Book Reviews

Microbial Ecology. Seventh Symposium of the Society for General Microbiology, held at the Royal Institution, London, April 1957. Published for the Society by Cambridge University Press, New York, 1957. viii + 388 pp. Illus. + plates. $6.50.

The appearance of a new volume in this distinguished series has always been a noteworthy and gratifying event in microbiology. And so, when it was announced that the symposium would tackle microbial ecology, it became apparent to those who have some comprehension of the status of this subject that the challenge was exceptional and that the outcome would have to be extraordinary to maintain the level to which we have been conditioned by the previous six volumes. That the present volume is out of character is therefore not astonishing; in itself this is a commentary upon the previous symposia, upon the make-up of the present symposium, and upon the status of microbial ecology in relation to modern experimental microbiology.

The unique quality of the earlier volumes is the stimulation that always comes when experts mold facts with imagination and project ideas beyond the reach of immediate experimental verification. To be given an opportunity to witness the insights and reflections of authorities who have thought a great deal about the areas of their competencies is a valued privilege we have come to expect of these symposia. This is microbiology at the conceptual level, an all-too-uncommon approach. In *Microbial Ecology* this flavor is substantially less in evidence—in part a consequence of the intrinsic difficulty of coming to grips with the essence of the concept implicit in the title.

However, the chief and fatal weakness of this effort is the assemblage of authors, the majority of whom had no message to deliver. Topics may even be of secondary importance in an affair of this kind so long as the organizers insure that its cardinal function—to unloose a flow of ideas—is fulfilled. The program of the present symposium can perhaps be explained in large part by the availability of the particular participants.

There are, though, some exceptions that are rewarding highlights; for example, F. C. Bawden on plant hosts and G. S. Wilson on aspects of virulence for animals are original, provocative, and scholarly essays after the classic manner. The same holds for the chapter on visible light and microorganisms by R. Y. Stanier and Germaine Cohen-Bazire, carried off with characteristic Stanierian virtuosity. These might well be required reading for graduate students in all branches of microbiology.

The remaining chapters deal, respectively, with the genome, nutrition, hydrogen ion and oxidation-reduction potentials, pressure and temperature, antibiotic production, osmotic pressure, bacteriophagy, predacious fungi, survival of fungi, protozoa, some cellulose-decomposing bacteria, man and animals as hosts, survival and transmission of animal viruses, and arthropod vectors for plant viruses. For the most part these are adequate for the reader seeking a résumé of the current status of the respective topics.

The constitution of "microbial ecology" is a highly subjective matter. Notwithstanding, the essential nature of microbial ecology is grossly misrepresented by the motley assortment of topics here chosen. Moreover, the all-embracing scope has necessarily entailed serious sacrifices. Apart from the strikingly disproportionate emphasis accorded some subjects in relation to others, there is a diffuseness and incohesiveness that derives from a selection of topics that do not lend themselves to integration. This, unfortunately, obscures any central theme and dissipates the impact on the reader, especially on students for whom the previous symposia in this series have been especially instructive and inspiring.

The breadth of subject matter in this volume will be of little consolation to the student and to the average general microbiologist alike, who will be amazed to discover that some of the best-studied habitats of microorganisms, ecologically speaking, such as stagnant ditches and ponds, muds, manure and vegetable matter composts, hot springs, silages, sewage, and the rumen of cattle, are not included.

Difficulties of this kind, and the problem of microbial ecology as a "field" are symptoms of a situation that Charles Dudley Warner had in mind in making the celebrated observation about the weather that is so often attributed to Mark Twain. Microbial ecology has to do with the survival and activities of microorganisms in the exquisitely complex pattern of nature, typically in the context of other microorganisms. Furthermore, the ultimate in microbial ecology is characterized not by environments in nature so extreme as to be unique "ecological niches" but by "normal" conditions where determinant forces are subtle and in dynamic equilibrium. If anything is distinctive about the natural environment of a microorganism, it is the competitive influence of large numbers of other, diverse, microorganisms. In his *Microbiologie du Sol,* Winogradsky's voice was loud and clear in exposing the inadequacies of pure culture methods and laboratory-imposed extremes and the dangers of interpreting microbial phenomena in nature from such information. Yet nowadays, as evidenced by most of the contents of *Microbial Ecology,* these still represent the main approaches to ecological problems. Indeed, it is all too clear that solution of such problems could be furthered greatly if they were approached in the old-fashioned natural history manner *à la* Winogradsky, whereby an accurate description can be obtained of the make-up and the behavior of the mixed populations characteristic of various environments.

This volume, albeit considerably out of focus, has done a service in spotlighting the subject of microbial ecology. We can hope that the embryonic subject of microbial ecology, through the kind of discernment Bawden eloquently reveals on the opening page of his presentation (page 299), will have metamorphosed into a recognizable entity and will be adequately represented when it reappears as the agenda of a symposium of the Society for General Microbiology.

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Sun Circles and Human Hands. The Southeastern Indians—art and industries. Emma Lila Fundaburk and Mary Douglass Fundaburk Foreman, Eds. E. L. Fundaburk, Luverne, Ala., 1957. 232 pp. Illus. $7.50.

This work begins with a competent eight-page summary of the major archeological periods of the southeastern United States, written by Emma Lila Fundaburk. In succeeding chapters are reprinted standard accounts by other authors on various aspects of prehistoric Southeastern art and industries. Each chapter is followed by a set of illustra-