Book Reviews

Marine microbiology: a monograph on hydrobacteriology. Claude E. ZoBell. Waltham, Mass.: Chronica Botanica; New York: G. E. Stechert, 1946. Pp. xv + 240. $5.00.

It is an extremely difficult business to organize the large number of scattered studies on the microorganisms and microbiological processes of the sea. Work has been done by many people whose interests have varied widely, and papers in all languages have been published in uncommon journals. Many of the questions raised have not been satisfactorily answered. In addition, researches in this field seem to develop from the general to the extravagantly minute in an explosive fashion. A very persistent, almost evangelical temperament is necessary to find, sort, and squeeze all of these into a comprehensible system. It does not come easily.

Dr. ZoBell is one of the few scientists in the country who, by experience and interests, can be regarded as capable of such a project. He has diligently catalogued his sources and edited them to the bone. Specialized reviews of the field have been published at intervals, but *Marine microbiology* is the first attempt since Benecke's digest of 1933 to bring together the whole literature. The work is complete, and inasmuch as little research has been published during the past five years, it is virtually an official introduction to new work.

It is not possible to treat such a large group of sources critically, and some may feel that Dr. ZoBell is overzealous to establish the place of bacteria and other microorganisms in the economy of the sea. Oceanographers, marine ecologists, geologists, chemists, and applied biologists have been concerned for a long time with the degree to which microorganisms determine the composition of waters and sediments, and with their significance in the organic food cycles of local areas. The relatively recent concentrated microbiological programs under Dr. ZoBell at the Scripps Institute of Oceanography and under Dr. Waksman at the Woods Hole Oceanographic Institution have described the qualitative boundaries of the functions of marine bacteria. It is much more difficult to represent the processes in a quantitative fashion, and reading *Marine microbiology* emphasizes the need for studies in this direction if the value of investigations in the field as an integrating science are to be realized.

The book has been organized about the predominant research tendencies. There are chapters on the numbers, types, and distribution of organisms; the influence of physical and chemical environment; bacterial transformations of organic matter; assimilation and regeneration of inorganic nutrients; parasitic, commensural, and antibiotic relations; and sanitary and other practical applications. There are also sections on the microbiology of marine air, and inland salt and fresh-water lakes. Full bibliographic references are given, and there are subject and author indexes, so that the book is an invaluable source finder.

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