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Population Biology of Genes and Molecules. Edited by NAOYUKI TAKAHATA and JAMES F. CROW. Published by Baifukan Co. Ltd, 3-12, Kudan Minami 4-chome, Chiyoda-Ku, Tokyo, 102, Japan. 1990. 370 pages. Price 9270 yen (about $61). ISBN 4 563 03890 3.

In November 1988 an international symposium on the 'Population Biology of Genes and Proteins' was held in Tokyo, Japan, where the International Prize for Biology was awarded to Motoo Kimura, founder of the 'neutral' theory of molecular evolution and mathematical geneticist par excellence. This volume serves as both proceedings for the symposium and a commemoration of the award. The book has 21 well-written chapters divided into seven sections, with the subjects covered ranging from cultural transmission to the molecular evolution of pigment genes. The list of authors, though heavily biased towards home-grown (Japanese) talent, is impressive.

The first section contains a summary of the neutral theory by the award winner himself and a historical perspective by Walter Provine. Provine argues that the 'neutral' theory was a radical departure from previous theories of drift, requiring as it did a decoupling of phenotypic and molecular evolution. However it is this very feature which may marginalise the theory. For although it can explain a wealth of data it cannot answer the central evolutionary question: 'why is the biological world so phenotypically diverse?'. This is a problem which Kimura tackles at the end of his chapter by proposing that environment change can convert a previously neutral allele into one under selection.

The second section is entitled 'DNA polymorphism' and contains excellent chapters by Weir on mapping the cystic fibrosis gene, and Langley on polymorphism in *Drosophila*. Of particular interest in the latter article is the observation of low polymorphism in regions of the genome with low recombination, hitch-hiking of neutral polymorphism by advantageous alleles being a possible cause. It is this sort of observation which threatens to greatly complicate the neutral debate by decoupling neutral polymorphism and substitution. The third chapter in this session (Satta *et al.*) is rather sparse on data but suggests interestingly that sequencing DNA may be more cost-effective than using restriction enzymes when looking for mtDNA polymorphism.

The other great evolutionary theory of random genetic drift is Wright's shifting balance theory. In section 3 Crow shows that the phase traditionally thought of as a weak link in the scheme, phase 3, can work with reasonable parameter combinations. It seems unlikely that Wright's theory will ever be directly proved or disproved, rather the critical parameters will be measured and inferences made as to whether the shifting balance theory occurs in nature. One of the most important variables is the

migration rate, measures of which Slatkin reviews. Finally Aoki presents a model of cultural transmission with a Wrightian flavour and Fukuda reviews the work done on *Trillium* species which underlines one of Slatkin's points, the long-range migration occurs and has important genetic consequences.

Section 4 has three chapters on multigene families. Yamazaki reviews experimental data from two gene families in *Drosophila*, and both Ohta and Watterson summarize their theoretical studies. Of great interest is the amylase allelic system which clearly demonstrates that selection is acting to maintain some of the polymorphism. Ohta looks at the mutation and substitution loads in multigene families in what is a rather poorly written chapter; and Watterson considers the number of alleles maintained in a multigene family. This last chapter is very difficult mathematically.

A related problem to that of maintaining genetic variation at the molecular level, is that of maintaining quantitative genetic variance. They may or may not have the same solution depending on whether the neutral theory really is correct in divorcing molecular from phenotypic evolution. Section 5 contains excellent chapters by Mukai, Hill and Tachida and Cockerham. Mukai reviews his very important experimental work characterizing mutations which affect viability. He argues that a model of mutation–selection balance is generally sufficient to explain the observed levels of variation, but that genotype–environment interactions maybe involved in certain localities. However the authors of the last two chapters in this section both point out that biological reality requires us to investigate models involving pleiotropy (Hill), and dominance and epistasis (Tachida and Cockerham). The work presented by Tachida and Cockerham shows that both epistasis and dominance have effects on the amount of genetic variation maintained and the ability to respond to selection. However the effects involved are not large – at most two-fold.

The sixth section is on molecular phylogeny. Nei and Livshits present recent work which supports the idea that modern man originated in Africa. However their chapter is most notable for a good discussion on the relative merits of using mtDNA to work out evolutionary relationships. Takahata introduces a novel theoretical treatment of allelic relationships, which when applied to the MHC loci suggests that overdominance, and not frequency dependent selection is responsible for the polymorphism maintained. Finally Tateno quantitatively considers the principle of parsimony often used in phylogenetic tree construction, showing by simulation that it is useful, though not always decisive or correct.

The final section of the book is entitled 'Molecular Evolution' and includes papers on visual pigment genes (Yokoyama and Yokoyama), the AIDS virus (Gojobori and Moriyama) and the evolution of the sex chromosomes (Miyata, Kuma, Iwabe, Hayashida and Yasunaga). The Yokoyama and Yokoyama show that there have been periods in the evolution of the pigment genes when the rate of non-silent substitution has been greater than the rate of silent substitution, a clear indication of advantageous alleles being fixed, especially when these periods can be matched up to the evolution of new functions. Gojobori and Moriyama examine the origins of HIV and the possibility of identifying regions suitable as vaccines; and Miyata *et al.* provide good evidence from sex chromosomes that it is the male which generates most point mutations. One feels that this latter observation has significant population genetic consequences.

The book as a whole doesn't have any particular message or central theme. It does however offer the reader a broad spectrum of good reviews from which much can be learnt. A number of chapters touch upon the neutral theory, and one is very much left with the impression that it will be some time before the controversy Motoo Kimura raised is finally resolved.

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The Genetics of Neurological Disorders. By MICHAEL BARAITSER. 2nd Edition. Oxford Medical Publications, Oxford University Press. 1990. 733 pages. Hardback £60.00; ISBN 0 19 261814 8. Paperback £30.00; ISBN 0 19 261813 X.

Russell Hoban once commented that a nervous disorder means an attack by the nervous system, and what chance do you have against a system? Books of this sort, documenting over 500 nervous afflictions with a genetic basis, tend to produce the same sentiment of being overwhelmed. Neurological disorders have highly visible phenotypes so it is not surprising that so many have been documented, ranging from writer's cramp to dentato-rubro-pallidoluysian atrophy and other ridiculously named conditions. Presumably, like most such clinical catalogues, it represents a far larger number of abnormal genes, it being the rule rather than the exception that such disorders are genetically heterogeneous. Inevitably therefore this is not a readable book but it is undoubtedly a superb one, the best of its kind. Many of the conditions described are vanishingly rare but collectively they crop up not infrequently in genetic, neurology and paediatric clinics and send the physician scurrying for a text such as this, with wonderfully succinct summaries and replete with over 200 pages of references. The author's reading of this vast literature is critical and he is seldom tempted to go beyond the available evidence, so the book will retain its value for longer than most.

The initial aim of the book was to provide an expanded *vade mecum* for counsellors, but it goes far beyond this in its scope. When appropriate, Dr Baraitser changes style from the encyclopaedic to that