



ALFRED C. REDFIELD, EMINENT ECOLOGIST — 1966

Alfred C. Redfield was born in Philadelphia in 1890 and educated at Haverford and Harvard. He was awarded a Ph.D. in zoology from the latter institution in 1917. He later did post-doctoral work at Cambridge and the University of Munich. After a year on the staff at the University of Toronto, he began a long and continuing association with Harvard University and the Woods Hole Oceanographic Institution. At Harvard he rose from assistant professor (1919) of physiology to professor (1931) and served as chairman of the Department of Biology, 1935–1938. At WHOI he was Senior Biologist, 1930–1953, and Senior Oceanographer, 1954–1956. Since 1956 he has been emeritus at both institutions and has

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pursued an independent career of research and writing while remaining in residence at Woods Hole. Among the many special honors he has received are honorary doctor's degrees from the University of Oslo and Lehigh, and election to the National Academy of Science, which further honored him with the Agassiz Medal in 1956. Dr. Redfield was president of the Ecological Society in 1946, and of the American Society of Limnology and Oceanography in 1956.

It is both a privilege and a pleasure for me to have the opportunity to write a brief commentary on Dr. Redfield as the ESA nominee for the Eminent Ecologist Award for 1966. Alfred Redfield is a man of great personal charm whose accomplishments extend into an astonishingly wide range of subjects. A mark of greatness is his ability to draw from more than one discipline in seeking an understanding of major natural phenomena. Dr. Redfield was making major contributions to the theory of the ecosystem as a working biogeophysical unit before Tansley invented the word. In a recent letter he modestly looks back over his career as follows: "I have worked in more diverse fields of science than many. Recently, I have reported my profession, for questionnaire purposes, to be naturalist. As I see it the ecological system is one in which biological and geophysical phenomena play inseparable parts. Without 50 years of dabbling in physiology, biochemistry, zoology, physical oceanography, meteorology and geology, I feel that I would not be qualified to tackle the problems of a naturalist".

Dr. Redfield's publications are so numerous, and are still appearing at the rate of two or three per year, that evaluation of his full influence on ecology would be premature. Again, his own words perhaps best describe his contribution. The following paragraph is taken from an autobiographical memorandum which he prepared in 1959.

"In approaching oceanography my point of view has been that marine biology is a special field in ecology and that the ecology of the marine organism is most profitably attacked by a study of the exchanges of the essential chemicals between the organism and the sea water. The analogies to the phenomena of respiratory and metabolic physiology are obvious. Physiological mechanisms define the demand which life makes on the chemicals of the environment while physical oceanography describes the means by which this demand is supplied. I consider a paper published in 1934 on the proportions of organic derivatives in sea water and their relation to the composition of plankton to be my most significant scientific contribution because it sets forth the basis for a viewpoint which coordinates the data of physical, chemical and biological oceanography. In carrying this point of view to its logical conclusion, I have recently ventured to suggest that the oxygen content of the atmosphere may have been stabilized by the biochemical cycle of the sea, and controlled by the quantities of phosphate available in sea water."

I might add that his later paper entitled "The Biological Control of Chemical Factors in the Environment" published in *American Scientist* (46:205-222) is a classic that should be included in any "suggested readings" for the beginning ecologist. In my opinion this paper is as important to the area of "ecocycling" as is Lindeman's classic paper to the area of "ecoenenergetics".

Since his retirement from administrative duties, Redfield's enthusiasm and remarkable physical stamina have led him into yet new fields, such as, the hydrology of saline lakes, the distribution of deuterium in the oceans and the geoecology of salt marshes. To take a class field trip over the Barnstable marshes on Cape Cod with him, as has been my privilege on several occasions, is to obtain a first hand measure of this remarkable man; only the most eager students can keep up the pace—most are left floundering in the mud far behind!

EUGENE P. ODUM

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