

from abacus,
through...bubble chamber...
carposporangium...
flying tuck...
pentaerythritol tetranitrate...
and (sic)
uncertainty principle...
to zymetic

CHAMBERS
DICTIONARY
OF SCIENCE
AND TECHNOLOGY
Revised edition 1974

£8.00 net

published by
W & R Chambers
11 Thistle Street
Edinburgh EH2 1DG

genetic experiments than *Paramecium*, though for biochemical work *Tetrahymena* is far superior. Finally *Tetrahymena* has recently been used for developmental studies, especially of the elaborate surface patterns of basal bodies, cilia, oral apparatus and so on. Thus the organism is now available for many different kinds of work, and a general review of the current state of knowledge about it would be very valuable.

This volume consists of some thirteen chapters written by about as many specialists and ranges over the taxonomy, cytology, life cycle, biochemistry, genetics and cortical development of the organism, with a final chapter on *Tetrahymena* as a nutritional and pharmacological tool. The styles of the different chapters are very diverse, from the relatively prosaic descriptive accounts of the taxonomy, life cycle, and some of the biochemistry, to far flung speculations in the genetics chapter of Allen and Gibson. Little attempt seems to have been made to interrelate the material in different chapters, and there is a certain amount of overlapping. The book is really a series of separate articles, tied together only by the fact that the same organism is mentioned in all of them. Viewed in this way, it is a useful source of information about the state of knowledge of various special topics in 1972

or slightly earlier, and for anyone planning to use the organism experimentally, it is essential reading.

The chapter by Frankel and Williams on "Cortical Development" is very comprehensive and clear, and the book ends with a bibliography prepared by Dr Elliott, after consultation with John Corliss, of no fewer than 1,700 citations stated to comprise all major and most minor publications on *Tetrahymena* up till 1972. This is one of the most valuable features of the book.

It seems to me that research on *Tetrahymena* may be approached from two opposing viewpoints. The first involves using the organism as a model cell whose behaviour resembles closely enough that of higher animals to enable it to be used for trials of pharmacological and dietary substances intended for use on higher animals or man. This is discussed in the final chapter by Hutner and others. It seems that one should be cautious in accepting the results of such trials, especially of drugs suspected of having carcinogenic, toxic, or other harmful effects on human cells, though the use of *Tetrahymena* as an agent for assaying preparations of particular amino acids or vitamins which are an essential requirement in its diet is more reliable.

The second approach to research on *Tetrahymena* is to study it for itself, as a remarkably interesting biological system, with many technical advantages for experimental work, helping us to understand all sorts of biological processes, whether biochemical, genetic or developmental. Here it does not matter so much that *Tetrahymena* differs markedly from cells of higher animals, for example in its presence of two kinds of nuclei, its extraordinarily elaborate surface structures, and finally its 'protozoan' nature—compressing all life processes into one and the same compartment.

Biologists expert in other matters, or those with more general interests, would be disappointed to find in this volume so little effort at assessing the overall importance of the work, and no attempt at all to write a single coherent account.

G. H. BEALE

Resistant plants

Breeding Plants for Disease Resistance: Concepts and Applications. Edited by R. R. Nelson. Pp. xii+401. (Pennsylvania State University: University Park and London, November 1973.) £6.85.

PLANT diseases are major factors limiting agricultural production throughout the world. Resistant varieties, which are less damaged by disease than others, are widely used to control diseases. This book attempts to summarise the

present state of our knowledge concerning the production of resistant varieties, with particular reference to some of the most economically important crop species.

The book is divided into two main parts. In part 1 the editor gives his views (many of which he admits are controversial) on the concepts, principles and terminology of breeding for disease resistance. Part 2 consists of sixteen chapters in each of which work on breeding for resistance in a particular crop species is summarised. Each chapter has been written by specialist pathologists, geneticists and plant breeders, mainly from the United States, with research experience in that crop. The format of these chapters varies from crop to crop but generally involves a short introductory section on the origin, economic importance and breeding system of the crop concerned and a description of the main sources of disease resistance. This is followed by accounts, which are often extremely brief, of breeding for resistance to some of the main virus and fungus diseases of the crop. An example of this brevity is afforded by the chapter on disease resistance in peas in which there are subsections on eighteen diseases in less than seventeen pages. Conversely, the chapter on soybeans deals in much greater detail with only four diseases in fourteen pages.

This lack of uniformity of treatment in different chapters can be disconcerting but is perhaps to be expected in such a compilation by so many authors, each with a different style and approach. It would have been useful if the editor had written a third part in which he attempted to draw general conclusions from the experiences described in the crop chapters, particularly in relation to the theoretical considerations outlined in part 1. As it is, the reader is left to draw his own conclusions from work on sixteen different crop species.

I find it surprising that a book of this nature includes no line drawings or photographs. Illustrations of disease symptoms and of examples of differences between resistant and susceptible varieties after exposure to infection would have been particularly interesting and useful. As a result of editorial policy, the book contains remarkably few references to original published work on disease resistance. A less restricted bibliography would have made this a much more useful reference book.

In spite of its limitations and shortcomings, this book is an up-to-date, authoritative account of breeding for resistance to diseases. As such it deserves to be read by all those concerned with plant pathology and plant breeding.

G. E. RUSSELL