

**William H. Mathews, Recipient of the 1991 W.A. Johnston Medal**

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## WILLIAM H. MATHEWS, RECIPIENT OF THE 1991 W.A. JOHNSTON MEDAL

The W. A. Johnston Medal is the highest award of the Canadian Quaternary Association and is given for professional excellence in Quaternary research. Nominations can be made on behalf of anyone with a demonstrated publication record who has contributed to Quaternary research in Canada or abroad. The nominator must be a member of the Canadian Quaternary Association and a nominee may be a researcher residing anywhere in the world. Further information on the background of the W.A. Johnston Medal is outlined in the preamble of the first award (Morgan, 1988).

### CITATION FOR THE 1991 AWARD OF THE W. A. JOHNSTON MEDAL

Dr. William H. (Bill) Mathews is the 1991 recipient of the W.A. Johnston Medal of the Canadian Quaternary Association. The letters sent in to support Bill Mathews' nomination were exemplary, and it has been a difficult task to re-formulate them and to retain the scope and admiration reflected in each.

Bill was born in Vancouver and obtained his first degree in Geological Engineering in 1940 from U.B.C. One year later he obtained an M.A.Sc., also in Geological Engineering from the same institute, before moving to the University of California at Berkeley for a Ph.D. in Geology in 1948. During this period he was able to retain a position as an Associate Mining Engineer with the B.C. Department of Mines in Victoria. Bill's first paper was published at the age of 18, and at the time of the completion of his doctoral degree he had already written 13 papers in the earth sciences.

These early publications covered a tremendous variety of topics. They range through geomorphology, mineral deposits, regional geology, vulcanology and petrology, and they draw attention to an aspect of Bill's career that was mentioned by all of the nominees.

I quote from four of them. "Dr. Mathews has been a prolific publisher over the span of his career. He has 133 papers to his credit, 14 of them written and published after his retirement in 1984. These papers span an incredible breadth of fields, but his most significant work has been in the field of glaciology and Quaternary vulcanism in the Canadian Cordillera". "Like Johnston, Bill Mathews has made major scientific contributions in a variety of Earth Science disciplines, including vulcanology, glaciology, geomorphology, engineering geology, Quaternary geology, and sedimentology. In an era of specialisation and parochialism in science, there are few geologists that have Bill's breadth of knowledge and ability to synthesize seemingly disparate observations". "The diversity of his accomplishments in Quaternary Sciences is perhaps what he is best known for. His long publication list shows a pervasive scientific finesse that underscores his confidence and ease with all geomorphic processes. His related abilities at geomorphic reconstructions with applications to regional mapping, mineral exploration and engineering development are, to my knowledge, unequalled". Finally, a last quote; "... I have long been impressed with Dr. Mathews' contributions in Cordilleran Cenozoic geology, glaciation and geomorphology. They range from short, incisive pieces which have gained him wide respect in the Cordilleran community, but there are longer works which are cited more widely (e.g., the 1962 paper on the Fraser Delta — also a "Johnston topic" — Hope Landslide papers of 1969 and 1978, the Laurentide ice sheet profile paper of 1974, that on Cenozoic denudation in eastern North America in 1975, the works on Quaternary deposits in N.E. B.C. of 1962, 1963, 1978, 1980, and the 1958 Glacial Map of Canada (with others)".

All of Dr. Mathews' nominees also cited his accomplishments in teaching. Beside his publication record which is "...one of the most eclectic and significant to be found anywhere in Canada; it is also reflected in the students trained by Bill over the last 40 years. More than a few have also striven to emulate the "master's" multidisciplinary scientific approach". Again, "...he has provided a dedicated and generous commitment to scores of students who have been fortunate enough to study under his tutelage." He was also described as a "...warm-hearted, generous man with a concern to see others get ahead".

In other areas his achievements have been rewarded by a receipt of fellowship in the Royal Society of Canada (1957), by NRC Senior Research (1963-1964) and Killam Senior Fellowships (1971-1972), and in the Willet G. Miller Medal of the Royal Society of Canada in 1989. Bill has served on innumerable geological and engineering committees, as Departmental Head at U.B.C. from 1964 to 1971, and as Chairman of two GSA Cordilleran Section Meetings in 1960 and 1985.

Obviously Bill Mathews has had a long and distinguished career, which, equally obviously, is far from slowing down. From what has been said above his career reflects a superlative example of a life-long commitment to Quaternary Sciences in Canada.

Alan V. MORGAN  
Chair, Johnston Medal Committee

## RESPONSE BY W.H. MATHEWS

My first thought on being chosen for this year's Johnston award was one of thanks to CANQUA. It is a real honor to be selected by CANQUA and to be included with three noteworthy Quaternary scientists previously awarded the Johnston Medal-Vic Prest, Aleksis Dreimanis and Jaan Terasmae. To them I offer my greetings.

Particularly pleasing to me is the name of the award. William Albert Johnston was an early hero of mine, helping to generate my appreciation of Quaternary geology by means of his classic GSC Memoir 135 (Geology of the Fraser River Delta map-area). This work, a comprehensive study of the Tertiary to Holocene sediments and volcanic rocks of the Greater Vancouver area, clearly influenced my teenage interests and played a major part in my choice of geology for a career.

The word that I was to be awarded the Johnston Medal prompted me to look at Johnston's life and work. His biography by H.C. Cooke, a colleague in the Geological Survey of Canada, appears in the *Transactions and Proceedings of the Royal Society of Canada* (3rd Series, vol. 42, appendix C, p. 127-131, 1949) and will not be repeated here except to note that Johnston worked for the GSC from 1905 until retirement in 1939 with emphasis on unconsolidated sediments that mean so much as a growing medium for mankind's food, a reservoir for his water supplies, a source of his building materials and a foundation for his structures. His geological publications as listed in the *Bibliography of North American geology* (U.S.G.S. Bulletins 746, 823, 932, and 1049), comprise 68 citations starting with his work on the Peterborough and Simcoe districts of southern Ontario, then turning to the Ottawa area, to Manitoba, to the Fraser delta, and to the gold placer deposits of central and northern British Columbia. In his final years he undertook broad surveys including a fifty year history of Pleistocene geology in Canada, migration of early man to areas south of the North American ice sheets, and late Quaternary shifts on sea level as well as more localized studies such as the age of the upper Great Gorge of Niagara River.

Although our paths never crossed, Johnston's studies were an inspiration for my own work, and that of some of my students in which we followed in his footsteps. I can cite particularly our investigation into glacial lakes — (WAJ's on Lake Louise, Alberta, and my own at Garibaldi and Sunwapta Lakes, Jasper Park, Alberta), sedimentation of the Fraser Delta (his GSC Memoir 125, and the work by Francis Shepard and myself in the AAPG Bulletin), postglacial shifts in sea level (WAJ in the Ottawa and Vancouver areas and in northern Manitoba, WHM with J.G. Fyles and H. Nasmith in southwest B.C.), tilting of strand lines of glacial lakes (WAJ in southern Ontario and WHM in the southern interior of B.C.), and migration of early man along the so-called ice-free corridor.

Johnston's conclusions have stood the tests of time very well indeed. His 8,000 years of growth of the Fraser Delta at approximately present sea level is but one example. He may not have achieved 100 per cent success, but then, who has? Consider for example the rhythmic stratification in core samples of silt he took in Pitt Lake, a water body cut off from the sea by the growth of the Fraser Delta. Johnson ascribed this to a tidal, not an annual cycle. My Ph.D student, Gail Ashley, suspected her cores from the same lake displayed an annual rhythm. To demonstrate this she sliced her core samples into individual couplets and had the successions analyzed for radioactive cesium, in fallout from nuclear bomb tests from the atmosphere. The pattern of  $^{137}\text{Cs}$  analyses, plotted on the assumption of an annual cycle demonstrated low values in the early 1950's, peaks becoming successively higher in 1956, 1959, and 1963, followed by a roughly exponential decline to about 1970 and steady values following this until 1975, the year of the topmost couplet. The match with annual patterns as measured, for example, in Lake Michigan sediments, or in milk produced in the lower Fraser Valley was very good whereas a plot on the basis of 23 tidal cycles wasn't meaningful. But were Johnston and Gail Ashley really in disagreement? Johnston comments that many of his "tidal" (or diurnal) laminae are 100 to the inch (*i.e.* average thickness 0.25 mm) whereas Gail Ashley's couplets average 18 mm in thickness. Gail's work shows that many of the tidal cycles are not sufficiently vigorous to initiate sediment transport, hence deposition from about 72 tidal cycles per year may be reasonable. Thus there may be no dispute between the two workers. In any case should Johnston be criticized for a conclusion or judged to be wrong on the basis of a technique not even thought of for 30 years after he did his work? I for one would excuse him.

Once again my thanks go to CANQUA.

Bill MATHEWS

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