contents of these two volumes clearly reveal that the basic premises of energy flow and production studies, on which the IBP is largely based, are both stimulating and fruitful.

F. B. O'CONNOR

FUNGAL WORLDS

The Fungi: An Advanced Treatise

Vol. 3: The Fungal Population. Edited by G. C. Ainsworth and Alfred S. Sussman. Pp. xix + 738 + 13 plates. (Academic Press: New York and London, August 1968.) 254*s* 4*d*.

THIS is the third volume of the treatise edited by Drs Ainsworth and Sussman, the first two volumes of which were concerned, respectively, with the fungal cell and the fungal organism. Whereas the earlier volumes dealt, in the main, with fungi in pure culture in the laboratory or fractionated into their chemical components, this one takes the reader into the larger and messier world of fungi in their wild state. To the laboratory experimentalist much of the knowledge reviewed in the present volume will seem inconclusive and unsatisfactory. Nevertheless, it was an excellent idea to cover in the same series both the molecular, which is sometimes so precisely known, and the ecological, which often seems so nebulous. Understanding of the larger biological environment, of which fungi are an important part, is as important for the future of man as knowledge of the internal workings of the cell, if not more so. One may hope that each field may eventually help to illuminate the other.

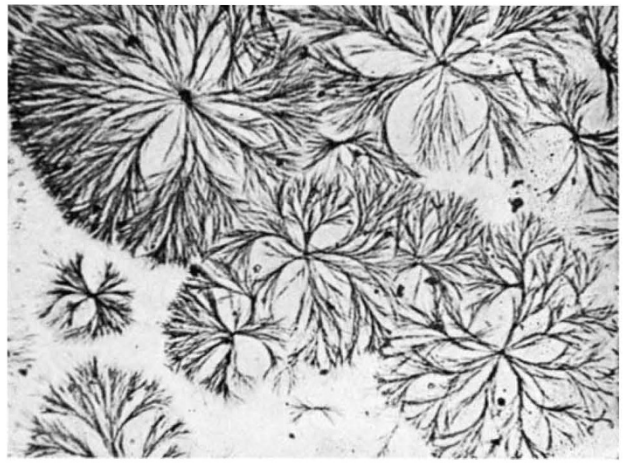
There are twenty-seven chapters, almost all by different authors, and they show considerable variation of approach and style. One approach is exemplified by David Park, whose chapter on "The Ecology of Terrestrial Fungi" is an essay concerned with general principles with relatively little emphasis on actual examples. Others, like Sparrow, who contributes chapter 2 on "Ecology of Freshwater Fungi", are more concrete; in Sparrow's chapter different kinds of freshwater environment are dealt with in turn, many fungal genera are mentioned in context and there is some discussion of sampling techniques. I preferred Sparrow's approach, but this is doubtless a matter of taste. Later chapters in the first section on saprobic fungi deal with other types of environment and ways of life—marine, thermophilic and psychrophilic. After a bridging chapter on mycorrhiza (by Harley) there is a substantial section on parasitism in which the invasion by fungi of plants, vertebrates, invertebrates and of other fungi is reviewed in turn.

There follows a series of chapters concerned with special aspects of response of fungi to their environment, including an account by Mazur of survival after freezing and desiccation which is likely to hold even more interest for keepers of laboratory collections than for ecologists. Person's article on "Genetical Adjustment to the Environment" is stimulating and thought-provoking, especially on the subject of parasitic specialization. The volume concludes with a number of chapters dealing, from various points of view, with taxonomy and evolution. The chapter by Barnett on biochemical criteria for the classification of the yeasts serves to emphasize that this group is the only one among the fungi in which the comparative biochemical approach is yet possible. Among the chapters on evolution Savile's confident and somewhat combative account of the relationships and origins of the major fungal groups contrasts with J. R. Raper's cautious treatment of such smaller-scale but baffling matters as the origin of multiple-allele systems of heterothallism.

The editors promise us a further volume on the main fungal groups. This should increase the value of the other volumes and round off a very worthwhile series.

J. R. S. FINCHAM

MICROCHEMISTRY OF LICHENS



At present there are about 36 different chemical substances known to occur in lichens of the genus *Cladonia*. These substances are identified by microchemical techniques and can be a help in the taxonomy of the group as each species contains at least one characteristic substance. In a new compendium by John W. Thomson (*The Lichen Genus Cladonia in North America*, Toronto University Press and Oxford University Press, 121*s* 6*d*), the chemical substances are identified and illustrated. The substance shown here is cryptochlorophaeic acid, diagnostic of the species *Cladonia cryptochlorophaea*. The microchemical test for this acid on dried extract of the lichen is one part each of glycerine, alcohol and water. The result is a series of very fine, needle-like crystals which radiate out from condensation nuclei and which branch and rebranch to form hair-like masses.

PANORAMA OF THE FUNGI

Fundamentals of Mycology

By J. H. Burnett. Pp. xiii + 546. (Arnold: London, October 1968.) 130*s*.

ANYONE attempting to compress the many facets of mycology into one medium-sized volume sets himself a task which few aspiring authors would even consider. Yet this is exactly what Professor Burnett has undertaken, and there can be little doubt that his aim of presenting an overall picture of the fungi has been achieved to a remarkable degree. Nowhere is superficiality accepted, but instead detailed accounts are presented in a manner which will retain the interest of beginner and specialist alike.

The text is divided into four broad sections, and the first of these deals with structure and growth. The account starts with a consideration of the fine structure of hyphae and moves into a discussion of the organization of hyphae into a mycelium and finally into the structures of reproduction. Some of the descriptive passages, such as that dealing with spore dispersal, are, of necessity, remoulded from standard texts, but sections which review rather more controversial topics, for example the dynamics of hyphal growth, make stimulating reading. This interest is generated partly by shrewd selection of the relevant data, but more particularly by the manner in which the absence of critical studies in certain areas is fully exposed rather than being shrouded by some nebulous half-truth.

The second section, "Function", discusses the biochemical and physiological activities of the fungi under both laboratory and natural conditions. Simple aspects of metabolism are covered together with the absorption and translocation of nutrients, and a glimpse of the