

chapters interesting for those students who have some previous exposure to genetics. To complete the introductory section there are chapters on population and quantitative genetics. The latter introduces the basic methods underlying the analysis of continuously varying traits and stresses the power of these methods in analysing individual differences in behaviour. Ten propositions are provided which summarize the concepts involved in quantitative genetics and which serve to stress the interactive nature of genes and the environment.

The core of the book deals with the methods of dealing with human behavioural traits. Family, twin and adoption studies are considered in turn. The authors apply each of these study methods to the analysis of IQ and schizophrenia and, by use of these examples, illustrate how both a continuously varying trait and an all-or-nothing psychopathological condition are dealt with. Here the authors have been very careful to stress what can, and more importantly what cannot, be inferred from these studies. A final chapter surveys research in human behavioural genetics and covers a range of cognitive abilities, psychopathological conditions and personality traits.

This book is timely. It stresses the interactive nature of genes and environment in influencing behaviour; neither genes nor environment 'cause' a behavioural phenotype. This important message must be conveyed both to students and to the public in general if serious misunderstandings are not to arise. It is very probable that we will soon see the publication of much more research in which behavioural traits are associated with the possession of particular RFLPs. If this research is published with incorrect emphasis or inadequate discussion then inappropriate labels will be attached to individuals. We have already seen that once attached such labels can be indelible. For example, in the popular press the presence of the extra Y chromosome in XYY males has become associated with antisocial and criminal behaviour because this karyotype was initially reported as being frequent amongst inmates in mental-penal institutions. It is now known that the large majority of XYY males are law abiding individuals and lead normal lives. XYYs are also taller than average so that any survey which selects tall men for analysis is likely to reveal an increased incidence of this condition. It is possible therefore that a survey of the British police force (in which there is a minimum height qualification) would also reveal an increased incidence of XYYs. Had this been the survey initially conducted, then the presence of the extra Y would be correlated with laudable characteristics; a willingness to enforce the law and tackle unpleasant and dangerous issues. It is, unfortunately, all too easy to foresee genetics being misused in the future unless the interactive nature of genetics and the environment is conveyed to the general public. The possession of an RFLP associated with alcoholism does not label the holder 'alcoholic'

any more than the possession of fair skin labels someone 'sunburnt'.

This book is carefully written, it is a balanced account and should be read by students of all types but especially by students of molecular genetics, for it is in this area that linkage of molecular markers to plastic behavioural phenotypes is likely to be reported. Any discoveries made in the molecular analysis of behaviour have to be published with great care if they are not to be misunderstood or misrepresented and this book should help to achieve this end.

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*The Biology of Parasitism: a Molecular and Immunological Approach (MBL Lectures in Biology, Vol. 9)*

Edited by P. T. ENGLAND and A. SHUR. New York: Alan R. Liss Inc. 544 pages. Hard cover \$90.00, ISBN 08451 2208 8. Soft cover \$45.00, ISBN 0 8451 2209 6. Can be obtained in Europe from John Wiley and Sons Ltd, Baffins Lane, Chichester, Sussex PO19 1UD, England.

Parasitic diseases still cause an enormous amount of human suffering and economic loss, especially in the developing countries, and financial support for research is very inadequate. In 1977 about 80 times as much money was spent by the US government on cancer research, as on malaria, schistosomiasis, and other tropical diseases, which are estimated to infect 500 million people or more. Of course this is because parasitic diseases mainly concern poor people in poor countries, and the financial returns on sale of drugs or vaccines do not encourage pharmaceutical companies to spend the large sums required to develop the necessary drugs. Hence the study of parasitism on modern scientific lines has not received the attention it deserves. Much of the work supported by WHO and other international agencies tends to be orientated towards routine tests of drugs and epidemiological surveys, while basic biological research on parasites and parasitism is relatively neglected.

Current immunological and molecular research on a number of the more important protozoan and helminthic parasites is summed up in the 27 chapters of this book, written by participants at the annual courses on parasitism held at the Marine Biological Laboratory, Woods Hole, USA (somewhat surprisingly, in view of the location of the course, no mention is made of fish parasites).

The incidental scientific harvest from some of these studies is quite appreciable, as exemplified especially by the work on trypanosomes, which are haemoflagellate protozoa causing sleeping sickness in man and nagana in cattle. These organisms display an extraordinary range of variation in their surface antigens (VSG<sup>s</sup>). As pointed out by M. J. Turner and J. E. Danelson, something like one tenth of the entire

genome, comprising perhaps 1000 gene loci, is concerned with these antigens, and the system controlling switching from one antigenic type to another is amazingly complicated. No doubt, as is often pointed out, such antigenic variation helps the organism to evade the immunological defence system of the human or animal host, though – as mentioned by M. J. Turner on pages 365 and 366 – some of the antigens are not situated on the external surface of the protein molecules and are not recognized by neutralising antibodies. It is hinted that these ‘cryptic epitopes’ have some other role, not connected directly with immunological evasion. That this is so is perhaps supported by the fact that free-living organisms (e.g. *Paramecium*) also indulge in antigenic variation, though not so extravagantly as *Trypanosoma*. Whatever its biological significance, the trypanosome antigen system, which is far from being fully understood at present, is intensely interesting to molecular biologists, whose work is admirably summarized in this book.

Another topic on which much molecular work has been done recently is that of the circumsporozoite (CS) antigens of malaria parasites, which are discussed by V. & R. S. Nussenzweig. These substances are proteins containing highly repetitive sequences of small groups of amino acids, and are situated on the surface coat of the sporozoites, – the parasite stage which is injected into the blood by mosquito bites. In 1984 the gene for the CS antigen in *Plasmodium falciparum* – the most important human malaria parasite – was cloned and sequenced. This made possible the *in vitro* production of large quantities of antigen, from which it was hoped that a prophylactic vaccine could be developed. Optimists thought that with such a vaccine the problem of malaria might be overcome, and *Nature* of 16 August 1984 carried a leading article headed ‘Malaria vaccine in sight?’. However, similar forecasts of the elimination of malaria had been made before, e.g. just after the end of the Second World War, when DDT and new anti-malarial drugs (chloroquine) became available. But malaria is still with us, unfortunately. Perhaps this is not surprising: parasites – especially intracellular parasites – would not have evolved and survived were they not well protected from the many and various obstacles which could be placed against them. C. C. Wang (p. 413) states, perhaps rather too sweepingly, ‘there has not been a single successful vaccine against any parasitic disease’. Moreover the spread of drug resistance, especially of malaria parasites, is becoming steadily more menacing.

Parasitology is a subject in urgent need of more basic biological research. What might be done, if facilities were available, is well illustrated by a chapter by S. Ward on ‘*Caenorhabditis elegans*: a model for parasitic nematodes’. This worm, which has been the target for intense attention by the molecular biologists, is not a parasite, however. Partly for that reason it is

enormously more amenable to genetic and molecular experimentation than the protozoan or helminthic parasites which give us so much trouble.

The book contains a number of excellent accounts of recent researches, though inevitably the amount of information on different parasites varies greatly. Some important pathogens, e.g. *Coccidia* and *Theileria* are not discussed at all, and the existence of plant parasites, some of which like *Striga* cause huge losses of agricultural crops (including maize), is completely ignored. As for classical genetics, D. Walliker contributes a concise account of genetics of malaria parasites, but very little is known about the genetics of other parasites. In *Trypanosoma* the extensive studies of Tait and others on isoenzymes and the evidence for genetic recombination is not mentioned. G. S. Nelson contributes a very readable chapter on ‘Zoonoses’.

The book is less comprehensive than its title indicates, but is nevertheless a very useful source of information about current work. It makes one realise the vast extent of topics under the heading of parasitism, about which we still understand very little.

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*Genetic Effects of Air Pollutants in Forest Tree Populations.* Edited by F. SCHOLZ, H. R. GREGORIUS and D. RUDIN. Springer-Verlag, 1989. 201 pages. Hard cover DM 75. ISBN 3 540 50858 9.

‘Waldsterben’ or forest decline is clearly of overwhelming importance to foresters and the general public alike. This book looks at the effects that pollution is likely to have on genetic diversity within a species and is therefore of specific importance to forest geneticists.

The book represents a collection of papers presented at a meeting held in Grosshansdorf (Fed. Rep. Germany) in 1987 and organised by three working parties – ‘Ecological and Population Genetics’, ‘Genetic Aspects of Air Pollutants’ and ‘Biochemical Genetics’ – of the International Union of Forest Research Organisations (IUFRO).

The book is divided up into four different chapters, each containing a number of papers. Chapter 1 consists of two additional papers, not presented at the meeting on ‘Methods of sampling and genetic analysis’. Both papers are involved in explaining the use of isoenzymes to investigate genetic diversity within polluted populations and recommended ways of tree selection for further investigation in the absence of genetic tests.

Chapters 2 and 3 are entitled ‘Variation in response to pollutants’ and ‘Selection effects of pollutants’ respectively (although it is difficult to see any real difference in content and meaning between the two) whilst chapter 4 concentrates on the ‘Preservation of genetic resources’.