The Filament Fungi. Volume 1, *Industrial Mycology*. Edited by J. E. Smith and D. R. Berry. Pp. xii+340. (Edward Arnold: London, April 1975.) £12.50.

THIS is the first volume of a series devoted to the filamentous fungi and is intended to be used by senior undergraduate and postgraduate students as well as by workers involved in the pharmaceutical, chemical and food industries. The industrial applications of yeasts have been fully considered elsewhere and have not been included.

Twenty authors have contributed the sixteen chapters which constitute this volume. The backgrounds of these authors are somewhat different but it is of interest that all except four are at present working in Britain. Academics are more frequently represented than those engaged in work in industrial establishments.

No attempt is made to provide any treatment of the taxonomy of filamentous fungi or to provide assistance in their recognition. The first portion of the book deals with such fundamental aspects as structure and development, environmental control of physiology, secondary metabolism and its relationship to growth and development, strain improvement and stability and growth kinetics. The fungi are particularly prolific in the production of a wide range of secondary metabolites and since only a minority of species has so far been studied the real extent of the range of products they can produce is likely to be shown to be very much wider than is at present appreciated.

The second portion of the book deals mainly with the fungal fermentation industry. In an account of the historical development of this industry it is shown that the discovery of penicillin, followed by other antibiotics, provided the main initial impetus for the rapid expansion of the industry at a time when the background knowledge made such an expansion possible. After a discussion of commercially important secondary metabolites there are chapters dealing with the commercial production of organic acids, the transformation of organic compounds by fungus spores, industrial enzyme production, industrial exploitation of ergot fungi and oriental food fermentations. In a chapter entitled 'Submerged culture production of mycelial biomass' the modern developments in the production of protein by mycelial biomass and in the production of mycelium for use as flavouring agents are discussed. Three useful chapters on the cultivation of edible mushrooms, mycotoxins and biodeterioration and biodegradation by fungi are provided.

Not only does the text provide an up-

to-date and comprehensive treatment of the subject but the citation of a considerable number of publications at the end of each chapter is useful. The book is well produced although the few photographs are rather poorly reproduced. It represents a valuable review of an important field of study.

J. Colhoun

Mycogenetics: An Introduction to the General Genetics of Fungi. By J. H. Burnett. Pp. xiv+375. (Wiley: London and New York, 1975.) £12.50, cloth; £6.00, paper.

THIS work gives wide coverage to all the significant aspects of fungal genetics, and comprises four sections: structure and life histories of the various groups of fungi; formal genetics (genetic markers, linkage and recombination in

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meiotic and mitotic systems, extra-chromosomal elements and quantitative inheritance); population genetics (variation, selection and isolating mechanisms); industrial applications; genetics of fungal pathogenicity; and the mechanism of recombination and of gene action and regulation in fungi. Although there are no photographic plates, the text is admirably illustrated with numerous diagrams, figures, line drawings, tables and graphs. Worked examples are included and should prove valuable in understanding the complexities of, for example, the analysis of unordered tetrads and of certain aspects of quantitative inheritance.

The text is not easily read because of the extreme condensation of research publications, the profusion of technical terms and frequent directions to refer backwards or forwards to chapters or illustrations. There is also the interpolation of numerous references to original work. The introductory reader must be prepared to cope with the 'jargon' liberally sprinkling the text, as no glossary of these perplexing terms is given. Indeed, a few of the terms are not even defined in the text: for example, introgression, allopatric and sympatric.

The author must be taken to task on a number of points where I feel important omissions, ambiguities or even errors have been made. For instance, in the legend to Figure 5.4 it is mentioned that 43 out of 120 *trp-1* mutants of *Neurospora crassa* show no complementation with each other or with any of the mutants which fall into the eight complementation groups. The significance of such non-complementing mutants is not considered.

In the analysis of ordered tetrads, the

author states that the centromere distance of a locus is half the percentage frequency of second-division segregation asci for that locus because "a single cross over involves two of the four chromatids, that is, half of them". In fact, in higher diploid organisms the map unit was based directly on recombination percentage which represents the percentage frequency of "half chiasmata". In a second-division ascus, a whole reciprocal chiasma has been detected and so the percentage frequency of second-division asci is divided by two to give the centromere distance in conventional map units. The author then states that double cross overs between the locus and the centromere will be recorded as first-division segregations. This is not true because a three-strand double cross over will be recorded as a second-division ascus, as if a single cross over had occurred. The author attributes this "reduction in the real incidence of recorded cross over" to account for a maximum value of 67% second-division asci. This statement is somewhat ambiguous.

In the explanation of hybrid DNA formation during recombination between two of the four chromatids with the resulting formation of mis-matched base pairs, the author states, "Any mis-matched base pairs in the 'hybrid DNA' region are then corrected". He fails to realise that sometimes none of the mis-matched base pairs may be corrected so that no gene conversion occurs but post-meiotic segregation leads to the formation of "aberrant 4+:4m asci", with 'misplaced' spores, but in which the outside markers show normal 4+:4m segregations. Such asci are not mentioned yet they provided the key to the understanding of gene conversion. Consequently the author is, as it were, one step out in the subsequent possibilities.

Finally, the author does not mention valuable work and models proposed by Professor Olive and coworkers or the still more recent work by various researchers.

Those aspects of fungal genetics with which the author is familiar and to which he has contributed by original research, are treated in a full, interesting and up-to-date manner. To be fair to the author, he does state in the preface that he has tried to concentrate on general issues rather than to report the latest findings on any particular topic, but this method is likely to result in uneven treatment of the various aspects. He tells us also in the preface that the book is intended not only for geneticists but also for mycologists, pathologists, industrial users of fungi and biologists. I fear, however, that most of the latter types of reader will find the text turgid and tough going.

L. C. Frost