

LIBRI NOVI

W. BRIDGE COOKE: A Laboratory Guide to Fungi in Polluted Waters, Sewage and Sewage Treatment Systems (132 pp.) Public Health Service Publication No. 999-WP-1.

This little book is one of the "Environmental Health Series" prepared through the Division of Water Supply and Pollution Control of the United States Public Health Service. As our limited inland water resources recede and become polluted, knowledge of the fungi, and other members of the aquatic biological community represented in sewage becomes of increasing importance. As the foreword indicates, "More definitive and detailed information relative to the life and death of this group and its interrelations with other members of biological communities may provide the basis for developing more efficient treatment methods."

Toward meeting this objective, Dr. COOKE has written a laboratory guide which is designed to introduce the fungi recovered in sewage and polluted water and to aid in the identification of their original habitats. Methods are presented for the collection and isolation of these fungi, and for the preparation of media. Then, means for the examination and identification of the organisms are discussed, including those used for yeast which include considerable nutritional tests. In addition, a small section on the biology of fungi in an aquatic habitat is inserted. Finally, almost half of the book is devoted to line drawings of many of the fungi found in polluted waters.

In general, this little book should prove to be a very useful introduction to aquatic mycology for the beginner. Much of the material on identification is derivative and suffers, in some cases, from the failure to have primary sources identified. For example, a textbook is referred to as the source of the keys to the *Phycomycetes* instead of SPARROW's monograph. Nevertheless, the keys appear to have been chosen well, the figures are clear and the techniques have obviously been worked out by an expert in the field of the fungi of polluted waters. That this manual serves mainly as an introduction for the beginner, and is limited to relatively few organisms, probably is a necessary reflection of the status of the field at the moment. It is to be hoped that a monograph of greater scope will be the next endeavor of the author.

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Microbial Behaviour in "vivo" and "in vitro". Edited by H. SMITH & JOAN TAYLOR. Cambridge University Press. 1963. pp. x + 296. \$ 8.00 or 45 s.

The fourteenth symposium of the Society for General Microbiology, in an attempt to answer the question, "Where has test tube microbiology taken us?" has shown that "microbiologists are little people working in a large world only tiny areas of which have been explored." The extent to which laboratory experimentation has answered the question of how much we know about life of micro-organisms "*in vivo*" from observations "*in vitro*" is demonstrated in the range of subject matter considered by the 14 participating discussants: H. SMITH: Microbial behaviour in natural and artificial environments; D. D. WOODS & M. A. FOSTER: Metabolic considerations relating to the life of bacteria *in vivo*; J. KEPPIE: Host and tissue specificity; A. F. B. STANDFAST: The correlation of properties *in vitro* with host-parasite relations; F. MARIAT: Saprophytic and parasitic morphology of pathogenic fungi; B. WEITZ: The reactions of trypanosomes to their environment; P. L. INGRAM: Some factors influencing the response of young domesticated animals to *Escherichia coli*; E. W. BUXTON: Speculations on plant pathogen-host relations; B. J. DEVERALL: Substances produced by pathogenic organisms that induce symptoms of disease in higher plants; V. R. WALLEN: Host-parasite relations and environmental influences in seed-borne diseases; G. B. MACKANESS: The behaviour of microbial parasites in relation to phagocytic cells *in vitro* and *in vivo*; D. W. HENDERSON: Mixed populations *in vivo* and *in vitro*; and J. J. HOLLAND: Viruses in animals and in cell culture.

This summary of the contents of the symposium shows a very thorough coverage of the work that has been done in which the activities of viruses, bacteria, fungi and protozoans, pathogenic for plants, animals and man, were observed both in pure culture and in culture in living hosts — natural or induced — of the organisms being studied. It may be that not all possible combinations of such sets of organisms have been covered here, but a large percentage of them apparently have.

The writers of the various reports or reviews agree fairly well that "*in vivo*" refers to conditions under which the organism is living within its normal living-host species, and "*in vitro*" refers to pure culture conditions in the laboratory, usually on artificial, non-reproducible or synthetic media, sometimes in host cells in tissue culture and sometimes in living hosts, but not in the host normally parasitized by the organism studied. The environments and techniques used in attempts to reproduce such environments are considered. The use of nine groups of organisms for growth in these two types of habitat, and the differences in growth exhibited in the two habitats are reviewed by SMITH as an introduction to the symposium.

WOODS & FOSTER describe some of the general problems faced by microorganisms during life *in vivo* including problems of nutrition, enzyme production, and inhibition. The observer has difficulty in understanding the types of adjustment made by such organisms to life *in vivo*. A large amount of research is needed to understand many of the phenomena of such mutual co-existence. Details of studies on brucellosis and on kidney disease are used by KEPPIE to demonstrate experimental approaches to problems of host and tissue specificity exhibited by some microorganisms. In one direction of study, the addition of a simple nutrient in experimental work yielded results useful in explaining aspects of an infection. With our present knowledge, STANDFAST found that very few generalizations on the basis of host-parasite relations can be made; each case must be treated separately whether organism, host, or route of infection is being studied. Certain types of experimentation relating to such relationships, however, yield promise of future answers to present questions.

MARIAT reviews the available knowledge of the morphology of human pathogenic fungi and Actinomycetes. Structures are known in pure culture and in host tissues, but what mechanisms effect the change from yeast phase to mycelial phase, or produce the characteristic structures in tissue not found in pure culture are as yet unknown or imperfectly known and subject to considerable conjecture. Trypanosomes and their activities are best known through laboratory studies of tissues removed from sites of infection and cultures. WEITZ thinks that these are artificial environments and that conclusions reached from their study are not necessarily valid when applied to the occurrence of the organisms and their activities within their hosts. Studies based on infection produced in young animals by strains of *Escherichia coli* when antibodies normally received by the animal in colostrum are withheld are described by INGRAM. Abilities of animals to withstand toxin production, the production of toxins by the bacterium, and methods of studying the effect of toxins on living tissues are described; a large amount of research is required before answers to many questions concerning such infections can be obtained.

A number of questions concerning the relation between plant pathogens *in vitro* and their effects on the living host are not answerable on the basis of research conducted to date. Among these, BUXTON cites the fate of enzymes, toxins, and growth substances produced *in vitro* and introduced into the host. Can an enzyme that macerates host tissue *in vitro* do so *in vivo* and, if so, how far can it penetrate into the tissues? Little is known of the metabolites formed by a pathogen *in vivo*. Biochemical mutation may play a part in plant host-pathogen relations, and studies of gene-for-gene relationships between host resistance and pathogen virulence are still in their infancy. According to DEVERALL, some fungi are capable of producing toxins in the host plant. The nature of these

toxins and the ability of the plant to combat their effects form a wide area of study, which thus far has been restricted to only a few organisms and their effects on certain aspects of the host's activities. For WALLEN and other plant pathologists the incidence of seed-borne plant disease is a critical area for study. A number of kinds of fungi are transmitted by seed, whether through spores on the surface, tissue within the seed tissue, or spores replacing the embryonic tissues. The detection of infected seeds, the ability of seedlings to ward off the inroads of the infectious fungus, and the evaluation of the potential destructiveness of such disease are areas that need intensive study.

MACKANESS is concerned with phagocytic cells and their behavior in relation to microorganisms that penetrate to areas in the body in which the several types of such cells occur. The measurement of phagocytosis *in vivo* and *in vitro* is carried out differently, and only with great care can one type of measurement be used to explain a phenomenon in the other type of culture. Additional problems are created by phagocytosis-resistant organisms; this is illustrated by reference to experiments with species of *Salmonella*. Mixed populations of bacteria and viruses have been studied by HENDERSON. His experiments were set up to determine the effect of the activity of one organism on that of another unrelated organism. Where the fate of one organism is dependent on the reaction of the host to another organism, it may be best to carry out part of the experiment *in vitro*, and part *in vivo*.

According to HOLLAND, most animal virus-cell interactions observed *in vitro* reflect virus-cell relations *in vivo*, although the latter may be influenced to considerable extent by the differentiated nature of host cells and by the many physiologic and immunologic responses that can take place. "It is suggested that with both virulent animal viruses and tumor viruses, cellular alterations observed in the whole animal can usually be successfully reproduced in cultured cells."

Each contribution is well documented by references to the recent literature. The book is well written, edited, and produced. Because of the timeliness of the subject matter it deserves a place on the bookshelf of microbiologists working with interactions between host organisms and their microorganism parasites or pathogens.

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CUNNINGHAM, G. H.: The Thelephoraceae of Australia and New Zealand. With 5 plates reproducing 24 photographs and 200 text figures. 369 pp. New Zealand Dept. Sci. Ind. Research Bull. 145. Price 65s (\$9.10).

For some years CUNNINGHAM's beautifully illustrated papers on the Thelephoraceae have attested to the author's interest and competency in the large and difficult group of fungi included in that somewhat ambiguous category. It is fortunate that before his death in 1962 his manuscript was in press and his colleagues in the New Zealand Department were able to prepare the index, read proof and see the publication completed.

The author speaks of the Thelephoraceae as a "traditional" family retaining, after a century and a half of segregation, the coriaceous and woody homobasidiomycetes without morphologically distinctive gills, pores or spines or the clavarioid habit and with a "smooth" hymenium. It still remains a heterogeneous assemblage and other segregations have been and will be made, but it is a convenient unit for classification, particularly for those interested primarily in other groups or concerned with the economic aspect of some of its species.

CUNNINGHAM recognizes four subfamilies: the Corticioideae, with the tribes Corticeae (10 genera) and Stereae (6 genera), Thelephoroideae, with the tribes Thelephoreae (3 genera) and Hymenochaetae (3 genera), Cyphelloideae (3 genera) and Meruloideae (3 genera). It will be noted that this arrangement reflects some of the more important modern trends in classification.

In addition to the descriptions and illustrations, which naturally occupy the bulk of the volume, and the usual index and bibliography, there is a brief but discerning introduction and a list of 131 doubtful or discarded species, with critical notes. One new genus, *Acanthophysium*, raises a subgenus of PILAT's to generic rank and new species are described in that genus (3), and in *Corticium* (8), *Lachnella* (3), *Lopharia* (2), *Tubulicrinis* (3) and *Veluticeps* (1), Latin diagnoses for these taxa are combined in a list at the end of the volume. In addition to the new species, there are a number of new combinations and a few new names.

Of the 261 species described, 96 are said to be endemic in New Zealand. It is probable that further collections elsewhere, especially in Australia, will reveal wider distribution. Others are widely distributed: 97 are known to occur in North America, 89 in Europe, hence the volume will be generally useful. It still seems probable that New Zealand has more than its share of curious species belonging to the group, even though in few places have they been studied so intensively.

COOKE's term "metuloids" is used for what are usually called cystidia in *Peniophora* and the latter term is restricted to the comparable structures in *Tubulicrinis*. The distinction made between them

may not prove to be significant, and the use of the term "paraphyses" for components of a basidiomycete hymenium may be questioned. The classification adopted will undoubtedly be altered in the near future. *Peniophora*, for example, can probably not be maintained, a number of the generic limitations will be adjusted, and other changes are inevitable. These, however, are to be expected in any work of such scope. The descriptions are clear and precise and, for most of the species, the accompanying detailed and schematic drawings are not only beautifully executed but are extremely helpful in interpreting the text. I find only one fault — they are all upside down. The basidia of all these forms are inferior or at most lateral and shed their spores downward. Why it has become a tradition to show them inverted, I do not understand. That is, of course, a very minor matter in no way detracting from the great usefulness of the figures themselves.

The book is well bound and clearly printed on excellent paper. A few pages near the beginning, evidently reproduced by a photographic process, are not up to the standard. A printed list of *Corrigenda* is pasted on p. 14 of the volume before me. This, I understand, is not the case in other volumes distributed. Doubtless a copy may be secured by applying to the publishers.

The clear descriptions, the magnificent illustrations and the wealth of information about the fungi discussed will make this volume an important reference work for many years to come.

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BLUM, J. *Les bolets*. 168 p., 52 fig., 16 pl. Éditions Paul Lechevalier, Paris France. 1962. Price F. 20.00.

This booklet is the first of LECHEVALIER'S "Études Mycologiques," a proposed series of field guides with each guide devoted to one major genus of higher fungi. The series is directed to those amateur mycologists who wish to obtain a good knowledge of "all" the species of a genus. This represents a new approach in publications for amateurs. I question how successful it can be if, as in *Les Bolets*, microscopic characters are always to be omitted from the species descriptions and key.

Les Bolets describes over 50 species, many of which are illustrated by poor to good sketches or reasonably good water colors. The species are arranged in artificial, unnamed groups, and each group is discussed. Introductory and concluding chapters are on taxonom-

ic characters (including some microscopic ones), edibility, gastro-nomic considerations, and classification of the boletes. BLUM discusses recent trends in classification, but recognizes only one genus, i.e., *Boletus* in the broadest sense. I think this is the most commendable point of his booklet.

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"Advances in Acarology," edited by JOHN A. NAEGELE. Volume 1. Cornell University Press, Ithaca. 480 pp. \$ 9.75.

This book should be read and appreciated by all acarologists, for it reflects the development and diversity of the science of acarology. Others who, in their research or teaching, come in contact with mites and ticks will find much information on many widely known acarina. Forty-four research papers, originally presented at a Symposium on Acarology at Cornell University in March of 1962, are grouped into the general categories of bionomics and control of acarine pests (of both plants and animals); techniques for rearing, mounting, and testing; physiology, biochemistry, and genetics; disease transmission; current trends in systematics; and behavior.

Certain papers, as those on taxonomy and systematics, are of interest to specialists working with different groups. Other papers contain information on the use of basic genetical, biochemical, entomological, parasitological, and physiological techniques and their modifications to obtain knowledge about acari. The specific papers on culture techniques, insecticide testing, biochemistry, and resistance; the general papers on acarine pests of cotton in the United States, apples in Wisconsin, woody plants in New York, and stored products in Canada; and the special review papers on ticks as purveyors of animal ailments by C. B. PHILIP and mite transmission of plant viruses by J. T. SLYKHUIS, make this volume an asset to many personal libraries.

Each article has a separate bibliography of cited references, and there is a short index for the book. The type is large, the printing clear, and the text free of typographical errors.

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