is rather poor: for example, some data have been presented without references, although they were culled from only one or two papers, and there are some lapses in linking textual material with the references quoted at the ends of chapters.

The authors, in their preface, express the hope that "the material will prove useful not only to the advanced student but to the mammalian radiobiologist and the physician as well". This hope will be fulfilled if such readers concomitantly have at their disposal fuller and more authoritative sources of information on basic cellular radiobiology. On the other hand, this book will be invaluable to the cellular radiobiologist who is interested in the impact of his work on radiobiological investigation at a higher level of organization. When, after the Second World War, data on 'acute' radiation death started accumulating, it scarcely seemed possible that all the facts could ever be accommodated within one simple pattern. During the past decade it has become ever clearer that they can be, and much of the evidence, therefore, is here most usefully collected together.

TIKVAH ALPER

THE FUNGAL CELL

The Fungi

An Advanced Treatment. Edited by G. C. Ainsworth and Alfred S. Sussman. Vol. 1 : The Fungal Cell. Pp. xvi+748. (New York: Academic Press, Inc.: London: Academic Press, Inc. (London), Ltd., 1965.) 192*s*.

THE Fungal Cell forms the first volume of a three-volume treatise, of which the later two volumes will deal with fungi as whole organisms and with fungal populations. The purpose of the whole work is, to quote from the editors' preface, "to summarize what is known about fungi as fungi" and to serve as a reference book.

The fungal cell in its various aspects is dealt with in twenty-seven chapters by different authors. The first two chapters are introductory to the whole treatise, the first being a most readable historical introduction by G. C. Ainsworth, and the second, a summary outline for the non-mycologist of the structure and organization of different fungal groups, by C. J. Hickman. There follow five chapters on structural components of fungal cells (including cell walls, flagella, nuclei and ultrastructure of the cytoplasm), two on chemical constituents of fungi, five on cellular metabolism, fourteen on nutrition and growth, and a final chapter on gene action.

In general the coverage is very complete, but there are some gaps, especially in the section on cellular metabolism. D. J. D. Nicholas deals with the utilization of inorganic sources of nitrogen, but there is no chapter on amino-acid metabolism even though this subject offers scope for the kind of comparative treatment which would fit very well in a book such as this. More important, nothing is said about the regulation of cell metabolism by induction or repression of enzyme synthesis or by end-product inhibition of enzyme activity. The question of how far fungi share the regulatory mechanisms which have been demonstrated in so much detail in bacteria is an important one, about which a considerable amount can now be said. Perhaps the book was written a year or so too soon for a chapter on this subject.

Concerning the chapters which have been written, I have few serious complaints. Naturally enough some seem more interesting and readable than others, but all are written from expert knowledge and nearly all have excellent bibliographies. Here and there it seems that a greater integration of the different contributions would have been desirable. For example, C. F. Robinow and A. Bakerspigel deal with nuclear division in vegetative cells, while L. S. Olive covers meiosis and also touches on the post-meiotic divisions in asci. This somewhat artificial division of subject-matter is adhered to rather strictly, and one is left in some doubt as to whether there really is an important difference between mitosis in the ascus and mitosis in the vegetative mycelium, or whether the difference lies more in the different points of view of the respective authors. Each of these chapters is extremely interesting within its own terms of reference.

In one way this volume must have posed problems for the editors which will not arise with the later volumes. At the cellular level, especially in most of their metabolism, fungi are much the same as other organisms. One possible approach, and one which the reference by the editors to "fungi as fungi" might be understood to favour, is to take for granted, or to sketch in briefly, those aspects of cell structure and metabolism which are common to fungi and to other organisms, and to concentrate on those features of fungal cell biology which give the group its special characteristics. R. T. Moore, in his well-illustrated chapter on ultrastructure, takes this approach, dealing with cell-wall structure and septal pores, the behaviour of the nuclear membrane during mitosis, sporogenesis and haustoria. It might, in fact, have been better to have included some reference to, for example, fungal mitochondria, even if it was only to say that they were similar in structure to those of other organisms. One of the most interesting chapters dealing with the specifically fungal nature of fungi is that of N. F. Robertson on hyphal extension and branching, but the brevity of his account serves to emphasize how far we are from being able to account for even simple morphology in biochemical terms. The alternative point of view is represented by the chapters on glycolysis, by H. J. Blumenthal, on the tricarboxylic acid cycle, by D. J. Niederpruem, and on terminal electron transport by A. Lindenmeyer. Much of the space in these chapters is taken up with documenting the unsurprising proposition that fungi have, for the most part, the same enzymatic equipment as other organisms. This will no doubt be valuable for the fungal specialist, even though not very exciting for the general biologist. D. G. Catcheside's chapter on the rapidly moving subject of gene action has a rather different *raison d'être*. Here, although the general conclusions drawn are probably as applicable to other groups as to fungi, much of the best evidence comes from work with fungi, especially with *Neurospora crassa*.

Some diversity of treatment and approach is inevitable in a compendium of this kind, and it cannot be said to detract seriously from the value of the volume. This and the companion volumes seem likely to remain standard works of reference for many years to come, in spite of their extremely high price.

J. R. S. FINCHAM

TEA-GROWING

Tea

By Dr. T. Eden. Second edition. (Tropical Agriculture Series.) Pp. xvi+205+73 photographs. (London: Longmans, Green and Co., Ltd., 1965.) 45*s*. net.

THE first edition of *Tea* appeared in 1958 (see *Nature*, 182, 1577; 1958) with a second impression in 1960. This new edition does not differ fundamentally from the first, although a few sections have been altered or rewritten. The size of the book has increased by only four pages and the price from 35 to 45 shillings.

Tea is one of those tropical crops, like sugar cane, that are voracious consumers of nitrogenous manures, and these are all-important. The section on nitrogenous manuring has been rewritten and the results of recent experimental work incorporated. A feature of tea cultivation is the use of shade trees, usually leguminous. "Shade