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**Robert William Stewart**  
**1923-2005**



Robert William Stewart, a leading figure in the study of turbulence and air-sea interaction who helped shape the development of ocean science in Canada, died peacefully in Victoria on 19 January 2005.

Bob was born in Smokey Lake, Alberta, on 21 August 1923 and raised in Olds and Calgary. He accepted the single scholarship offered to an Alberta student by Queen's University, graduating in engineering physics in 1945. After a year of teaching physics to returning armed forces personnel he received his Master's degree from Queen's in 1947. An Ontario government scholarship provided support for Bob to go to Cambridge where he joined G.I.Taylor's group which also included Alan Townsend and Werner Heisenberg. His thesis, a study of third order velocity correlations in grid-generated turbulence in a wind tunnel using apparatus of his own design, started him on a path that led to important contributions in naturally occurring flows in the atmosphere and ocean.

Bob returned to Canada in 1950 to a position at the Pacific Naval Laboratory where, with Harold Grant and Tony Moilliet, he began studies of ocean turbulence using thin film sensors. Their measurements in Discovery Passage provided an important first test of Kolmogorov's 1941 paper on the universal aspects of turbulence and led to what is surely the most famous and widely quoted study in the field (*J Fluid Mech.*,12, 1962). Bob's last paper (Stewart & Grant, *J Atmos & Oceanic Techn.*,16, 1999) provides a sense of the difficulty and excitement involved: "After some seven years of designing, testing, modifying equipment, somehow matching tiny probes to a relatively large research ship, designing marginally suitable analysis equipment, working in the rain and a ferociously turbulent sea at ridiculously low ship speeds, fighting plankton and other sources of interference and noise - it all came together!"

In 1961 Bob was seconded to the University of British Columbia and subsequently appointed full professor in physics and oceanography. This was a period of great productivity for Bob. His collaboration with Michael Longuet-Higgins resulted in an important series of contributions on wave-wave and wave-current interactions, wave set-up and its interpretation in terms of radiation stress. Bob's interest in turbulence and surface waves then led him to consider air-sea interaction, which became a primary topic for many UBC graduate students. A research platform was installed in shallow water in English Bay (usually accessible at low tide, but not without risk to the UBC vehicle!) from which a long and highly significant sequence of air-sea interaction studies were conducted. Bob had previously visited the Institute of Atmospheric Physics in Moscow, which led to further collaborations and an important comparison of atmospheric turbulence measuring techniques. In 1968 he was appointed to the Joint Organising Committee for the Global Atmospheric Research Program, which he chaired from 1972 to 1976. In this and the Committee on Climate Change and the Oceans (member 1978-1990, chair 1983-1987), he played a key role in establishing cooperation between different nations, especially the US and the USSR, and in encouraging important programs such as the World Ocean Circulation Experiment.

Following a federally sponsored survey of marine science and technology in Canada, Bob and Lloyd Dickie wrote a report (*Ad Mare: Canada looks to the sea*) providing a far-sighted view of the direction Canada should take. This may have played a role in Ottawa's decision to build an oceanographic center on the Pacific coast, culminating in construction of the Institute of Ocean Sciences at Patricia Bay. Bob left UBC in 1970 to lead the new west coast federal initiative in ocean sciences. In reaching this decision, he stated that other scientists had provided leadership

and support of his activities thus far in his life and now he considered it appropriate to return that favor to the next generation. He began his tenure in the old post office on Fort Street, Victoria, while preparations were underway for the new institute. Firmly rejecting the usual government architectural style (a fortress like appearance he attributed to the government's typically defensive posture!), he insisted the architects visit the beautiful IGPP building at Scripps Institution in La Jolla. The final construction, with its low profile and magnificent views, is a tribute to Bob's vision and sense of what a scientific institution should be.

In 1979-84 Bob assumed senior posts in the BC government, first as ADM for Science and Technology, then as Deputy Minister of Universities, Science and Communications. Given the partisan nature of BC politics he wisely set unique conditions on these appointments, insisting there be no restriction on his interaction with members of the Opposition! Bob's distinctive style had its impact in many ways. The federal government was vigorously opposing private use of satellite broadcast receiver dishes. Bob pointed out that a zone plate could be used as an antenna just as well as a dish and, being flat, would be undetectable when built into the wall of a house. Proving his point he had a zone plate cut out of plywood and set up a working system with a television receiver outside the legislative buildings. The feds ultimately retreated!

Bob's scientific interest shifted progressively towards climate issues at this time, particularly sea-level rise. Following a spell as President of the Alberta Research Council (1987-89) he served as Interim Director of the new Centre of Earth and Ocean Research at UVic. A retirement symposium for Bob was held in 1989 (see *Atmosphere-Ocean* **29**, 1991), but he continued his international activities, notably with the International Council of Scientific Unions. He also continued to attend seminars at UVic, serve on graduate student committees, and join in wide-ranging discussions with students and colleagues.

Bob was a gifted teacher with a profound intuition and an uncanny ability to explain physics in straightforward terms. This is particularly evident in his educational film *Turbulence* which remains one of the outstanding examples of its genre and is still used in university fluid dynamics courses. Bob was generous with his ideas and time, always willing to engage in scientific discussion at any level and an inspiration to numerous graduate students and junior scientists. While turbulence and air-sea interaction will continue to be the field for which he is most widely known, his contributions to the broader issues of climate studies and international collaboration, as well as his leadership in public service and the influence he had over a generation of young scientists provide an enduring legacy. Bob was elected FRSC in 1967 and FRS in 1970, and was appointed Officer, Order of Canada (1980) in addition to receiving the American Meteorological Society's Sverdrup Gold Medal, the CMOS Patterson and Tully Medals and other awards and honorary degrees for his scientific and public service contributions.

Bob is survived by his wife, Anne-Marie, four children, four grandchildren and a great-grandson. On 8 May 2005, in a quiet but moving ceremony aboard the research vessel CGCS Tully, his ashes were scattered on Saanich Inlet, a fitting tribute to a grandfather of Canadian oceanography.

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*(Author's title given as of the time of writing)*