

interactions which occur between fungi and other organisms is also included. On balance this is probably the least satisfactory section of the book, for the sheer volume of available data on the subject renders satisfactory condensation into around a hundred pages almost impossible. As a result, there is a certain feeling of discontinuity about the text, and this disquiet is heightened by the fact that the author has been rather less than objective in his assessment of some of the material. Thus, in discussing the translocation of nutrients by fungi, the work of Schutte is given great prominence, while that of Lucas and his associates which questions the basic premise of Schutte's experiments is included almost as a curiosity. The last two sections dealing with "Recombination" and "Speciation and Evolution" show the same crispness and coherence of narrative that were apparent in the first section. The sexual cycles of the fungi are examined in relation to the exchange and recombination of genetic material, and due attention has been paid to the unique non-sexual mechanisms which generate variation within certain groups. Particularly noteworthy is the salutary emphasis on the significance of these mechanisms under natural conditions.

Overall, the balanced selection of material together with the critical appraisal of its merits make this a most valuable work. The illustrations are generally instructive, although some relating to intracellular structures might have been better left as photographs. Nevertheless it must surely rate as one of the outstanding textbooks on mycology to reach the market in recent years, and anyone whose work involves some knowledge of these fascinating organisms will be grateful to the author for having put the subject into such sharp perspective.

R. K. ROBINSON

VIRUSES IN PLANTS

Plant Viruses

By Kenneth M. Smith. Fourth edition. (Methuen's Monographs on Biological Subjects.) Pp. ix+166+15 plates. (Methuen: London, March 1968.) 30s.

EIGHT years ago, when the third edition of Professor K. M. Smith's *Plant Viruses* was published, I commented that it was regrettable that plant viruses were so little studied in British universities, and the third edition was welcomed in the hope that it would encourage such study.

In the past few years plant viruses have, at last, achieved recognition in several British universities and have taken their place in both teaching and research programmes. At the same time plant virology has continued to advance so rapidly that the absence of an up to date introductory text to the subject has become marked.

This new fourth edition is very welcome, therefore, and it should do much to interest students in the subject.

The new edition is virtually a new book; the increase in page size and a more readable type alone are great improvements. There is little increase in the volume of the book, however, the number of pages having been reduced slightly. There are fifteen plates bound together in the middle of the book—a practice which I feel lessens their value considerably—and two figures accompanying the text.

Sections which have been rewritten and expanded include those on symptomatology, physiology of disease, transmission by vectors, transmission by other methods, serology, isolation and purification, testing for viruses, assay and control of virus diseases. Included in this fourth edition are new sections dealing with the morphology and ultrastructure of virus particles, chemistry of plant viruses, infection and replication, tissue and cell culture of plant viruses, and nomenclature and classification.

It would be surprising if one could not find omissions in a book of this size. For example, in chapter five, there is no mention of the theory of quasi-equivalent bonding of identical subunits to form isometric shells of varying sizes and appearance with icosahedral symmetry. Without this, the results of the high-resolution electron microscopy and X-ray diffraction studies described must be of doubtful value to the student "with no previous knowledge".

The section on the chemistry of plant viruses is brief, and no mention is made of the characteristic electrophoretic mobilities, isoelectric points, or sedimentation coefficients of different viruses, nor of the different ultra-violet-absorption spectra of the protein and nucleic acid constituents of viruses. Yet all of these have important practical applications in virology. In chapter eight on vector transmission, Cadman's *Nepovirus* group of soil-borne viruses is discussed (with no explanation of the term), but the other group of nematode-transmitted viruses which are rod-shaped is not mentioned.

The final chapter contains an unusual assortment of subjects: a short but welcome discussion of the topical problems of nomenclature and classification of viruses together with the down-to-earth considerations of the control of plant virus diseases.

These examples demonstrate my main criticism of this book, which is that insufficient space has been allowed to accommodate our much-increased knowledge of plant viruses, resulting in some loss of clarity and accuracy.

These points having been made, however, there is much in this book that should interest students and stimulate them to further study of plant viruses. It can be recommended to all students of biology.

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Applied Sciences

EXPLOITING FISH

Fisheries Biology

A Study in Population Dynamics. By D. H. Cushing. Pp. xii+200. (University of Wisconsin Press: Madison and London, August 1968.) 71s 3d.

SINCE the war, fisheries science has witnessed many advances, among the most important of which has been the growth of quantitative studies of the dynamics of exploited fish stocks, embracing the development of appropriate, theoretical dynamic models, describing the

biological and man-made processes governing fish production and fishery yields, and the necessary analytical methods for their evaluation. In this book, the author gives an account of this basic theory, the methods of analysis and some of the results of their application in the study of a number of important marine fisheries, mainly in the north-east Atlantic. He deals with his extensive subject matter in ten well-chosen chapters. The first six chapters deal with the basic concepts, theory and methods used in population dynamics study and their application in fishery management problems; chapters seven and eight, respectively, consider in more detail the processes