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A TRIBUTE TO DR. ARCHIBALD WILSON McCULLOCH, FORMER NSIS PRESIDENT AND NRC RESEARCH SCIENTIST

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Dr. Archibald Wilson "Archie" McCulloch (October 31, 1940-September 3, 2019) was a former Director of Chemistry at the National Research Council of Canada's Institute for Marine Biosciences in Halifax, NS. Born in Troon, Scotland, he received his secondary education at Marr College, Troon. He graduated from the University of Glasgow in May, 1962, with a B.Sc. in Pure Science with First Class Honours in Chemistry, and was named a Fellow of the Chemical Society, London, in the same year. He continued at Glasgow for his Ph.D. (1965) in organic chemistry, supervised by Dr. N.J. McCorkindale, his thesis being entitled "Studies on Hydroxyisoquinolines". He came to Canada in October, 1965, to take up a postdoctoral fellowship with Dr. A. Gavin McInnes, Head of the Natural Products Chemistry Section at the National Research Council's Atlantic Regional Laboratory (NRC-ARL) in Halifax. His research with others in the Section at NRC-ARL produced a series of papers on many topics in organic chemistry, including the influence of Lewis Acids on Diels-Alder reactions, natural product derivatives including muconic acids, fusarubins and related antibiotics, biosynthetic studies of caerulomycins, and studies of silica production by diatoms. He was awarded a Fellowship of the Chemical Institute of Canada in 1980.

In 1987 the then Director (later Director General) of NRC-ARL, Dr. Roger Foxall, appointed Dr. McCulloch as Head of the Natural Products Chemistry Section following the retirement of Dr. McInnes. Shortly thereafter, NRC-ARL became part of an interlaboratory effort to determine the cause of an episode of serious human poisoning after consumption of some mussels harvested in Prince Edward Island. Along with Dr. Jeffrey Wright and some other

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ARL section heads, Dr. McCulloch helped to mobilize the capabilities that had been built up over many years to determine structures of natural products. They proposed bioassay-guided fractionation as a means of narrowing down on the toxic substance, subjecting samples of toxic and non-toxic mussels to identical fractionation procedures, and testing each fraction for toxicity using a mouse bioassay temporarily set up at ARL by the Department of Fisheries and Oceans. Ultimately, this resulted in definitive identification of the toxin (domoic acid) within 4 days of installation of the bioassay. Subsequent work established analytical procedures for sensitive quantitative detection of the toxin and showed that it was produced by an algal (diatom) species that had bloomed in the area of PEI where the mussels had grown. The episode demonstrated the vulnerability of the molluscan shellfish industry to marine toxins and resulted in the establishment of a continuing research focus on marine natural toxins at NRC-ARL. This covered virtually all aspects from the identification of new toxin types and their producing organisms, biosynthesis, structural characterization of toxin molecules and variants, development of chromatographic and other analytical techniques for their isolation and sensitive detection, and production of analytical standards.

Following the appointment of Dr. Pierre Perron as President of NRC in 1989, major changes were made to the administrative structure of the Halifax NRC laboratory. The eight "sections" were replaced with two divisions, Chemistry and Biology, in 1991. Dr. McCulloch was appointed Director of Chemistry alongside Dr. John van der Meer as Director of Biology. At about the same time, the name of the Laboratory was changed to "NRC Institute for Marine Biosciences" (NRC-IMB), reflecting a major change of research direction and the winding down of some disciplines such as Lichenology, Biophysics and Ceramics (formerly High Temperature Chemistry) which did not fit readily within Dr. Perron's vision that each NRC institute should have an identifiable focus. The subsequent years were turbulent. The change of federal government in 1993 was followed by stringent austerity measures with major budget cuts, layoffs and retirements of staff, and appointments of new Research and Technical Officers specializing in fields related to fish aquaculture, fish nutrition, shellfish aquaculture and genomics. Much of the thankless job of administering these changes

fell to Dr. McCulloch, who managed to shield those in his charge from the day-to-day aggravations, thereby enabling their research to continue and even flourish, but leaving very little time for his own research. A cancer diagnosis in 1997 unfortunately hastened his retirement from NRC in 1998.

Subsequently, having undergone successful treatment, he volunteered for many years with the Canadian Cancer Society, where his administrative skills were soon recognized by appointment to many national committees. Many other organizations benefited from his effective volunteer services. The breadth of his interests was also exemplified by his authorship of a profile of Sir John William Dawson (1822-1899), a noted Nova Scotian scientist (McCulloch 2010). A keen and artistic photographer, Archie was a long-standing member of the Photographic Guild of Nova Scotia, serving as its President in 1993 to 1995. His other hobbies included stamp collecting, golf, curling and tennis. Archie was devoted to his wife Elaine, their sons John and Scott, and three grandchildren, and greatly enjoyed opportunities to retreat to their family cottage at Eight Island Lake in Guysborough County, NS.

Archie was an active Council member for the Nova Scotian Institute of Science from 2002 to 2006 and a regular attendee at the monthly meetings. He was elected President for 2003-2004. While he published widely in international journals, just two of his papers were in these Proceedings (PNSIS), the one mentioned above on Dawson, and a second paper describing a long term, collaborative study over 27 years of sea trout in Nova Scotia (Whiteway and McCulloch 1995).

In summary, Archie will be remembered for his meticulous research skills, clarity of thought, careful writing, and unfailing kindness, courtesy and directness in dealing with all his colleagues and acquaintances.

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(This list is in chronological order and may be incomplete)

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