Book Review

The Biology of the Actinomycetes. Edited by M. Goodfellow, M. Mordarski, and S. T. Williams. Academic Press, Inc., London, 1984, 544 pp., \$95.00/£57.00.

The actinomycetes historically have been defined solely on morphological grounds, that is, microorganisms with thin, elongated cells or filaments that show some degree of true branching. The application of biochemical and molecular biological techniques to microbial systematics has provided insights that have drastically altered traditional taxonomic concepts. It is now evident that possession of branching filaments does not automatically place an organism in the actinomycetes, nor does the absence of branching filaments necessarily exclude it from this group of bacteria. The term actinomycetes is currently applied to heterogeneous collections of bacteria that have little genetic or phyletic relatedness. Conversely, bacteria that show phylogenetic affinities to recognized actinomycetes are not yet included in comparative studies and critical reviews. This monograph does not break from traditional misconceptions and does not succinctly articulate a new holistic synthesis of actinomycete systematics. The authors do acknowledge the problem, however, and the limitations of the current treatise.

All of the chapters have been written by international authorities and active research investigators. As a result, the presentations are dynamic and provocative. The chapters reflect the perspective and approaches of the authors and do not necessarily present generally accepted viewpoints. The editors have attempted to prepare a book that presents a balanced survey of the current knowledge of actinomycete biology. This orientation distinguishes this book from several recent books on actinomycetes, most of which have originated from the proceedings of symposia. This book will attract a broader readership than the proceedings, which are aimed at specialists.

The authors have made a conscious effort to prepare a comprehensive monograph. There are valuable and detailed reviews on systematics, morphology, genetics, transformation of xenobiotics, wall envelope composition, clinically significant actinomycetes, and ecology. The authors address the industrial, ecological, and medical importance of the actinomycetes. Accordingly, the book will be a valuable reference to all those who work with actinomycetes and try to unravel their nature. The book will find a place in advanced courses in microbiology and in the laboratories of professional workers in industry, the health services, and academic institutions.

Although the book attempts to be comprehensive and present a balanced survey of current knowledge of actinomycete biology, there are notable shortcomings. About 30% of the text is devoted to classification. In light of the rapid changes in understanding of biological relationships in this heterogeneous collection of organisms, the effort of Goodfellow and Cross to provide concise definitions

of important genera must be applauded. Locci and Sharples have carefully crafted a useful and interesting review of the morphology and ultrastructure of the streptomycetes and nocardioform bacteria. Brownell and Denniston have analyzed carefully the rather preliminary studies on the genetics of nocardioform bacteria. Chater and Hopwood have highlighted the shifts in emphasis in *Streptomyces* genetics during the past decade. This chapter will be of special interest to workers in various aspects of biotechnology. Peczyńska-Czoch and Mordarski recognized that a comprehensive survey of microbial transformation of xenobiotics is not feasible, and instead focused on some representative conversions performed by actinomycetes. Minnikin and O'Donnell have prepared a relatively complete comendium of lipids and peptidoglycans in actinomycete wall envelopes. They do not delve, however, into the biosynthesis, assembly, and function of actinomycete envelopes. Schaal and Beaman give a brief account of the clinical significance of actinomycetes. They use a relatively traditional approach that includes *Bifidobacterium*, which is no longer considered an actinomycete. Schaal gives a superb synthesis of current knowledge on laboratory diagnosis of actinomycete diseases. Again, the scope is traditional, encompassing nocardioform bacteria, the microaerophilic/anaerobic actinomycetes, and the nonactinomycete bifidobacteria and propionibacteria. Beaman provides a valuable account of actinomycete pathogenesis, an area in which he is a leading contributor. Williams, Lanning, and Wellington alert the reader to the extensive capabilities of actinomycetes to grow in diverse environments, ranging from conventional soil saprophytes to animal and plant pathogens and important symbionts.

The book has a professional and useful index. The text is generally free of typographical errors and is printed in clear type. The reproduction of transmission electron micrographs could be better, but the scientific message is adequately documented. The authors have included extensive citations with each review. Unfortunately, the text was completed in 1983 and published in 1984. As a result, the content is essentially 2 to 3 years out of date. Fortunately, the authors are authorities in their specialties, so the book will serve the reader well for several years to come. It must be recognized that this monograph reflects a stage in the maturation of scientific thought on the biology of the actinomycetes. The book is, as the editors intended, a useful and challenging survey and not a manual of determinative bacteriology for actinomycetes.

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