

Remembering Distinguished NSIS Members

DAVE JAMIESON – A LEGACY OF HIGH STANDARDS

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William David Jamieson, 1929-2017

W. David (Dave) Jamieson, distinguished analytical chemist and long-time member of the Nova Scotian Institute of Science, passed away peacefully on 19 September, 2017, aged 88. Dave was born in Toronto but spent most of his life in Halifax, where he was educated at Queen Elizabeth High School and Dalhousie University (B.Sc. 1950, Dipl. Chem. Eng. 1951, M.Sc. 1951). In 1951 he was awarded a Royal Commission for 1851 Overseas Scholarship to pursue research in Physical Chemistry at Cambridge University, where he received his Ph.D. in 1954. The title of his thesis, supervised by Prof. R.G.W. Norrish, was “Photochemical studies in solution at high pressures”. Just before leaving for the UK, he married Muriel Anne (Ritch) Ritchie, a partnership that lasted 66 years. Their daughter Rebecca Anne (Becky) was born during their time in Cambridge.

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Following his return to Halifax, Dave joined the National Research Council of Canada, Atlantic Regional Laboratory (ARL; later Institute for Marine Biosciences, IMB), where he had a long and successful career, including terms as Assistant to the Director, Head of the Analytical Chemistry section, and Manager of the Marine Analytical Chemistry Standards program, until his retirement as Principal Research Officer in 1990.

Although Dave's early research was in physical chemistry, in the 1960's he began working with Charles Masson and Stirling Whiteway in the internationally known High Temperature Chemistry Section at ARL. This soon led him into analytical chemistry, where he established his independent scientific reputation. A noteworthy analytical project undertaken in this period involved characterization of lunar specimens acquired by the Apollo 11 mission. This required developing methods for determination of silicate anions in small samples by gas chromatographic separation with mass spectrometric identification (GC/MS) of their trimethylsilyl derivatives. It also provided an opportunity for his characteristically wry sense of humour, as he always referred to this as his "lunacy project".

In 1966 he established the analytical mass spectrometry group at ARL with both GC/MS and a high-resolution magnetic instrument that could be operated in scan mode or with parallel detection using a photoplate. Over 20 years this facility provided invaluable service to the natural products chemists at ARL and elsewhere. The notable characteristic of those analyses was the wide range of compounds identified, from indoles, to sporidesmin mycotoxins, to red algae polysaccharides. Dave was not only a skilled user of commercial analytical equipment, but also undertook to improve it, and became an inventive designer of new peripheral devices. His best-known work in this regard involved the then gold-standard INCOS data system from Finnegan Corporation, which controlled data acquisition and processing for GC/MS. He so impressed the Finnegan engineers that they gave him access to the source code so that he could properly implement his novel ideas. In 1985 his reputation had grown to the point that NRC funded a modern high-resolution instrument capable of the new tandem mass spectrometry techniques. This resulted in a new generation of analytical chemists attracted to ARL. A paper that drew attention to the new facility exploited the abundant doubly-charged ions formed from polycyclic aromatic hydrocarbons (PAHs).

These appear at half-integral m/z values, providing a means of increasing the selectivity and sensitivity in analyses of PAHs in complex samples. He suggested that this technique be termed “half-massed mass spectrometry”, which greatly amused the journal editor but unfortunately had to be changed for publication.

In 1970 Dave was part of “Operation Oil”, the scientific task force that dealt with an unprecedented cold-water spill of Bunker C oil following the February grounding and break-up of the *MV Arrow* on Cerberus Rock in Chedabucto Bay. He led the “Clean-Up Technology” team, much to the amusement of his family (Dave was a notorious pack-rat). A major accomplishment was the design, installation, and successful use of a dry-cleaning system for fouled fishing gear and other equipment. The time from design proposal to installation was 3 weeks, at a cost of \$26,000, considerably less than the cost of replacing the fouled gear. Not bad for a government clean-up project by today’s standards!

This special assignment led to a promising new research direction that was to become a highlight of Dave’s already successful career. The major effort required to monitor the clean-up pointed to the urgent need for accurate analytical standards and reference materials for monitoring various environmental contaminants. In 1976, Dave initiated the NRC Marine Analytical Chemistry Standards Program (MACSP), which he managed from 1976 until his retirement in 1990. This involved the combined efforts of the Analytical Chemistry sections at ARL and NRC’s Division of Chemistry in Ottawa. Key elements in the program were the assembly of a world-leading research team and the acquisition of advanced analytical instrumentation. From 1977-1987 the ARL component of MASCP focused on developing analytical methodology, environmental standards, and reference materials (RMs). Products included harbour-sediment RMs certified for a suite of PAHs and polychlorinated biphenyls (PCBs). Instrument calibration standard solutions were also produced for 51 individual PCB congeners.

Another turning point came in late 1987, when three deaths and numerous illnesses were traced to the consumption of cultivated mussels from Cardigan Bay, PEI. An unprecedented emergency investigation by Dave and many colleagues at NRC, DFO, UPEI, and other agencies led to the identification of domoic acid as the contaminating agent in the shellfish. There was an urgent need for analytical methods and standards for this toxin to prevent future incidents. In 1989, the first calibration standard, a mussel tissue RM certified for domoic acid,

and corresponding analytical protocols, were released by MACSP. These efforts allowed comprehensive monitoring of shellfish for the toxin – notably, there have been no other human intoxications due to domoic acid despite its widespread distribution in marine environments. Many analytical methods and RMs for other classes of toxins were developed by his group in the following years, and the IMB rapidly became the worldwide supplier of marine toxin standards and RMs. Finally, after more than 35 years of scientific service to the Canadian public, Dave retired from NRC in 1990.

Retirement was an entirely hypothetical concept to Dave – and one that failed repeated testing. Following his official departure, he remained with IMB for another four years as a guest worker. He also became associated with Fenwick Laboratories as an advisor on the development of organic methods of chemical analysis and incorporation of robotics in water analysis procedures. In 1992 he co-founded and became principal associate of a small consulting firm, Scotia Chemical Technology Associates (SCTA), and continued his work there for 10 years. While at SCTA, Dave used his vast experience in quality assurance in chemical analysis to prepare quality control workshops for government laboratories, including Health Canada labs, and private organizations such as the Nova Scotia Power Corporation. Established laboratories were not always ready to hear that operational improvements could be made by implementing the procedures outlined in the ISO standards and guides, but Dave could be very persuasive. During this time he also acted as an Assessor of Laboratory Quality Systems for the Canadian Association for Environmental Analytical Laboratories, performing laboratory audits for the CAEAL and chairing its Committee on Standards and Reference Materials from 1989-1994. In 1993-94 Dave served as the scientist member of the Environmental Assessment Panel advising the Nova Scotia government on a proposal to build a solid waste incinerator in Dartmouth. The proposal was rejected on the advice of the panel, opening the door to the development of solid waste composing programs in the Halifax Regional Municipality.

Dave was an active member of several local and national professional societies, including the Nova Scotia Chemists' Society, Chemical Institute of Canada, and the American Society for Mass Spectrometry. He joined NSIS in 1949, while still an undergraduate, and served as its Secretary in 1965-67 and its President in 1975-77. He was also

an active member of several community organisations and the NDP Halifax Citadel-Sable Island Constituency Association.

At ARL, Dave Jamieson laid the foundation of a world-class analytical chemistry effort, with state-of-the-art instrumentation and skilled personnel. As the developer of the first NRC chemical metrology program, his legacy lives on in the Halifax group, an essential element of NRC's current Measurement Science and Standards Program. His keen mind, ready wit, and unflagging optimism, which were with him until the very end, will be sorely missed by his many colleagues and friends in Halifax and beyond.

