# Meetings

## Marine Biology

Unresolved problems in marine biology—sampling techniques, media requirements, distribution of bacteria in the sea, metabolism, autotrophy, and other technological problems involving marine bacteria—were discussed at the fourth meeting on marine biology, 9–12 January 1966 at Princeton, New Jersey.

Carl H. Oppenheimer (Florida State University, Tallahassee) and Luigi Provasoli (Haskins Laboratory, New York) dealt with the problems of sampling the environment and the nutrient needs for the cultivation and isolation of marine bacteria. It was concluded that each environment in the oceans poses a special problem for collecting adequate representative samples of bacteria (for example, surface slicks, deep sea pressures and temperatures, sedimentary environments, and others). Various special media are needed for the cultivation of the indigent bacteria.

The discrepancy was pointed out between the normal low nutrient content of seawater and the high nutrient content of the average media used to isolate and study marine bacteria. The marine environment is normally in a steady state and the low numbers of one type of bacteria in a given parcel of water can be significant. It was also pointed out that the marine bacterium is adventitious and its abundance is in proportion to the availability of nutrient at any time within the steady state system. The various collecting devices for marine bacteria were also discussed which will be included in the published book.

John Liston (University of Washington, Seattle) and Wolf Vishniac (University of Rochester, New York) discussed the distribution of terrestrial and marine microorganisms and the definition of a marine bacterium. They noted that when differential media are used it is possible to trace the movement of terrestrial microorganisms in seawater. No final definition of marine bacteria was accepted, except perhaps that any organism functional in the sea is necessarily a marine bacterium. The significance of the small incidence of bacteria in the open ocean was noted, but no conclusions made. Many of the deep-water bacteria favor cold environments which raises the usual question—whether the shock of bringing bacteria to the surface could affect the determination of final numbers.

Vishniac presented some rather interesting data on the amount of light energy available to photosynthetic organisms in the sea, suggesting a total of primary production with a striking similarity to total world's fish catch. Such data always raise the question as to the total capacity of the marine environment for the production of life. If the data are near correct, the seas now approach the level of their capacity for primary production. The discussion centered on the nitrogen cycle and the sulfur bacteria, and the continuing lack of a suitable method for the accurate determination of the total members of nitrogen-oxidizing bacteria in the sea. In as much as many so-called autotrophic bacteria require trace amounts of organic molecules, there was the usual attempt to define the term autotrophy.

Richard Morita (Oregon State University, Corvallis) and Edward Zuraw (General Dynamics, Groton, Connecticut) led discussions on the metabolism of marine bacteria and technological problems. Much of the discussion on metabolism was related to the salt requirement of marine bacteria. Robert MacLeod (McGill University, MacDonald College, Quebec, Canada) noted that sodium was required by some marine bacteria and was needed for transport and metabolism. Other evidence of sodium requirement was presented by William Payne (University of Georgia, Athens). Hajime Kadota (Kyoto University, Japan) showed the osmotic effect of seawater on the distribution of terrestrial bacteria in the sea and the positive correlation of sulfate-reducing bacteria to organic matter. Morita gave examples of pressure-temperature effects on marine bacteria. Warren Litsky (Florida State University, Tallahassee, and University of Massachusetts, Amherst) described 5 years of research on the pollution of Raritan Bay, New York; the high coliform counts and biological oxidation are evidence of pollution. They also described the difficulties involved in eliminating such pollution. A discussion followed on the effect of microbes on man-made structures in the marine environment and the use of submersibles for the collection of bacteria from the sea.

The conference brought up many more problems than were solved. However, one valuable output was the small collection of methods media and the evaluation of collecting devices for marine microbiology.

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## Antimicrobial Agents and Chemotherapy

There are many infections that are not adequately treated by the antimicrobial agents now available. In particular there is a need for a good antifungal agent, a better agent against gram-negative bacteria, and agents to treat a host of "uncovered" diseases, including the viral diseases and those caused by protozoa and other parasites. Hence at the Fifth Interscience Conference on Antimicrobial Agents and Chemotherapy–Fourth International Congress for Chemotherapy (Washington, D.C., 17–21 October 1965) there was a great deal of interest in the prospects for antibiotic therapy. This was evident both in the opening addresses by E. B. Chain, S. A. Waksman, and J. F. Enders and in various panel discussions in which the need for nontoxic, effective antibotics for