LIBRI NOVI

BONNER, JOHN TYLER: The Cellular Slime Molds. Princeton University Press. Princeton, New Jersey. Investigations in the Biological Sciences, No. 1. 1959. pp. viii, 150. Price: $4.00

In the last 25 years, and especially since 1945, increasing interest has been shown in that group of organisms classed in the *Acrasiales*. These organisms are considered particularly useful in the study of developmental morphology. According to BONNER, the Mycotozoa (Myxomycetes) may be divided into four orders: *Myxomycetales* (Myxogastrales) or "true slime molds," *Plasmodiophorales* and *Labyrinthulales*, including two groups of plant parasites; and the *Acrasiales*, the "simple", "amoeboid", or "cellular slime molds",

After describing each of the orders of slime molds, the author suggests that the origin of the *Acrasiales* may be found in the free living amoebae of the soil. Three major points concerning the significance of aggregation in biology include: the aggregation process may serve as a partial substitute for sexuality; for some forms this may be the channel by which a truly multicellular condition has been achieved; and aggregation is an important tool in the study of the mechanisms of development.

A brief survey of the Acrasiales shows that the genera are placed in three families. *Sappinia* is placed in the Sappiniaceae, *Guttulina* and *Guttulinopsis* in the Guttulinaceae, and *Dictyostelium*, *Polysphondylium* and *Acytostelium* in the Dictyosteliaceae. *Acrasis* and *Coenonia* are known only from their original descriptions. A total of sixteen species is known in the order, of which those in the Dictyosteliaceae are used in most of the studies described in this book. Details of morphology are presented from spores and spore germination, through the "vegetative stage," the " aggregation stage", and the "migration stage", to the "culmination stage" of *Dictyostelium discoideum*. Other species descriptions are given in terms of variation from this basic pattern of the life cycle. Different stages are illustrated diagrammatically and by photographs. Macrocysts, microcysts, and spores are also illustrated. A hypothetical phylogenetic tree of the order is presented and discussed.

Since the book is designed as a survey and analysis of 123 papers or books published on this order and 42 supplementary to such a discussion, it is not surprising to find a minimum of graphic and tabular material and a maximum of discussion. Two principal problems are considered: the problem of morphogenetic movement, and variation and the problem of differentiation.

Three mechanisms of movement are considered. The substance

acrasin, which has not yet been chemically defined, has been found to be important throughout these three stages: aggregation, migration, and culmination. As the scattered amoebae, which feed on bacteria, come together in the aggregation stage, a change comes about in the cell walls which permits cells to adhere to one another. Depending on the species, 24 to 2200 cells may be present in an aggregation. Still unknown are the factors which control aggregate size. Apparently not just one cell but any group of cells in the mass may possess whatever activator agent is required. Movements have been studied from many points of view and with numerous techniques: cell size, shape, and position within an aggregate; shuffling of portions of aggregates of clones, strains, and species; stains, lighting, chemical stimuli, variation in nutrients within an agar; and variations in cell orientation. Mechanics of movement are still a long way from being understood.

In spite of much experimentation on variation and methods of control of differentiation within an aggregate, there are still many unsolved problems. Variations are considered as between species and strains, between clones, and between the cells within a clone. Cell size, speed of movement, position within an aggregate in relation to tip or tail, and other qualities have been checked for genetic variation, but little information has yet come to light to indicate that each cell in an aggregate is not totipotent; that is, each cell in an aggregate appears to be genetically capable of performing any function at any stage in the life cycle that any other cell can perform.

The author is well known for his studies in this group of organisms. This fact is emphasized by the 13% of the citations by him or by him and with his students. The book is well written, easily read, and without noticeable typographical errors. It will serve as an excellent introduction to this poorly understood group of organisms for those unfamiliar with them, and a morphogenetic review for those in the field.

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PIERRE DANSEREAU. *Biogeography: An Ecological Perspective.* New York, N.Y. The Ronald Press, 1957. 394 pp. $7.50.

As indicated in the title, this work approaches Ecology from a broad viewpoint including the interplay of plants, animals, and man with the environment. The great bulk of the discussion, however, is concerned with the vascular plants. The animal and microbiological viewpoint is merely mentioned in passing. It is not within the province of this review to evaluate the technical detail or accuracy of the theories and data presented. The author, himself, points out that the scope of the book only allows a review of the

vast field covered. As such it will be invaluable to the beginning or advanced student of ecology.

The book is divided into five chapters or "levels" of discussion: Historical; Bioclimatological; Synecological; Autecological and "Mans Impact upon the Landscape". The text is well organised and written in an interesting style. The book is profusely illustrated with charts, tables, photographs and diagrammatic drawings which are original with the author. These features, together with an extensive glossary at the end, make the book a valuable source of information regarding the language, terminology and various theories of the field of ecology. The author, who has traveled widely and become personally intimate with many world-wide aspects of plant distribution is particularly competent to present such a broad approach.

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ALLEN, ROY M.: *Photomicrography*, 441 pp., 235 figures, 54 plates in black and white and 1 color plate. D. Van Nostrand Co., Inc. Princeton, N. J. Second edition November 1958, reprinted February 1959.

Long and authoritative guide to the making of photographs with a microscope, this useful volume now encompasses new designs of microscopes, cameras, and accessories, new methods and applications that present an up-to-date manual of practical modern usage. Included are such important subjects as phase and interference microscopy, electron microscopy, uses of color photography, and the application of polarized light.

Presentation of photographic equipment in all its details (cameras, optical systems, light sources) is exhaustive. Highly important are the illustrations concerning common errors and failures in photomicrography (uneven illumination, not axial lighting, excessive diffraction, etc.). The plates are excellent and most instructive, they bring examples from the whole field of microbiology. Although the three-dimensional presentation of the subject is highly important in botany, this manual proves that even with the two-dimensional photomicrography one can get excellent results from botanical specimens, let alone, from the practically two-dimensional objects in mycology. Drawings from mycological specimens are instructive, however, photomicrographs are documentary evidences. This manual can be warmly recommended to microbiologists in general and to mycologists in special.

TIBOR BENEDEK

Fungus Diseases and Their Treatment, edited by R. W. RIDDEL and G. T. STEWART, XVII, 256 pp., 145 figures. Butterworth & Co. Ltd. London, 1958. Price 45/- net.

This book is a condensation of papers read at the SYMPOSIUM ON FUNGUS DISEASES held in London during 1958. The SYMPOSIUM was designed to bring together individuals with different approaches to each topic, and was characterized by contrasts in subject-matter. Among the 34 contributors, the brunt of the work was done by British investigators, yet, French, American and Belgian research was well represented. This SYMPOSIUM contains two parts: (1) Pathology, Clinical Features, and Epidemiology; (2) Treatment. The first part contains 22 papers, and the second one 9 papers. A number of papers were dealing with superficial mycoses, with special attention to infections caused by *Tr. rubrum*. Moniliasis, Aspergillosis, Histoplasmosis are covered clinically, pathologically and immunobiologically. The Treatment covered older and newer methods, with special reference to antifungal drugs.

The almost proverbial conformity of opinion of the dermato-mycological confraternity came again to the fore in this SYMPOSIUM. I refer particularly to the chapter of CALNAN on "*Trichophyton rubrum* infection" and to that of HOLMES on "Tinea pedis in miners". These chapters excel in poor methodological knowledge and a complete lack of knowledge of the pertaining literature. These authors still believe that a positive fungal culture is at the same time a "fungus disease". For CALNAN *T. rubrum* infection of the palms and soles is equally resistant whether the nails are involved or not . . . "Nail infection is at present virtually incurable .." As far as these "infections" are considered as "fungus infections" and treated as such, they will be "resistent" for the simple reason because they are not "fungus" infections. What he describes as fungus infection of palms and soles and the nails is pompholyx of the palms and soles and of the nail organs, a condition not of fungal origin, but endoparasitic-bacterial. With this correct etiological diagnosis the "cure" is straight and simple. He does not mention whether he ever observed the primary lesion of these hand- feet- and nail mycoses. There exists a rich literature on this topic which went completely unnoticed by this author. The presentation of HOLMES moves on the same level as the question stood in 1911 when MALCOLM MORRIS "assumed that white soggy skin between the toes was evidence of tinea pedis" . . . He repeats the same stock errors by sheer conformism which is slowly overcome in the States. Knowledge of this literature would have helped to arouse some doubt about the etiologic role of fungi he was able to culture. His list is an outstanding counterpart of the list of fungi which mycologists prepared not so long ago about the two dozens or so of fungi as "causative agent" of pinta!! Mycologists became the victim of

their ignorane of the primary lesion in pinta which HERREJON proved to be a spirochaetosis.

The other chapters of the SYMPOSIUM do not carry any problematic. Their material was adequately handled by the respective author. They are well written, well presented and adequately illustrated. Every paper brings selected references. The therapeutic part of the Symposium gives an excellent and objective presentation and orientation about the newer antifungal antibiotics. All in all, this SYMPOSIUM gives a good survey about the present trend and current of medical mycology. It is a useful publication for dermatologists and mycologists working in this borderline field. The lesson derived for both groups of workers is that conformism is a fiend of progress in any field of science. They finally have to give up the age old error that a fungus culture, no matter whether pathogen or non-pathogen, is a fungus disease. They have to increase their methodologic knowledge and they have to know the foremost basic rule of investigation in medical mycology that is the knowledge: the etiology and pathogenesis of the primary lesion in any condition. The production of the book (paper, printing, illustrative material) is satisfactory.

TIBOR BENEDEK

WYBURN-MASON, ROGER: The Reticulo-endothelial System in Growth and Tumour Formation. London, Henry Kimpton, 1958. 206 pp., with 79 illustrations in black and white. Price 42/- net.

The protective function of the reticulo-endothelial system with its ability to extract foreign substances, bacteria and cells and effete red and white blood corpuscles from the circulation is well known. In this book the author has thought to show that this is only part of the function of the cells of this system. They appear to extract from the circulation and concentrate the various physiological substances, including proteins, amino-acids, fats, lipids, sterols, vitamins and hormones, and to bring them into contact with the parenchymatous, epithelial, muscle and nerve cells and to receive from these same cells their metabolic products, in so doing playing a part in cellular excretion.

The text is well written, concise and clear. The illustrations are well chosen. The production of the book (paper, printing) is excellent. Medical mycologists, beside internists and general pathologists, have to be interested in this monographic text, because the reticulo-endothelial system plays also a role of basic importance in the course of the deep-seated mycoses. References are adequate. However, the reviewer regrets the "blind" references, that is references without title of the papers. In a monograph there is no excuse for this omission. A detailed index closes the work. It can be generally recommended.

TIBOR BENEDEK

WAKSMAN, S. A.: *The Actinoycetes Vol.* 1. *Nature, Occurrence, and Activities*. The Williams and Wilkins Company, Baltimore, 1959. pp, xi, 327, 107 Fig., 77 Tables, Price: $12.50.

This is the definitive work on the Actinomycetes. It is written by the man whose name is synonymous with research in this group of organisms. Two more volumes are promised in this series and are referred to constantly throughout this one. A preface, in which the author indicates his own personal interest in the group, and an introductory in which general milestones in the study of the Actinomycetes are listed, together with certain typographical conventions to be made in the book, precede the main presentation which is divided into 18 chapters. The importance of the study of this group of organisms is attested to by the facts that nearly 25 antibiotics derived from Actinomycetes are in general use today, and that two-thirds of the 2.4 million pounds of antibiotics which were produced in the United States in 1955 alone, at an estimated value of more than a half billion dollars, were derived from the Actinomycetes.

Among the topics which are considered in this general volume are included: history, methods of isolation, identification, cultivation and preservation; distribution in nature; nomenclature and general systems of classification; morphology, cytology and life cycles; variations, mutations and adaptations; physiology, including growth and nutrition, mineral metabolism, biochemical activities and lytic mechanisms; the production of enzymes, vitamins, other growth-promoting substances and pigments; antagonistic properties; the production of antibiotics; the role of the Actinomycetes in the decomposition of plant and animal residues; and the diseases of plants and animals caused by these organisms.

Dr. WAKSMAN is strongly in favor of considering these organisms bacteria. He presents 10 strong arguments in favor of this proposition while he could only find four arguments, several of which are very weak, indicating their relationships with fungi.

Approximately 1200 references are cited throughout the text and listed in a comprehensive bibliography. Of these, 6% were written by the author. In a treatise such as this, in which an attempt is made to summarize all the literature, certain items are bound to be left out. This is partly because an item was considered unimportant or of no significance, partly because a report was not known to the author. To those for whom this book may appear, or may be assumed, to be a complete encyclopedia of information about the Actinomycetes the statement should be made that in both his preface, his introductory, and his epilogue, Dr. WAKSMAN admits that first consideration was given to his own work, and the work of his students. Throughout the text it is apparent that in addition to this work, that published in Russia has been given a prominent place in the treatment. This is good because otherwise much significant work could easily be overlooked partly because of availability of

references, partly because of the language barrier. Thirdly, the works of other students of these organisms in the United States, England, Japan, and many other countries throughout the world are included.

It is interesting that in his introduction of the term "colony" in the text, Dr. WAKSMAN indicates that the actinomycete colony arising from a single spore is not a true colony but a single organism. On page 250 the term "created" is used in reference to recognition of genera of thermophilic organisms. One wonders if this was meant in the Lloydian sense or if the author accepts these genera and really should have used the word "recognized".

At several points in the text the decomposition of lignin is considered. On page 247 this is given a half column of space. However, whenever this is mentioned no references are made to research on the subject although Table 68 on page 244 gives a clue to research that has been done on this problem. Additional information in this field would be of much help. In relation to composting, only work with green and stable manures is considered. No reference was found to work which has been done on the composting of garbage and and municipal refuse as a means of disposal of a troublesome refuse and the conservation of an important resource.

The chapter on morphology, cytology and life cycles is primarily concerned with morphology. A brief section is given over to sexuality and another to staining properties. It would seem to this reviewer that in this connection a lot more space could have been given to cytology, the demonstration of nuclear materials or artifacts assumed to be nuclear bodies in cells, and other matters more readily demonstrated by the electron microscope. Electron micrographs are used as illustrative materials in various places in the book but either have been used insufficiently or are not available for use in connection with the development of the topic of cytology. In the section on sexuality, the work reported in nine references is summarized in four paragraphs. Figure 36, p. 75, reproduces a life cycle proposed in a paper which is only cited as a reference to which the reader may turn. Upon turning to this reference one wonders why Dr. WAKSMAN did not choose to consider it point by point in his text, or if not worthy of that treatment, why he used it at all.

It seems to this reviewer that if the material on heterocaryosis, presented in Chapter 6 on variation, mutations and adaptations, is all that is available on this subject in relation to the Actinomycetes, here is a very fertile field for work. In reading through various parts of the text it seemed that a number of phenomena which were described could well have been studied with this in mind.

The book is well written and easily read. Format and type are similar to those used in "Applied Microbiology," that is, two-column pages of folio size. Illustrative material is well chosen and placed in the text near the point of reference. Only two minor typographical

errors were noted. The author and his publishers are to be congratulated on the production of a treatise which will be of value to anyone whose work embraces the Actinomycetes.

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GÄUMANN, E. A.: *The Fungi.* A description of their morphological features and evolutionary development. Translated from the German by FREDERICK LYLE WYND. Hafner Publishing Company, New York-London, 1952. Price $ 10.— 420 pp., with 440 figures.

This book describes the morphological and developmental features of Fungi. It especially emphasizes the natural relationship existing within this vast and intricate group of plants. GÄUMANN-WYND have directed their efforts toward aiding the student to understand the Fungi rather than to classify them. The reader continually is aware that the natural phenomena presented by the Fungi are more important than rigid and artificial systems of classification. Taxonomy is regarded as a useful but flexible aid for the comprehension of major biological problems.

The Fungi are grouped in four classes: Archimycetes, Phycomycetes, Ascomycetes and Basidiomycetes. An appendix deals with the Fungi imperfecti. The illustrations are excellent and most instructive. The translation is highly satisfactory. The production of the book (paper, printing, illustrations) is impeccable. This work of GÄUMANN, like his other works on Fungi, does not need any further recommendation. They speak for themselves. For the students of general Mycology it is simply a "must".

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BASSI, AGOSTINO: *Del Mal Del Segno,* translated by P. J. YARROW. Edited, and with an introduction, by G. C. AINSWORTH and P. J. YARROW. Phytopathological Classics, No. 10. Published by the American Phytopathological Society, Ithaca, N.Y. XIII, 49 pp., Frontispiece: Portrait of AGOSTINO BASSI.

Phytopathological Classics embraces titles that are unavailable in most libraries and provides translations of papers originally published in foreign languages. This publication brings the work of BASSI on Muscardine or Silk Worm Disease in excellent English translation. The original was published at Lodi (Italy) in 1835. BASSI's name survived because he was the first to elucidate the

nature of a microbial disease of animals when he proved the fungal nature of the muscardine disease of silkworms. This treatise like the other numbers of this series of Phytopathological Classics are of interest to pathologists, mycologists, plant breeders, physiologists, and historians of science.

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