

## A tribute to William N. “MAC” McFarland (1926–2004)

ELLIS LOEW

Cornell University, Biomedical Sciences, Ithaca, New York

On August 31, 2004 William N. “MAC” McFarland died in Mt. Vernon, Washington just 11 days shy of his 79th birthday. He was into his second post-retirement professorship (from Cornell and USC) at the Friday Harbor Labs of the University of Washington. Rather than the usual CV with a list of awards and accomplishments, of which Mac had many, I would like to posit the following question, “Why should Mac be honored in this issue?” To those of us who knew and worked with him, the fact that he was “Mac” says it all. However, to those who did not know him, more justification is needed.

Mac loved fish. His knowledge was encyclopedic on the subject. Not in just being able to recite a particular phylogeny from Kingdom to Species for almost any common name you threw at him, but in knowing the life history, physiology, and special interest facts on the species in question. Rarely was he at a loss when it came to visual physiology and the visual ecology of fish. In relating facts concerning spectral sensitivities and photic environment to expected behaviors, he had an almost piscine intuition. If one had to identify those works that have had lasting impact on the field of vision in fish, the list would have to start with his series of papers in *Vision Research* from 1973 to 1975 on tropical marine fishes. Spectral measurements of oceanic waters had certainly been made before and there had been other surveys of fish visual pigments, however Mac together with his longtime collaborator Fred Munz were the first to combine these in truly comprehensive studies. Out of these came the first real chemical extraction data on multiple cone classes in fish, further confirmation of the “sensitivity hypothesis” and Lythgoe’s contrast hypothesis and a lengthy database of visual pigments of reef- and pelagic-fish. Aside from the work itself, three “themes” emerged from these studies that would shape Mac’s thinking for the rest of his career. The first was the importance of twilight as an adaptive force. From the spectral data came Mac’s “twilight hypothesis” that attempted to explain why the majority of rod visual pigments are centered around 500 nm, a question of great interest at the time. The importance of twilight was reinforced by his study with Ted Hobson in 1980 on crepuscular and nocturnal behaviors of California near-shore fishes and their relation to scotopic visual pigments. He continued this theme of twilight behavior with studies at the West Indies Lab on St. Croix and the Wrigley Marine Science Center on Catalina Island. A second theme was temporality. In the original spectral data from his early works one can often see the effects of surface wave activity as intensity fluctuations. The character of these fluctuations varies with depth. Through observation Mac developed the idea that certain patterns seen on fish bodies could interact with the moving grating-like intensity patterns and either



increase conspicuousness or aid in camouflage. He also felt that the temporal characteristics of the visual system of fish would be related to the “flicker” spectrum of the environment. The discovery of ultraviolet vision and reaffirmation of polarization sensitivity allowed Mac to develop a “world view” of vision in fish. Until the time of his death he was designing experiments to further explore the presence and purpose of these capabilities and encouraging his colleagues to perform them as well! One thing one learned when working with Mac was that one would be foolish to not move in the research directions that he pushed you. He had the knack! To those who have not done so, I suggest reading his papers. Whereas his detailed and illustrative figures alone are worth the read (all done by hand with pen, ink, and a LeRoy lettering set), it is rare that one will finish without being led to that one critical experiment that needs to be done.

So, Mac is gone and we are left with much work to do in just those areas he contributed to the most. Without his input some of us will be at a great disadvantage, but at least he pointed us in the right directions. There is only one way to end an epistle about Mac and that is with his signature farewell, “GLUB.”