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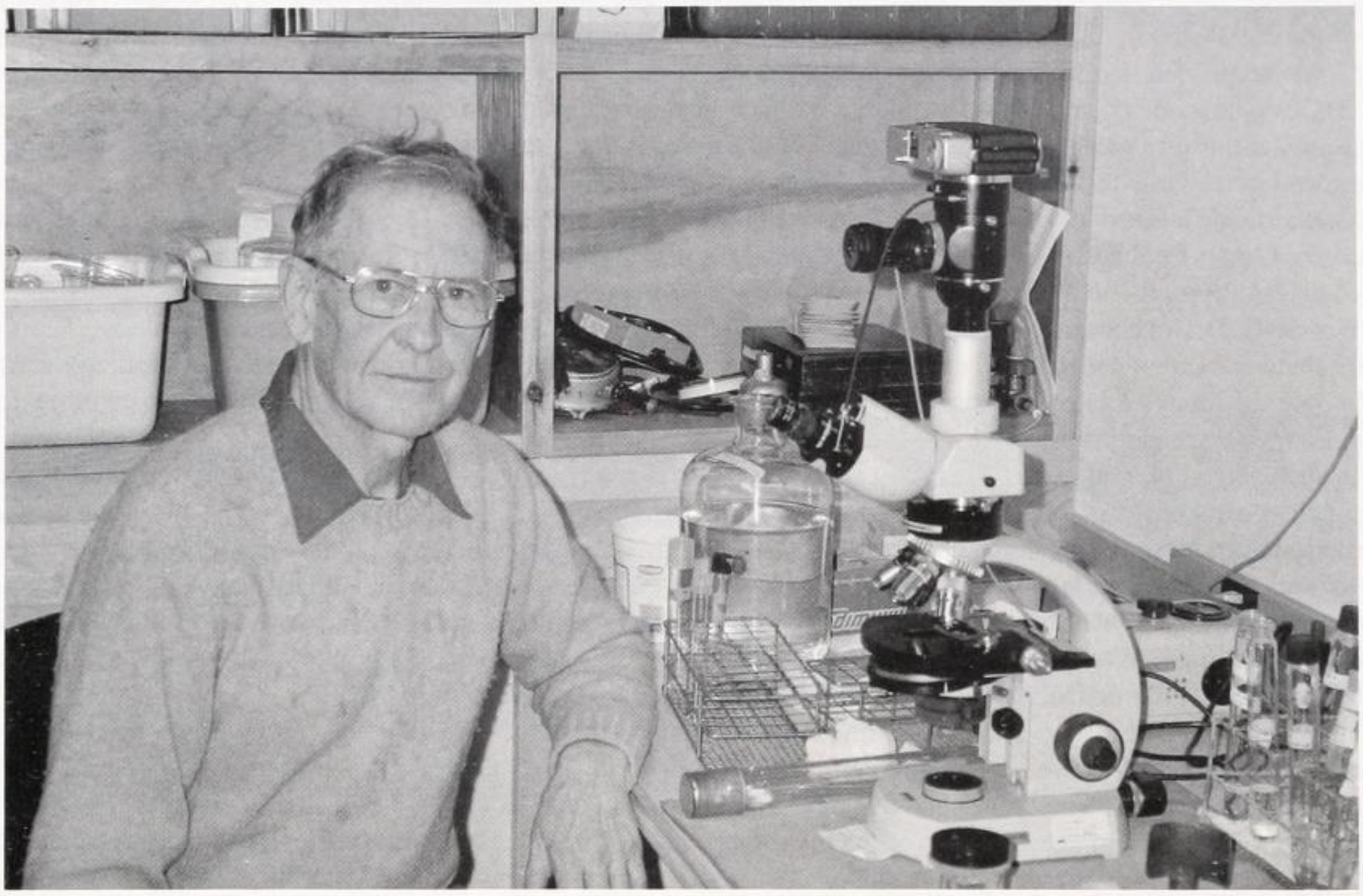

Robert R. L. Guillard
Honored Life Member
National Shellfisheries Association

As we honor Dr. Robert R. L. Guillard—Bob—with lifetime membership in the National Shellfisheries Association, we should remind ourselves of two important aspects of Bob's relationship with shellfish. The first is that the rearing of shellfish in captivity, both for experimental research and aquaculture production, would not be possible without Bob's pioneering work in phytoplankton culture. The second important point is that Bob's contributions to the world of shellfish, although not exactly inadvertent, are no more than fortuitous offshoots of his research focus on the physiological ecology of phytoplankton. We should all hope that our sidelines are so successful!

Bob began his professional life as an electrical engineer at the Navy Yard in New York City; perhaps mussels set on the hulls, but otherwise, this seems a long way from shellfish. Graduate studies in microbial ecology at Yale, leading to a Ph.D. in 1954, brought Bob to Connecticut, where he became acquainted with Victor Loosanoff. Dr. Loosanoff then was Director of the U.S. Fish and Wildlife Service's Milford Marine Biological Laboratory and a fixture at Yale marine science seminars, having completed his own Ph.D. there. Apparently, Loosanoff would preface all questions of seminar speakers in his strong Russian accent, "As you know, I am interested from oysters . . ." Efforts to grow oyster larvae at the Milford Laboratory on fertilized, bloomed seawater had met with limited success, and communication with the Plymouth Laboratory suggested advantages of feeding selected phytoplankton to larval shellfish. Loosanoff must have seen in one student, Bob Guillard, the expertise needed to produce baby food for his oysters; a position funded by the Oyster Institute of North America was secured for Bob to spend several years at Milford.

During his time at Milford, Bob isolated a number of the phytoplankton cultures used widely to this day in marine research and shellfish culture, including 3H *Thalassiosira pseudonana*, and *Synechococcus bacillaris* (a cyanobacterium that would revolutionize biological oceanography 20 years later). Bob Guillard's first full research report was an article published in 1957, not coincidentally in the *Proceedings of the National Shellfisheries Association* (Vol. 48, pp. 134–142), titled, "Some Factors in the Use of Nannoplankton Cultures as Food for Larval and Juvenile Bivalves." Between this article and the 1958 *USFWS Fish. Bull.* 136 (Vol. 58), "Relative Value of Ten Genera of Microorganisms as Foods for Oyster and Clam Larvae," by Harry Davis and Bob Guillard, most of the practical information we use to this day in deciding what phytoplankton to feed molluscan larvae was established. Countless studies of basic shellfish biology, not to mention the establishment of hatchery-based shellfish aquaculture, were made possible by Bob Guillard's identification of practical algal diets.

If Bob Guillard did nothing more to benefit the shellfish community, his place among the legendary figures of shellfish biology would be assured. Then, he invented f/2. In July 1958, Bob had accepted a research position at Woods Hole Oceanographic Institution. While working to establish a collection of marine phytoplankton cultures for studies of plankton ecology, Bob faced the challenge of developing a nutrient enrichment for seawater that would support survival and growth of the widest possible range of microalgal taxa—no mean feat, considering the physiological diversity represented. Achievement of the "right recipe" was coincident with completion of a study,

published with John Ryther in 1962, having the seemingly arcane title, "Studies of Marine Planktonic Diatoms. I. *Cyclotella nana* Hustedt and *Detonula confervaceae* (Cleve) Gran." in the *Canadian Journal of Microbiology* (Vol. 8, 229–239). This article would become one of the most-cited in marine science, not because of extreme interest in the two diatoms that dominate the title, but because the seawater enrichment detailed in this report—designated f/2—turned out to be the most successful algal-culture medium ever developed. "f/2" has trademark recognition in marine science that would be the envy of most breakfast cereals, and a number of aquaculture-supply companies market premixed products of this composition. For this contribution, Bob Guillard does not deserve to be merely famous (which he is anyway), but he deserves to be very wealthy!

A move to the Bigelow Laboratory for Ocean Sciences in West Boothbay Harbor, ME, in 1982 led to the establishment of the Provasoli-Guillard Center for the Culture of Marine Phytoplankton (CCMP) there in 1985. Bob was director of this institution from its inception until his "retirement" in 1989. CCMP brought together the two great, privately held U.S. collections of marine phytoplankton, Bob's Woods Hole Collection and that of the late Dr. Luigi Provasoli of the famed Haskins Laboratories. The Center also established a framework and organization to ensure that phytoplankton strains of known origin and identity are available to the research community far into the future. Again, we have Bob Guillard to thank for building an algal supermarket where we can shop for shellfish munchies and know we are getting what we ask for.

As a publication record of well over 100 articles and many book chapters, notes, abstracts, etc. attests, Bob Guillard continues to contribute mightily to the field of phytoplankton ecology. In his "retirement," Bob has only increased the pace of his scientific activities, having shaken loose the chains of bureaucracy that inevitably accompany the title, "Director." Bob continues, as he has for many years, to teach. There are the legendary short courses. There are the endless telephone calls for help to which we subject him; there is no known instance of anyone whose call for help was ignored or given short shrift. There are the endless telephone calls *he* makes to students and professionals alike to suggest research directions and ideas—these seem to pop into his head much faster than even he can follow up on. There is the boundless curiosity and enthusiasm that continue to inspire.

A sign of maturity is the ability to articulate ideas in direct, simple language. Bob expresses the question driving his work with phytoplankton as, "Why do they live where they do?" This seemingly simple question weaves physical, chemical, and biological threads into the fabric of the invisible ecosystem—that of organisms too small for us to see, catch, dissect, and catalog with our unaided senses. To cultivate, using the limited resolution of the microscope and a dizzying array of indirect methods of measurement, a garden in which the smallest flowers will thrive requires a rare combination of knowledge, insight, and intuition. Bob Guillard has brought these talents to bear on the challenges of culturing phytoplankton . . . relentlessly. As we honor him at our annual meeting, Bob is back in his laboratory nursing along another new "bug," one that may reveal more secrets of his invisible ecosystem. We wish him luck with it and, for our own sakes, hope that it is the perfect food for larval oysters.

Bob has shared with some of us the irony of his interactions with shellfish farmers. He describes the typical telephone troubleshooting scenario as a series of phone calls in which the hatchery operator relates a problem and Bob suggests a response. The hatchery operator calls back to say that the suggested action did not fix the problem. Bob suggests the next step. The process is repeated. "Eventually," says Bob, "they stop calling. That's how I know what finally worked." Bob Guillard, as we thank you for over 40 years of help fixing our most difficult problems, we want you to know, "IT WORKED!"

Gary H. Wikfors
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