**Book reviews**

**Mutagenesis in Sub-Mammalian Systems:**
Status and Significance
Edited by G E Paget. (Pp xiv + 231; Figures + Tables. £8.95.)

Recently there have been stirrings of the old controversy about the extent to which man's social evolution can affect the course of his own biological evolution. Looking back, it is quite astonishing to find how close some distinguished figures in genetics came to the position that man's control of the environment means that he can avoid natural selection. Man's behaviour may change those characteristics that are biologically successful, perhaps in unforeseen ways, but he is just as much at the mercy of evolutionary forces as he always has been. It is all the more important, therefore, that we now face up to another possibility, namely, that man's behaviour may alter the rate at which change takes place by altering mutation frequencies. Concern about the introduction into the environment of many new influences with mutagenic potential has led to a great deal of research effort, not only by fundamental scientists, but by several different groups of applied scientists. That is what this book is about (in spite of a very misleading title). It reports the proceedings of a meeting convened by Dr Paget's Inveresk laboratories at which a number of distinguished European and American geneticists turned their attention to the use of sub-mammalian mutation systems (that is, up to and including mammalian cells) to recognise chemicals which might be mutagenic for man. The book is not concerned with mutation in micro-organisms as such, nor the effects of mutagens in any group of organisms other than man. Like all conference proceedings it is patchy. A delightfully lucid plea for *Drosophila melanogaster* to be used in mutation testing systems by Charlotte Auerbach tends to stand out in stark contrast to the imprecision that shows in some of the chapters. She almost convinced me. Bruce Ames gives a clear description of his views on the strategy that should be adopted in protecting man from mutagens and carcinogens. He may well be right that a microbial system should be the cornerstone of such a policy, but it is rather frightening to see how he and others jump the gap that separates mutagenesis from carcinogenesis. If screening for mutagens helps us also to recognise carcinogens, that is useful, but we should not assume that it also solves the problem of how cancer, or rather cancers, start. There are enough exceptions to the correlation between mutagenesis and carcinogenesis for it also to be a problem in screening, a topic dealt with sensitively by John Ashby. It would be churlish not to welcome this book as an attempt to bring different sorts of people together to discuss a vitally important subject, but the subject really demands a tighter analysis than this. Diana Anderson's sketch of available systems is useful, especially for the references, but here and in other chapters, in particular B J Dean's chapter on cytogenetics, the level is elementary and does not seem in keeping with the weighty matters under consideration. A good book to read and provoke thought, but it must be only one step on a long journey.

D G Harn den

**Genetic Mosaics and Chimeras in Mammals**

There has been much scientific activity in the study both of natural mosaics and of artificial mosaics such as those resulting from the successful manipulation of early embryos to make viable aggregation chimeras. Subjects with two different cell types recognisable by their genetic markers permit studies on cell lineage, clonal growth, totipotency, inductive influences, and cell selection, and provide information about the activation/inactivation of genes.

This volume contains chapters based on talks given at the Symposium on 'Genetic Mosaics and Chimeras' held in Gattinburg, Tennessee in April 1978. The book is organised into sections on problem areas rather than on the origin of the mosaic condition. This is valuable because it is stimulating for those not directly involved in this field to see the biological and experimental relevance of mosaicism (for example, X inactivation in female mammals).

The first section contains papers about the use of chimeras and cell aggregations in the analysis of gene expression during differentiation and development, the control of phenotypic expression (of growth and behaviour), and in the study of developmental potency. Teratocarcinomas derived either from gonadal tumours or produced experimentally...
from embryos or primordial germ cells show that the malignant phenotype results from a reversible change in gene expression.

Questions about the origin of the germ line, differentiation of the gamete, and sexual differentiation are examined in the second section. Reproduction and the germ line cells are considered for single sex chimeras by McLaren and for XX-XY mouse chimeras by Tarkowski, and aspects of sexual development are considered in the question posed by Ohno ‘Why not androgynes among mammals?’.

The largest section is devoted to X chromosome inactivation, the mechanisms of X chromosome differentiation, and non-randomness of X inactivation. Papers are presented on enzyme studies, dosage effects, and studies of maternally and paternally derived X chromosomes and X autosome translocations. The final section covers mathematical and statistical analysis of mosaicism.

Although the majority of papers in this volume are devoted to studies in mice, the contents have much to interest those whose studies are restricted to humans. Experimental studies are possible on human cells in vitro and many of the intriguing questions posed by this volume have special relevance to the medical geneticist.

Christine Gosden

The Neutrophil: Function and Clinical Disorders

This is an excellent book; it contains almost 800 pages devoted to the structure and function of this single blood cell type. This book instantly becomes the major reference work, but such is the vast research literature published every year on the neutrophil and its related disorders that it will require regular revision to remain up to date. The references are up to Autumn 1977 and should provide a more than adequate basis for a comprehensive literature survey.

There is an ever increasing list of disorders related to defective neutrophil function; some are inherited primary disorders but many more are secondary to a whole range of diseases. The neutrophil, for a brief passage from the bone marrow to the tissues, can be sampled and tested for its functional capacity, for its ability to adhere, to move randomly, to move in response to a chemotactic stimulus, to ingest, and to kill. The book is divided into two halves; the first half describes the normal structure and function of the neutrophil in terms of morphology, ultrastructure, and contents of granules, how the neutrophil moves in response to chemotactic stimuli and all the chemotactic factors released by the various mediators of inflammation, complement activation, Hageman factor activation, and those derived from cells.

There are excellent chapters on phagocytosis including factors affecting opsonisation, the basis for the metabolic burst occurring upon ingestion, and the way in which neutrophils actually kill microorganisms.

The second half of the book is devoted to clinical disorders of neutrophil function. It begins with a short chapter relating these disorders to the orderly sequence of function, viz adherence, movement, phagocytosis, killing. It then devotes a long chapter to neutrophil dysfunction secondary to humoral deficiencies such as opsonising or chemotactic factors or inhibitors of these, and another to primary and secondary cellular defects. The final chapters are devoted to chronic granulomatous disease, myeloperoxidase deficiency, and the Chediak-Higashi syndrome. These latter inherited diseases are very rare, but much insight has been gained from studying their neutrophil function.

We are becoming much more aware of relative deficiencies of neutrophil function and these can cause a variety of common clinical syndromes as a result of compromised host defences and increased infections. This book provides a comprehensive review of existing knowledge and should stimulate much more research into those conditions which are related to defective neutrophil function.

It is to be highly recommended.

Roland Levinsky