Cytogenetics

Chromosomes and Cancer. Edited by James German. Pp. xxv+756. (Wiley: London and New York, November 1974.) £17.40.

IT is well established that the great majority of cancer cells have grossly abnormal chromosome complements. Since malignancy is, in essence, a heritable loss of growth control, it is obviously tempting to relate its development to these visible derangements of the genetic material. Because some clearly malignant cells have apparently normal chromosomes, and because the chromosome abnormalities observed seem (with a few notable exceptions) to lack specificity, it has been argued that these microscopic rearrangements are merely a by-product or late result of the malignant process.

The book is the first in a series devoted to cytogenetics, although we are not told what other topics will be covered. It starts rather charmingly with a brief scientific autobiography by Curt Stern, followed by a review (by U. Wolf) of Theodor Boveri's 1914 publication *On the Problem of the Origin of Malignant Tumours* in which the questions of this field were first clearly formulated. The body of the book consists of what are essentially 22 review articles, grouped into four sections: disturbances of the genetic material; cancer as a clone; cytogenetics of certain specific cancers; and special approaches. The chapters stand pretty well independent of one another, with relatively little cross reference. This inevitably leads to some repetition —the classification of visible chromosome damage into gaps, breaks, and so on, is covered by three different authors. There is also some imbalance in the amount of space devoted to different topics—for example, Makino uses 31 pages (excluding references) to review in minute detail the admittedly fascinating but limited subject of canine venereal tumours, which are seemingly transmitted from animal to animal by whole-cell transfer, whereas H. J. Evans covers the entire field of radiation cytogenetics in only five pages more.

As with any multi-author book, styles vary widely. Personally I do not find this a disadvantage. The quality also varies quite considerably, from chapters which are rather dull catalogues of major publications to some really excellent resumés of complex subjects. I particularly enjoyed David Comings arguing for uninemy—"What is a chromosome break?"—O. J. Miller's section on cell hybridisation, and S. M. Gartler's review of the use of biochemical markers in mosaic individuals (including females heterozygous for X-linked markers) to study the clonal origin of tumours.

The recent and unexpected metamorphosis of the Philadelphia chromosome from a deletion into a translocation caught some authors with their hypotheses showing. In fact, the subject matter of the book by and large antedates the application of chromosome-banding techniques to tumour cytogenetics; and much new information is bound to emerge over the coming years. Dr German writes in his introduction that, for this very reason, it is "a highly suitable time to review previously accumulated knowledge". I thoroughly agree with him. Recent advances must be read in the current literature—a book like this justifies its cost by summarising, in digested and digestable form, a vast and complex literature which will generally be relevant for a good many years to come.

The general standard of contributions is high. I recommend this book to anyone interested in the subject of cancer, either for a quick overview of accumulated cytogenetic knowledge, or as a detailed reference source for those actively engaged in the field.

Martin Bobrow

Defects in solids

Theory of Defects in Solids: Electronic structure of defects in insulators and semiconductors. (Monographs on the Physics and Chemistry of Materials.) By A. M. Stoneham. Pp. xix+955. (Clarendon: Oxford; Oxford: London, May 1975.) £29.25.

THIS is a particularly worthy book, one which has long been needed by theoretician and experimentalist alike. Approximately the first half of the book leads one through a very detailed discussion of all aspects of the necessary theory, stressing the role of the perfect lattice, the electronic structure of the defect, and lattice dynamics. All the major theoretical models are discussed and their shortcomings made clear, in some cases brutally so. I think that the solid-state theorist will enjoy this part of the monograph particularly, although for the beginner it will be a daunting task. Many theorists will also find the second half of the book invaluable as the comparison of experiment and theory is especially well presented. Not only will it be informative, but it may imbue the reader with the motivation, so evident in all Stoneham's work, to attempt calculations of direct applicability to experiments already done and still to be done. This last part of the book will be much used by the experimentalist, not simply "to know what, if anything, they should believe of the present theories" but also because it will give them a clearer vision of the interaction between theory and experiment in solid-state physics.

There are various areas of defect physics which are not treated as they do not fall within the remit of the author to concentrate the electronic properties of defects in insulators and semiconductors. Thus, there is no attempt to treat line and planar defects, nor mechanical properties and defect production mechanisms. If this restricts the readership then the price will do so even more. Such possible restriction is a pity as this is an important book of considerable scholarship.

B. Henderson

Treatise on Solid State Chemistry. Volume 2: Defects in Solids. Edited by N. Bruce Hannay. Pp. xiii+527. (Plenum: New York and London, 1975.) $42.00.

THIS volume is the second in a series of works which aim to present the properties of solids from a chemical viewpoint. Studies of defects, imperfections or impurity ions may be described equally well from a basis of chemistry or physics and this volume has a definite chemical bias but is still suitable for physicists or materials scientists. As the existing literature on defects is predominantly oriented towards physicists it is refreshing to read a book with this change of emphasis. Within the volume seven aspects of defect properties have been selected and each is presented by a different author. Chapter titles range over the following topics: electronic structure and spectra of impurities in the more ionic crystals; colour centres in ionic crystals; dielectric properties; transport properties; semiconductors; magnetic properties; mechanical properties. In a single volume such a range of separate contributions has lead to some differences in the level of presentation but in general the book is suitable for first year postgraduates or people who are unfamiliar with some aspect of solid state chemistry. It is not easy to generalise on the work of seven authors but I felt that the book was clear and informative in those areas with which I am least familiar. In more familiar areas, however, it was apparent that much of the book must have been written several years ago. For an introductory text this is a minor fault but one consequence is that the references tend to be rather old and in an active field such as solid state chemistry this is a pity. Similarly in a few cases defect structures are discussed in terms of outdated models. In spite of these limitations this volume on defects in solids should prove a useful text.

P. D. Townsend