Géographie physique et Quaternaire

The 2001 W.A. Johnston Medal

Gail Chmura

Volume 55, numéro 3, 2001

URI : https://id.erudit.org/iderudit/006850ar
DOI : https://doi.org/10.7202/006850ar

Aller au sommaire du numéro

Éditeur(s)

Les Presses de l'Université de Montréal

ISSN

0705-7199 (imprimé)
1492-143X (numérique)

Découvrir la revue

Citer ce document

Chmura, G. (2001). The 2001 W.A. Johnston Medal. *Géographie physique et Quaternaire*, *55*(3), 201–211. https://doi.org/10.7202/006850ar

G*éographie physique et Quaternaire*, 2001, vol. 55, n° 3, p. 201-211

THE 2001 W.A. JOHNSTON MEDAL

The W.A. Johnston Medal is the highest award of the Canadian Quaternary Association. This award recognizes professional excellence in Quaternary research by Canadian scientists or those who have made significant contributions to our knowledge of the Canadian Quaternary and the training of students who conduct Quaternary research in Canada.

The Johnston Medal was named after William Albert Johnston, born in 1874 in Aberarder, Ontario. Johnston spent most of his career with the Geological Survey, from which he retired in 1939. A prolific writer, he produced over sixty publications on a variety of topics. Johnston's research helped elucidate the former limits of the eastern glacial Great Lakes, as well as historical drainage routes through the North Bay, Trent and Sarnia outlets. His examinations of the surficial geology of the Ottawa-Georgian Bay region revealed the extent of isostatic uplift in the area and more accurately defined the western limits of the Champlain Sea transgression in the Ottawa Valley. In central Canada, Johnston spent many years investigating the areal limits of glacial Lake Agassiz. He helped to establish suitable water supplies for Regina and Moose Jaw, and was one of the foremost authorities on placer gold deposits in Canada. Johnston conducted extensive studies of the Fraser River and its delta, and was instrumental in helping to improve navigation in the area.

The first Johnston Award was made in 1987. The contributions of eight other scientists have been recognized since (see Table). With such a short history, making a choice among the many scientists worthy of the award has been difficult for the CANQUA members who have served on the Johnston Award committee. We are grateful to them for their service. In 2001 the decision was particularly difficult, and the award was made to two individuals: Dr. Weston Blake, Jr. and Dr. Derek Ford. Congradulations from all CANQUA members. Citations by the nominators and responses of our award winners follow.

Gail Chmura

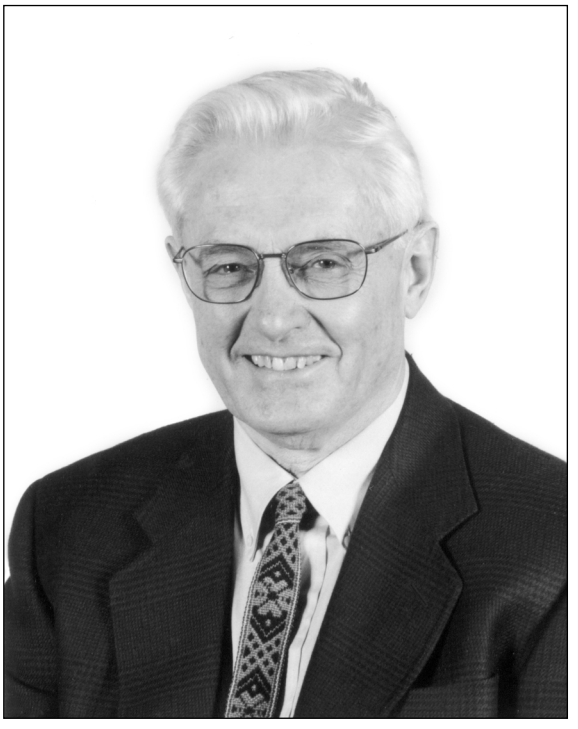
CANQUA Past President

TABLE

Past winners of the CANQUA W.A. Johnston Award

1987	Vic Prest
1989	Alexis Dreimanis
1990	Jaan Terasmae
1991	Bill Mathews
1993	Ross Mackay
1995	John Clague
	Paul Karrow
1997	Nat Rutter
1999	Jim Ritchie

The 2001 W.A. Johnston Medallists



WESTON BLAKE, Jr.

Weston Blake, Jr., who is currently an Emeritus Research Scientist with the Geological Survey of Canada, has worked on Quaternary research throughout his career. Although he has many important research accomplishments to his credit, foremost among these was his proposition that the Innuitian Ice Sheet covered the Canadian High Arctic during the last glaciation, an idea that is now widely accepted after some 30 years of heated debate. He has encouraged and promoted many young scientists who now are well established Quaternary researchers. Moreover, he has been perhaps the most devoted and hard working CANQUA supporter this country has ever had!

If someone asks Wes what he feels his greatest achievement has been, he says that he is especially proud of the accomplishments of the young students and field assistants who went with him to places such as Ellesmere Island. Almost all now enjoy very successful academic/government/research careers, and in most cases they have continued work on a variety of northern Quaternary subjects. Wes continues his arctic research even in "retirement"; for example, last summer (2001) he celebrated his 50th year of arctic fieldwork!

Although Wes seems firm at claiming his main accomplishment has been the encouragement of other, younger scientists to take up Quaternary subjects, his personal scientific research legacy is very strong indeed. In many areas of the Arctic, such as Svalbard, Bathurst, Devon and Baffin islands, there were no ^{14}C determinations at all when Wes began his career, and in other areas, such as Ellesmere Island and northwest Greenland, there were very few dates. When Wes came to the Geological Survey of Canada (GSC) in 1962, the radiocarbon lab had just opened the previous year. Wes was instrumental in setting up the high standards of the GSC radiocarbon lab, and directed the laboratory for many years. He worked closely with many colleagues on geochronological problems and techniques. This work resulted in many influential publications, especially those dealing with the poorly studied arctic regions.

Secondly, as a result of his Ph.D. and later work in Svalbard, together with Russian work in nearby Franz Josef Land, Wes reintroduced the concept of an ice sheet over the Barents Sea in 1968. As a result of his work on Bathurst Island in 1963 and 1964, and on southern Ellesmere and Coburg islands in 1967 and 1968, Wes proposed at a meeting in 1969 the concept of an Innuitian Ice Sheet over much of the Queen Elizabeth Islands (published in the *Canadian Journal of Earth Sciences* in 1970). There was considerable opposition to both ideas for the next 30 years. As the readers of this journal are likely aware, the consensus today is that there was indeed an Innuitian Ice Sheet during the Late Wisconsinan.

Finally, only superlatives can be used to describe Wes' contributions to CANQUA. It is hard to imagine anyone in CANQUA's history who has sat on more committees or has done more to encourage the Association's goals. His list of committees does not need repeating here, nor do his three terms as a CANQUA councillor, but the amount of time and energy Wes has put into this organization is an example to us all. So much of what Wes does is done quietly, behind the scenes. Wes truly believes Quaternary research is important, that it should be vigorously encouraged, and that CANQUA is the vehicle that should be used to meet these ends.

We think we would all agree that such devotion and dedication deserves the gratitude of all Quaternarists, and so we are delighted that Wes is receiving the 2001 Johnston Medal, and what better place to do it than here, in a northern location such as Whitehorse.

John P. Smol
Queen's University

Marianne S.V. Douglas
University of Toronto

Donald Lemmen
Geological Survey of Canada

ACCEPTANCE TEXT

I am delighted to be named a co-recipient of CANQUA's W.A. Johnston Medal for 2001. I offer my congratulations to the other medallist, Professor Emeritus Derek Ford of McMaster University, whose work I've long admired, and a glance at the list of previous winners of this award shows me that I am in excellent company! I am most appreciative to my nominators, to those colleagues who wrote supporting letters, and to the selection committee itself, all of whom deemed my research and career worthy of this award.

With the exception of a few excursions "southward", to Labrador, to southern Baffin Island, to the mainland around Bathurst Inlet and to the Kola Peninsula of Russia, all of my field work has been in the northern Canadian Arctic Archipelago, North-West Greenland and Svalbard — north of 75°. Although I have not worked in the areas that W.A. Johnston studied, much of my research has dealt with raised and tilted shorelines, like his on Glacial Lake Agassiz. In my case, I have been particularly interested in raised marine shorelines, displayed so well north of the treeline along Arctic coasts. The other main focus of my research has been on radiocarbon dating and other dating methods, the aim being to establish chronologies of Pleistocene and Holocene events throughout the little studied Arctic areas where I've worked.

It is not surprising that the Arctic became part of my lifeblood, so to speak. First, I came from a family of ardent skiers, so I learned to love the outdoors at an early age. Next, as an undergraduate in geology at Dartmouth College in Hanover, New Hampshire, I was enthralled by the annual visits and talks by the famous Arctic explorer, Vilhjalmur Stefansson. Then, in 1950-1951, I was one of three students to take a new course offering in Polar Geography, taught by Trevor Lloyd and Cmdr. David Nutt. Dartmouth was followed by two fine years at McGill University, where I learned a great deal more about the Arctic, especially at the Geography Summer School in Stanstead, Québec. In 1952 I spent three months on the Meta Incognita peninsula of southern Baffin Island, as John Mercer's field assistant. John is best known for his outstanding work in Patagonia and Antarctica, but his Ph.D. was based on Baffin. The geomorphological studies there were followed immediately by a sojourn in Northwest River, Labrador, where I did the field work for my own M.Sc. thesis in forest geography (air photo interpretation of forest cover types), under Ken Hare's supervision, and supported by the Defence Research Board in Ottawa. Additional field experience in Labrador came the following winter, when I accompanied Dave Nutt on a journey by dog team around Lake Melville, re-occupying oceanographic stations established by his summer "Blue Dolphin" expeditions. The McGill experience was made even more special because I had an office in the "attic" of the Bishop Mountain House, then the Canadian headquarters for the Arctic Institute of North America. The Director was Colonel Pat Baird, aided by Svenn Orvig, and lots of Arctic tales swirled around at morning coffee and afternoon tea!

Service in the U.S. Army's Transportation Arctic Group gave me a chance in 1954 to spend five months on the Greenland Ice Sheet east of Thule Air Force Base, testing a crevasse detector (it didn't work, but it was great for skijoring!) and mapping a safe route for heavy tractor trains through the crevassed marginal areas of the ice sheet. On weekend geomorphological excursions I met such luminaries as Børge Fristrup, glaciologist and Danish Liason Officer; Dick Goldthwait, glacial geologist, with whom I later did my Ph.D. at Ohio State University; Nat Rutter, then an undergraduate at Tufts University; Valter Schytt, glaciologist, then working for the Snow Ice and Permafrost Research Establishment (SIPRE); Spence Taylor, glacial geologist, University of Alberta; and Herbert Wright Jr., paleoecologist, University of Minnesota.

Following two further visits to North-West Greenland in 1956, to carry out glaciological work (flow rates) on an ice cliff at Red Rock Lake north of Thule AFB with a group led by Dick Goldthwait, I spent several years alternating between graduate studies in glacial geology and geomorphology at Ohio State and the University of Stockholm. In addition, two long seasons of field work in Nordaustlandet, Svalbard (astride the 80th parallel) were carried out with the Swedish Glaciological Expedition (summers of 1957 and 1958), under the leadership of Valter Schytt. The glacial geological studies there led to a Ph.D. in 1962. That same year I joined the Geological Survey of Canada, having learned that there was an opening in the Pleistocene Section from Bert Lee, whom I met at the International Geological Congress in Copenhagen in 1960.

The GSC's Quaternary Research and Geomorphology Division (as of 1967), or Terrain Sciences Division (as it became in 1971), under the leadership of John Fyles and John Scott, allowed me a great deal of freedom to pursue topics of interest in the Arctic Archipelago. First came Bathurst Island in 1963 and 1964, a joint venture with Bill Kerr, then at ISPG. A return to southern Baffin Island followed in 1965 with Bob Blackadar's 'Operation Amadjuak', where I was helped greatly by Francis Synge of Leicester University/Geological Survey of Ireland. Later cooperative efforts were with Bill Kerr at Cape Storm, Ellesmere Island, in 1967, and with Bob Christie at Grise Fiord in 1968. Tom Frisch provided excellent base camp facilities at Makinson Inlet, Ellesmere Island, in 1977, where I was also joined by Roland Souchez (for the third summer) and Reggie Lorrain from Université Libre de Bruxelles, to continue their investigations into processes operating at the soles of glaciers and ice sheets. Finally, Bob Christie joined me at Cape Herschel in 1982 to provide advice on the origin of erratics along Nares Strait, based on his extensive knowledge of the region.

Most of my time since 1967 has been devoted to southern and eastern Ellesmere Island and North-West Greenland. In this connection I owe a tremendous debt to Fritz Müller, of McGill and ETH Zürich, whose foresight and energy led to the building of stations to study the North Water in the early 1970's on Coburg Island, at Cape Herschel on Ellesmere Island, and on Nordvestø in the Carey Øer, northern Baffin Bay. Without these well-provisioned stations, and the shelter they provided from some extremely inclement weather, it would have been impossible to carry out our extensive field programs. The land studies

were supplemented by two excellent cruises aboard C.S.S. *Hudson* to northernmost Baffin Bay and the southern part of Nares Strait — led in 1974 by Dave Ross and in 1991 by Ruth Jackson, both of the Atlantic Geoscience Centre (AGC), Dartmouth, Nova Scotia. These cruises gave me a chance to learn details of the bottom topography over vast areas and to acquire cores of marine sediments at selected sites.

Excellent assistance in the field was provided by a succession of students as well as by several colleagues from institutions in Canada and abroad. Several of the students went on to become leading arctic specialists in their own right. Gordon Cox, McGill University, after working with me in southern Ellesmere Island, did a Ph.D. in glaciology at Dartmouth, and then he worked for both CRREL and AMOCO, as well as serving on the Polar Research Board of the U.S. National Academy of Sciences. Longest serving of all was Rick Richardson, originally an undergraduate at Brock University, who accompanied me for several seasons in the 1970's, interrupted by travel to Auckland, New Zealand, to do his M.Sc. He moved to the Alberta Geological Survey in 1980, and he is now Alberta's Provincial Geologist. For several years he devoted part of his summer vacation to working with my field parties at Cape Herschel, Ellesmere Island, and in 1990 and 1991 he was there to carry out his own program, including work on coal with Wolfgang Kalkreuth from ISPG. Rick is an acknowledged expert on what to do if a polar bear leans on you while you are trying to sleep in your Logan tent, or on how to find mud in which to land a Piper Super-Cub!

The extensive program of coring shallow ponds (frozen to the bottom, although one lake on Rundfjeld at 830 m asl was also frozen to the bottom, with 5+ m of ice) and lakes in east-central Ellesmere Island was initiated in 1978. Although the original aim was to acquire chronological data bearing on the time of deglaciation and the pattern of land emergence from the sea, it quickly became apparent that the cores could yield other information of great value. Hannu Hyvärinen, University of Helsinki, joined us in 1979 and produced the first pollen diagram for the Holocene from Ellesmere Island. Steve Watts, Sir Sanford Fleming College, was with us to work on weathering phenomena later the same season. Svend Funder from the Geological Museum, University of Copenhagen, accompanied us in 1980, in part to join in the work on the Greenland side of Smith Sound, and Otto Salvigsen, from the Norwegian Polar Research Institute in Oslo, contributed his expertise in 1981. Brian McCann, McMaster University, worked on coastal phenomena in both 1981 and 1988.

John Smol, FRSC and Director of PEARL in the Department of Biology, Queen's University, first came to Cape Herschel in 1983, and Marianne Douglas, then John's graduate student but now teaching in the environmental geology program at the University of Toronto, started her extensive studies of the ponds (leading to both M.Sc. and Ph.D. degrees) in 1986. After a hiatus in the early 1990's, they have continued the program of monitoring the nearly 40 ponds there every three years, so revisits have been made in 1995, 1998 and 2001. Their ongoing study already has meant that changes in water chemistry and the diatom flora at Cape Herschel (78° 45' N) have been documented for nearly 20 years — longer than at any other High Arctic site! As with all of my own work earlier on Ellesmere Island, their research is made possible by the excellent logistical support provided by the Polar Continental Shelf Project.

Interspersed with the summers in the Canadian Arctic Archipelago and North-West Greenland were several summers in Svalbard: in 1966 a return to Nordaustlandet (this time with helicopter support) with an expedition from the Institute of Physical Geography, University of Stockholm, led by Professors Valter Schytt and Gunnar Hoppe; in 1990 to Nordaustlaudet as co-leader of a small expedition with Professor Wibjörn Karlén, by that time head of the same institute in Stockholm; and in 1995 with Otto Salvigsen, Norsk Polarinstitutt, Oslo, to the north coast of the main island of Spitsbergen. In fact, the overseas contacts, especially those in Fennoscandia, have been of immense value, for they have provided a continual learning experience and a source of inspiration and support for over 40 years. As an example, I probably never would have discovered pumice on the raised beaches of Ellesmere and Devon islands had I not worked with this material earlier in Svalbard! Several of the publications on the Queen Elizabeth Islands were used for a 'Filosofie doktor' degree in physical geography at the University of Stockholm, defended publicly in May 1975, the opponents being Jan Mangerud, Hannu Hyvärinen and Bo Strömberg.

Collaboration or assistance in various aspects of the Arctic work with specialists other than those named already has also been of great value: for instance, Bill Barr, University of Saskatchewan; Guy Brassard, University of Ottawa and Memorial University of Newfoundland; Anne de Vernal, Université de Québec à Montréal; Bent Fredskild, University of Copenhagen; Misha Grosswald, Academy of Sciences, Moscow; Dick Harington, Canadian Museum of Nature; Bob Hooper, Memorial University of Newfoundland; Jan Janssens, University of Alberta and later, Minnesota; Karen Luise Knudsen and Marit-Solveig Seidenkrantz, Aarhus University; and Antony Sutcliffe, the British Museum. GSC colleagues Thane Anderson, Jocelyne Bourgeois, Marian Kuc, Sigrid Lichti-Federovich, John V. Matthews, Jr., Bob Mott and Mark Nixon helped out in many ways, either in the field or in analyzing samples in the laboratory. Support by radiocarbon laboratories was essential to my research. First came Ingrid U. Olsson at Uppsala University, followed by Göran Possnert when ^{14}C-dating by accelerator mass spectrometry became feasible. At the GSC, the laboratory was operated, in succession, by Willy Dyck, Sandy Lowdon and Roger McNeely, and since 1983 I've benefitted greatly from the expertise of Roelf Beukens at the IsoTrace Laboratory, University of Toronto. Finally, the unwavering support of my family made the long absences in the Arctic possible. Sincere thanks to Ingrid, Erik and Sven, and once again my gratitude to CANQUA for conferring this high honour on me.

Weston Blake, Jr.

SELECTED BIBLIOGRAPHY

Blake, W., Jr., 1955. Note on the dating of terraces in the Lake Melville district, Labrador. Science, 121: 112.

____ 1956. Landforms and topography of the Lake Melville area, Labrador, Newfoundland. Geographical Bulletin (Ottawa), 9: 75-100.

____ 1961. Patterned ground in Nordaustlandet, Spitsbergen. VIth INQUA Congress, Warsaw, Poland, Abstracts of papers: 88.

____ 1961. Radiocarbon dating of raised beaches in Nordaustlandet, Spitsbergen, p. 133-145. *In* G.O. Raasch, ed., Geology of the Arctic. Proceedings of the First International Symposium on Arctic Geology (Calgary, Alberta, January 1960), University of Toronto Press,. Toronto, 2 vol., 1196 p.

____ 1961. Russian settlement and land rise in Nordaustlandet, Spitsbergen. Arctic, 14: 101-111.

Olsson, I.U. and Blake, W., Jr., 1962. Problems of radiocarbon dating of raised beaches, based on experience in Spitsbergen. Norsk Geografisk Tidsskrift, 18: 47-64.

Blake, W., Jr., 1963. Notes on glacial geology, northeastern District of Mackenzie. Geological Survey of Canada, Paper 63-28, 12 p.

____ 1964. Preliminary account of the glacial geology of Bathurst Island, Arctic Archipelago. Geological Survey of Canada, Paper 64-30, 8 p.

Blake, W., Jr., Olsson, I.U. and Srodon, A., 1965. A radiocarbon-dated peat deposit near Hornsund, Vestspitsbergen, and its bearing on the problem of land uplift. Norsk Polarinstitutt, Årbok 1963: 173-180.

Dyck, W., Fyles, J.G. and Blake, W., Jr., 1965. Geological Survey of Canada radiocarbon dates IV. Radiocarbon, 7: 24-46.

Blake, W., Jr., 1966. End moraines and deglaciation chronology in northern Canada, with special reference to southern Baffin Island. Geological Survey of Canada, Paper 66-26, 31 p.

Schytt, V., Hoppe, G., Blake, W., Jr. and Grosswald, M.G., 1968. The extent of the Würm Glaciation in the European Arctic. International Association of Scientific Hydrology, Publication 79: 207-216. (Also published the same year in Russian in USSR Academy of Sciences, Proceedings, Geographical Series, 5: 56-68.)

Blake, W., Jr., 1970. Studies of glacial history in Arctic Canada. I. Pumice, radiocarbon dates, and differential postglacial uplift in the eastern Queen Elizabeth Islands. (Symposium on Recent Crustal Movements held in Ottawa, Ontario, March 1969, Proceedings). Canadian Journal of Earth Sciences, 7: 634-664.

____ 1971. Les ponces des plages soulevées du Spitzberg et du Canada arctique. Quaternaria, 14: 19-20.

____ 1972. Climatic implications of radiocarbon-dated driftwood in the Queen Elizabeth Islands, Arctic Canada, p. 77-104. *In* Y. Vasari, H. Hyvärinen and S. Hicks, eds., Proceedings of Symposium on Climatic changes in Arctic areas during the last ten-thousand years (Oulanka & Kevo, Finland, October 1971), Acta Univ. Ouluensis, Ser. A, Scientiae Rerum Naturalium 3, Geologica 1, 511 p.

Allan, R.J., Blake, W., Jr., Heginbottom, J.A., Hobson, G.D. and Hunter, J.A., 1973. Permafrost scientists meet in Yakutsk, Siberia for Second International Conference. Northern Miner (Special Issue): 53, 54, 71.

Blake, W., Jr., 1973. Former occurrence of *Mytilus edulis* L. on Coburg Island, Arctic Archipelago. Le Naturaliste canadien, 100: 51-58.

____ 1974. Collection of samples for radiocarbon dating, U.S.S.R. Geological Survey of Canada, Paper 74-1A: 191-192.

____ 1974. Periglacial features and landscape evolution, central Bathurst Island, District of Franklin. Geological Survey of Canada, Paper 74-1B: 235-244.

____ 1974. Studies of glacial history in Arctic Canada. II. Interglacial peat deposits on Bathurst Island, Queen Elizabeth Islands. Canadian Journal of Earth Sciences, 11: 1025-1042.

____ 1975. Glacial geological investigations in northwestern Greenland. Geological Survey of Canada, Paper 75-1A: 435-439.

____ 1975. Radiocarbon age determinations and postglacial emergence at Cape Storm, southern Ellesmere Island, Arctic Canada. Geografiska Annaler, 57, Series A: 1-71.

____ 1975. Radiocarbon age determinations from the Karuküla site, southwestern Estonia, U.S.S.R. Geological Survey of Canada, Paper 75-1B: 123-127.

____ 1975. Studies of glacial history in the Queen Elizabeth Islands, Canadian Arctic Archipelago. Naturgeografiska Institutionen, Stockholms Universitet, Stockholm, Forskningsrapport 21, 14 p.

Blake, W., Jr. and Lewis, C.F.M., 1975. Marine surficial geology: Observations in the High Arctic, 1974. Geological Survey of Canada, Paper 75-1A: 383-387.

Blake, W., Jr., 1976. Glacier ice cores, climate and chronology around northern Baffin Bay. American Quaternary Association, 4th Biennial Meeting (Tempe, Arizona), Abstracts: 20-21.

____ 1977. Glacial sculpture along the east-central coast of Ellesmere Island, Arctic Archipelago. Geological Survey of Canada, Paper 77-1C: 107-115.

____ 1977. Holocene glacier fluctuations and sea level changes in Arctic Canada: A reply. Geografiska Annaler, 59A: 257-260.

____ 1977. Iceberg concentrations as an indicator of submarine moraines, eastern Queen Elizabeth Islands, District of Franklin. Geological Survey of Canada, Paper 77-1B: 281-286.

____ 1977. Radiocarbon age determinations from the Carey Islands, northwest Greenland. Geological Survey of Canada, Paper 77-1A: 445-454.

____ 1978. Aspects of glacial history, southeastern Ellesmere Island, District of Franklin. Geological Survey of Canada, Paper 78-1A: 175-182.

____ 1978. Coring of Holocene pond sediments at Cape Herschel, Ellesmere Island, Arctic Archipelago. Geological Survey of Canada, Paper 78-1C: 119-122.

____ 1978.Weathering forms above Cory Glacier, Ellesmere Island. Geological Survey of Canada, Paper 78-1B: 207-211.

Brassard, G.R. and Blake, W., Jr., 1978. An extensive subfossil deposit of the Arctic Moss *Aplodon wormskioldii*. Canadian Journal of Botany, 56: 1852-1859.

Blake, W., Jr., 1979. Age determinations on marine and terrestrial materials of Holocene age, southern Ellesmere Island, Arctic Archipelago. Geological Survey of Canada, Paper 79-1C: 105-109.

Blake, W., Jr. and Matthews, J.V., Jr., 1979. New data on an interglacial (?) peat deposit near Makinson Inlet, Ellesmere Island, District of Franklin. Geological Survey of Canada, Paper 79-1A: 157-164.

Blake, W., Jr., 1980. Application of amino acid ratios to studies of Quaternary geology in the High Arctic, p. 453-461. *In* P.E. Hare, T.C. Hoering, and K. King, Jr., eds., Biogeochemistry of Amino Acids. Proceedings of a Carnegie Institution of Washington Conference (Warrenton, Virgina, October-November 1978). Wiley Interscience, New York, 558 p.

____ 1980. Mid-Wisconsinan interstadial deposits beneath Holocene beaches, Cape Storm, Ellesmere Island, Arctic Canada. American Quaternary Association, 6th Biennial Meeting (Orono, Maine), Abstracts: 26-27.

____ 1980. Radiocarbon dating of driftwood: Inter-laboratory checks on samples from Nordaustlandet, Svalbard. Geological Survey of Canada, Paper 80-1C: 149-151.

Blake, W., Jr. and Leaning, J., 1980. Glacial sculpture. GEOS, Spring 1980: 10-13.

Blake, W., Jr., 1981. Glacial history of Svalbard and the problem of the Barents Shelf ice sheet: Comments. Boreas, 10: 125-128.

____ 1981. Lake sediment coring along Smith Sound, Ellesmere Island and Greenland. Geological Survey of Canada, Paper 81-1A: 191-200.

____ 1981. Neoglacial fluctuations of glaciers, southeastern Ellesmere Island, Canadian Arctic Archipelago. Geografiska Annaler, 63A: 201-218. (Gunnar Hoppe Festschrift)

Hyvärinen, H. and Blake, W., Jr., 1981. Lake sediments from Baird Inlet, east-central Ellesmere Island Arctic Canada. Radiocarbon and pollen data, 3rd International Symposium on Paleolimnology (Joensuu, Finland, September 1981), Abstracts: 35.

Blake, W., Jr., 1982. Coring of frozen pond sediments, east-central Ellesmere Island: A progress report. Geological Survey of Canada, Paper 82-1C: 104-110.

____ 1983. Radiocarbon dating of inter-laboratory check samples. Geological Survey of Canada, Paper 83-1A: 469-472.

____ 1985. Radiocarbon age determinations from Arctic Canada — comparisons between marine shells and other materials. 12th International Radiocarbon Conference (Trondheim, Norway, June 1985), Abstracts: 126.

____ 1985. Radiocarbon dating with accelerator mass spectrometry: Results from Ellesmere Island, District of Franklin. Geological Survey of Canada, Paper 85-1B: 423-429.

____ 1986. New AMS radiocarbon age determinations from east-central Ellesmere Island: Applications to glacial geology. Geological Survey of Canada, Paper 86-1B: 239-244.

____ 1987. Lake sediments and glacial history in the High Arctic: Evidence from east-central Ellesmere Island, Arctic Canada, and from Inglefield Land, Greenland. Polar Research, 5 new series: 341-343.

____ 1988. Geological Survey of Canada radiocarbon dates XXVII. Geological Survey of Canada, Paper 87-7, 100 p.

____ 1989. Application of AMS dating to the chronology of Holocene glacier fluctuations in the High Arctic, with special reference to Leffert Glacier, Ellesmere Island. (Proceedings of the 13th International Radiocarbon Conference, Dubrovnik, Yugoslavia, June 1988). Radiocarbon, 31: 570-578.

____ 1989. Inferences concerning climatic change from a deeply frozen lake on Rundfjeld, Ellesmere Island, Arctic Canada. Journal of Paleolimnology, 2: 41-54.

____ 1989. Radiocarbon dating by accelerator mass spectrometry: A contribution to the chronology of Holocene events in Nordaustlandet, Svalbard. Geografiska Annaler, 71A: 59-74.

Barr, W. and Blake, W., Jr., 1990. Identification of the site of Fort Magnesia, Payer Harbour, Pim Island, N.W.T. Polar Record, 26: 39-42.

Blake, W., Jr., 1991. Interstadial marine deposits at Cape Storm, Ellesmere Island. (14th International Radiocarbon Conference, Phoenix, Arizona, May 1991). Radiocarbon, 33: 178-179.

____ 1991. Ratios of stable carbon isotopes in some High Arctic plants and lake sediments. Journal of Paleolimnology, 6: 157-166.

____ 1992. Holocene emergence at Cape Herschel, east-central Ellesmere Island, Arctic Canada: Implications for ice sheet configuration. Canadian Journal of Earth Sciences, 29: 1958-1980.

____ 1992. Shell-bearing till along Smith Sound, Ellesmere Island-Greenland: Age and significance, p. 51-58. *In* A.-M. Robertsson, B. Ringberg, U. Miller and L. Brunnberg, eds., Quaternary Stratigraphy, Glacial Morphology and Environmental Changes. Sveriges Geologiska Undersökning, Ser. Ca. 81 (Jan Lundqvist Festschrift).

Blake, W., Jr., Boucherle, M.M., Fredskild, B., Janssens, J.A. and Smol, J.P., 1992. The geomorphological setting, glacial history and Holocene development of 'Kap Inglefield Sø', Inglefield Land, North-West Greenland. Meddelelser om Grønland, Geoscience 27, 42 p.

Jackson, H.R., Loncarevic, B.D. and Blake, W., Jr., 1992. Shallow seismic and magnetic data from northernmost Baffin Bay: Insights into geology. Geological Survey of Canada, Paper 82-1B: 23-29.

Blake, W., Jr., 1993. Holocene emergence along the Ellesmere Island coasts of northernmost Baffin Bay. Norsk Geologisk Tidsskrift, 73: 147-160.

Blake, W., Jr., Douglas, M.S.V., Uutala, A.J., Smol, J.P. and Janssens, J.A., 1993. Paleolimnology of a nunatak pond, Stygge Glacier, Ellesmere Island, Arctic Canada. 6th International Paleolimnology Conference (Canberra, Australia, April 1993), Programme and Abstracts, no pagination.

Watchman, A.L., Lessard, R., Jull, A.J.T., Toolin, L.J., and Blake, W., Jr., 1993. ^{14}C dating of laser-oxidized organics. Radiocarbon, 35: 131-133.

Douglas, M.S.V., Smol, J.P. and Blake, W., Jr., 1994. Marked post-18th century environmental change in high arctic ecosystems. Science, 266: 416-419.

Blake, W., Jr., 1995. An historical perspective of radiocarbon dating for Nordaustlandet, Svalbard. PACT (Journal of the European Network of Scientific Cooperation for Cultural Heritage), 49: 107-116. (Ingrid Olsson Festschrift)

____ 1996. Interstadial deposits from Ellesmere and Coburg Islands, Arctic Canada. AMQUA, 14th Biennial Meeting (Flagstaff, Arizona, May 1996), Program and Abstracts: 151.

Blake, W., Jr., Jackson, H.R. and Currie, C.G., 1996. Seafloor evidence for glaciation, northernmost Baffin Bay. Bulletin of the Geological Society of Denmark, 43: 157-168.

Blake, W., Jr., 1998. The Broad Yoldia, *Megayoldia thraciaeformis*, in northernmost Baffin Bay: Radiocarbon ages and paleoceanographic implications. Bulletin of the Geological Society of Denmark, 44: 129-138.

____ 1999. Glaciated landscapes along Smith sound, Ellesmere Island and Greenland. Annals of Glaciology, 28: 40-46.

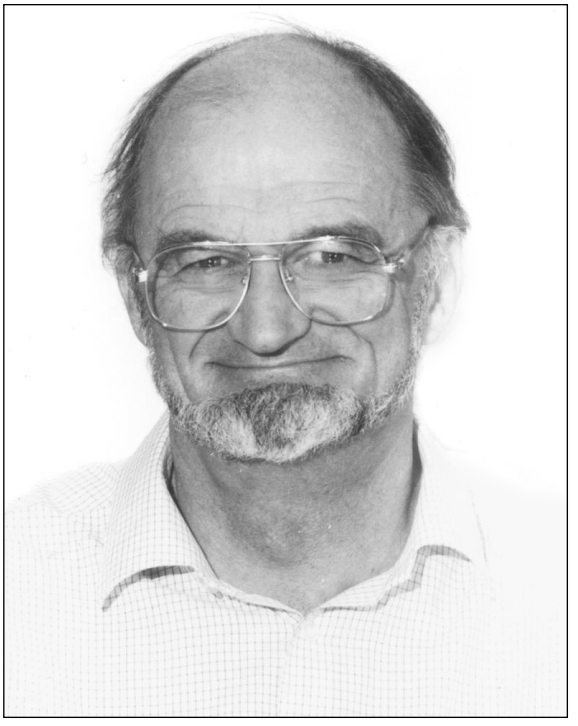
de Vernal, A., Blake, W., Jr., Darby, D., Hamel, D.D., Hillaire-Marcel, C., Grøsfjeld, K., Kunz-Pirrung, M., Levac, E., Matthiessen, J., Mudie, P.J., Peyron, O., Polyak, L., Radi, T., Rochon, A., Turon, J.L. and Voronina, E., 2000. Late-Quaternary variations of sea ice and sea-surface conditions in the Arctic and circum-Arctic based on dinoflagellate assemblages : Preliminary results and methodological issues. CAPE/ICAPP meeting on Sea Ice in the Climate System: The Record of the North Atlantic Arctic (Kirkjubæjarklaustur, Iceland, June 2000), Abstracts: 24-25.

Douglas, M.S.V., Smol, J.P. and Blake, W., Jr., 2000. Summary of paleolimnological investigations of High Arctic ponds at Cape Herschel, east-central Ellesmere Island, Nunavut. (*In* M. Garneau and B.T. Alt, eds., Environmental Response to Climate Change in the Canadian High Arctic). Geological Survey of Canada, Bulletin 529: 257-269.

Sutcliffe, A.J. and Blake, W., Jr., 2000. Biological activity on a decaying caribou antler at Cape Herschel, Ellesmere Island, Nunavut, high Arctic Canada. Polar Record, 36: 233—246.

Blake, W., Jr., 2001. Interstadial environments around northernmost Baffin Bay. (CANQUA Meeting, Whitehorse, Yukon, August 2001) Government of the Yukon, Occasional Papers in Earth Sciences 1, Heritage Branch, Program and Abstracts: 29.

Levac, E., de Vernal, A. and Blake, W., Jr., 2001. Sea-surface conditions in northernmost Baffin Bay during the Holocene: Palynological evidence. Journal of Quaternary Science, 16: 353-363.



DEREK FORD

It is a great pleasure for me to write this citation for my friend and colleague Derek Ford on the occasion of his receiving the Johnston Medal. Derek is truly deserving of this recognition for his research on the Quaternary era.His studies of caves and speleothems as recorders of climate and geomorphic evolution have been recognized throughout the world, as exemplified by the numerous awards and recognitions he has already received, including the Gold Medal of the Royal Canadian Geographical Society for his studies of Castleguard Cave, the G.K. Gilbert Award of the American Association of Geographers, and fellowship in the Royal Society of Canada.

Derek began his career at Oxford University where he did a degree under the supervision of the noted speleologist Margaret Sweeting. He studied the Mendip Caves near his home in Bath, and in subsequent years often returned to these caves to gain further insights in speleogenesis and in order to sample the stalagmites that these caves contained. In 1959 he came to McMaster, leaving briefly to try out the climate of southern California, but soon returning to Mac where he remained until his retirement in 1997. His research, however, has taken him to every corner of the world where caves can be found, from Brazil to northern Norway, from China to the Cayman Islands, from New Zealand to the Northwest Territories. There can hardly be a significant karstic terrain in the world that Derek has not investigated.

His travels have allowed him to study caves in four dimensions, observing their present-day form, and using both his geographical insights, and a variety of dating methods to infer the ways in which these underground features have evolved through time by the slow dissolution of carbonate and evaporite bedrocks. These insights were synthesized from a multitude of careful studies by himself and his many graduate students and post-docs. They allowed him to develop a comprehensive theory for the origin of cave systems, a theory which became the dominant view for the majority of students of cave development and has been borne out by studies of other researchers around the world.

At the same time, starting in the 1970's, Derek collaborated with various students as well as myself to develop a program of paleoclimate studies based on the dating and isotopic analysis of speleothems. Thanks to his broad awareness of the areas in which samples would be available for study, this program of research laid the foundations for a new insight into the history of continental climate over the past hundreds of millennia. He appreciated that this record had to be correlated with other existing records such as the isotopic signals from deep-sea sediments and ice cores from the Arctic and Antarctic. After some years of neglect, we are now seeing a world-wide revival of interest in isotopic studies of speleothems, so that this once arcane subject is now appreciated as an important input into our tracking of past glacial-interglacial transitions.

Intimately connected with these studies, Derek also maintained a close interest in the role of karst as a carrier of water. He became widely sought as a consultant on karstic hydrological systems, which provide the world with some of its most complex and inscrutable hosts for groundwater.In recognition of this work, he was awarded the 1999 first Annual Award of the Karst Waters Institute of America.

In the 1990's, he happened to encounter another cave enthusiast, Javor Shopov from Sophia, Bulgaria, who had a wonderful way of using laser beams to discern seasonal cycles in speleothems. Bringing Yavor to McMaster was a wild and woolly adventure, and allowed Yavor to broadcast his ideas more freely to the speleothem community.

These are just some highlights of the diverse and fruitful universe of ideas that Derek has harvested through his career. The Johnston Medal justly honours the life-long work of an underground genius, a man who has led a small army of bright young men and women into the stygian depths where they could achieve enlightenment. Virtually all of the academic speleologists in the English-speaking world, and many of those from the rest of the karstic field have either been students of Derek's or have spent time in his labs. His book with Paul Williams has become a bible for those interested in the study of karstic caves and hydrology.

The Quaternary Research community of Canada is fortunate to claim Derek as a member in good standing. He has been recognized both at home and around the world for his singular achievements in the study of the holes that lie beneath our feet as we stand on any limestone bedrock. The Johnston Medal is an appropriate further honour for these achievements. I look forward to his continued stimulus to myself and his many other research associates and students. Although he has moved off to Orillia, a few hours away from Hamilton, we await his regular visits to check up on how things are going with his technicians, students and the steady stream of visiting scientists who are attracted to the lab.

Henry Schwarcz
McMaster University

ACCEPTANCE TEXT

It is a great honour to be a winner of CANQUA's Johnston Award for 2001 in the company of Wes Blake, a good friend and colleague for many years.

I started to study Quaternary phenomena with a 1956 undergraduate expedition to map the recession of the most northerly icecap in arctic Norway. Quaternary science has made enormous advances worldwide since then and is certainly one of the most complex and worthwhile of interdisciplinary fields today. There is a lot more exciting discovery to come. For those younger CANQUA members who will be contributing to it I would like to offer some perspective from my own experience in the field.

As Henry Schwarz notes, much of my career has been dedicated to the dating of and paleo-environmental work on speleothems, stalactites, stalagmites and flowstones of calcite or aragonite that are precipitated in limestone caves. As a cave specialist I appreciated that these slowly accumulating deposits that can be seen growing on top of or buried within more conventional fluvial, lacustrine, aeolian or even glacial, sediments in ancient caves might contribute a lot to Quaternary chronology if they could be dated by some means. In 1962 a leading American specialist, John Rosholt, suggested that they would not be suitable materials for U series isotope ratio dating because they lacked sufficient uranium and suffered from detrital thorium contamination problems. In 1965, however, the "father of U series dating", V.V. Cherdyntsev, published some apparently successful results from speleothems and spring travertines in Russia.Henry Schwarcz, an isotope geochemist newly arrived at McMaster University, and I immediately decided to undertake an investigation to resolve the question. Our history of speleothem dating since then is an interesting and optimistic example of progress in scientific technology.

We began by using alpha particle radio emissions to measure the isotope ratios, the standard method of the 1960s and '70s. Anywhere from 40 to 100 grams of calcite would be required for one dating attempt, creating a big and ugly hole in the stalagmite, *i.e.* the temporal resolution within a given sample was pretty poor. After extraction, the U and Th in our samples sat for one week or more in alpha counters to accumulate a few thousand disintegrations. With such numbers the one standard deviation error of the age estimate was then about ±10 %. When we last bought an alpha counting system, in 1980, it cost $ 25 000.

In the 1980s our McMaster colleague, Alan Dickin, took some of our dated speleothem samples to experiment with thermal ionisation mass spectrometry, his specialty. We were beaten to the draw by Edwards, Chen and Wasserburg (Caltech) who published successful results on calcite corals in 1996-1997. Our first clear successes with speleothems came one year later. "TIMS" is now the standard method for U dating calcites. The size of individual samples is usually no more than one gram and can be much less if a deposit is old. The dating range is pushed back from ~350 000 years BP to 500 000-600 000 years in favorable circumstances and the one standard deviation error is reduced to about 1 % or less. U can be counted in automatic mode overnight while you are out at the pub but, with current technology,.a skilled person is needed to.control the thorium counting, paying close attention to the monitor for about three hours per sample. A suitable mass spectrometer costs $ 250 000 or more.

During the past two years U series dating of speleothems has been tried on induction-coupled plasma mass spectrometers ("ICPMS"). It works!. Both the uranium and thorium isotopes of a given sample can be counted in just 20 minutes. Running on the ICPMS machine at GEOTOP, Montréal, our McMaster speleothem standard yields an age of 15 750 years BP with a *two* standard deviation error of 30 years — which is probably less than the actual span of time that it took the calcite of the sample to accumulate in the first place. Suitable machines cost more than $ 1 000 000 but just think — inflation!

In other speleothem work we are now resolving calcite deposition to individual years or even to seasons within them. I am sure that there are similar successes to come everywhere else in Quaternary studies. Most impressive are recent results by Darryl Granger and Derek Fabel (Purdue University) studying the radioactive decay of cosmogenic ^{26}Al and ^{10}Be in the skins of quartz sands washed into Mammoth Cave, Kentucky, and so removed from further cosmic bombardment. Quartz grains one metre or more below the surface in any glacial deposits should be similarly protected. The one standard deviation error of ^{26}Al, ^{10}Be dating is now about the same as it was in our U series technology *ca.*1975.

Good luck!

Derek Ford

SELECTED BIBLIOGRAPHY

BOOKS

Ford, D.C. and Williams, P.W., 1989. Karst Geomorphology and Hydrology. Unwin-Hyman, London,.601 p.

Bosak, P., Ford, Glazek, J. and Horacek, M. (eds.), 1989. Paleokarst: A World Regional and Systematic Review. Elsevier/Academia Praha, Amsterdam, 720 p.

McCann, S.B. and Ford, D.C. (eds.), 1996. Geomorphology sans frontières. John Wiley & Sons, London, 245 p.

Klimchouk,A.V., Ford, D.C., Palmer, A.N. and Dreybrodt,W. (eds.), 2000. Speleogenesis: Evolution of Karst Aquifers. National Speleological Society of America, Huntsville, 527 p.

ARTICLES

Ford, D.C., 1958. Seilandsjokulen and Nordmannsjokulen, Finnmark, Norway. Journal of Glaciology, 3: 249-252.

____ 1961. The Bonnechere Caves, Renfrew Co., Ontario. Canadian Geographer,. 3: 22-25.

____ 1964. On the geomorphic history of G.B. Cave. University of Bristol Spelaeological Society, Proceedings, 10: 149-188.

____ 1964. Stream potholes as indicators of erosion phases in caves. National Speleological Society of America, Bulletin, 26: 67-74.

____ 1965. A method of contouring cave maps. National Speleological Society of America, Bulletin, 27: 55-58.

____ 1965. The origin of limestone caves: A model from the central Mendip Hills, England. National Speleological Society of America, Bulletin, 27: 107-132.

____ 1966. Calcium carbonate solution in some central Mendip caves. University of Bristol Spelaeological Society, Proceedings, 9: 89-104.

____ 1966. Permo-Triassic karstification in the Mendip Hills, Cave Research Group Transactions, 16: 31-39.

____ 1967. The sinking streams of Mt. Tupper — a remarkable karst in Glacier National Park.B.C., Canadian Geographer, 11: 49-52.

____ 1968. Features of cavern development in Central Mendip. Cave Research Group of Great Britain, Transactions, 10: 11-25.

Ford, D.C. and Stanton, W.I., 1968. Geomorphology of the south-central Mendip Hills. Geologists' Association, Proceedings, 79: 401-427.

Brown, M.C., Ford, D.C. and Wigley, T.M.L., 1969. Water budget studies in karst aquifers. Journal of Hydrology, 9: 113-116.

Ford, D.C., 1969. On Mesozoic marine erosion of the Mendip Hills. Geologists' Association, Proceedings, 80: 379.

Ford, D.C., 1970. Theories of limestone cavern genesis. Simpson Memorial Address, British Speleological Association Journal , 6: 35-45.

Ford, D.C., Fuller, P.G. and Drake, J.J., 1970. Calcite precipitates at the soles of temperature glaciers. Nature, 226: 441-442.

Pluhar, A. and Ford, D.C., 1970. Dolomite karren of the Niagara Escarpment of Ontario. Zeitschrift für Geomorphologie, 14: 392-410.

Bones, J.G. and Ford, D.C., 1971. Simulating the development of river drain age networks. Canadian Geographer, 15: 207-211.

Brown, M.C. and Ford, D.C., 1971. Quantitative tracer methods of investigating karst hydrologic systems. Cave Research Group of Great Britain, Transactions, 13: 27-46.

Ford, D.C., 1971. Alpine karst in the Mount Castleguard-Columbia Icefield area, Canadian Rocky Mountains. Arctic and Alpine Research, 3: 239-252.

____ 1971. Characteristics of limestone solution in the southern Rocky Mountains and Selkirk Mountains, Alberta and British Columbia. Canadian Journal of Earth Sciences, 8: 585-609.

____ 1971. Geologic structure and a new explanation of limestone cavern genesis. Cave Research Group of Great Britain, Transactions, 13: 81-94.

Goodchild, M.F. and Ford, D.C., 1971. A study of scallop patterns by simulation under controlled conditions. Journal of Geology, 79: 52-62.

Drake, J.J. and Ford, D.C., 1972. The analysis of growth patterns of two-generation populations: The example of karst sinkholes. Canadian Geographer, 16: 381-384.

Brown, M.C. and Ford, D.C., 1973. Caves and Groundwater patterns in a tropical karst environment. American Journal of Science, 173: 622-633.

Ford, D.C., 1973. Contribution to The Wisconsin Deglaciation of Canada. B.J. Bird (ed.), Arctic and Alpine Research, 5: 232.

____ 1973. Development of the canyons of the South Nahanni River, N.W.T. Canadian Journal of Earth Sciences, 10: 366-378.

Wigley, T.M.L., Drake, J.J., Quinlan, J.F. and Ford, D.C., 1973. Geomorphology and geochemistry of a gypsum karst near Canal Flats, British Columbia. Canadian Journal of Earth Sciences, 10: 113-129.

Drake, J.J. and Ford, D.C., 1974. Hydrochemistry of the Athabasca and North Saskatchewan Rivers in the Rocky Mountains of Canada. Water Resources, 10: 1192-1198.

Schwarcz, H.P. and Ford, D.C., 1974. Radiometric age studies of speleothems. Geological Survey of Canada, Paper 74-1B: 223.

Thompson, P., Schwarcz, H.P. and Ford, D.C., 1974. Continental Pleistocene climatic variations inferred from speleothem age and isotopic data. Science, 184: 893-895

Cowell, D.W. and Ford, D.C., 1975. The Wodehouse Creek Karst, Grey Co., Ontario. Canadian Geographer, 19: 196-205.

Ford, D.C., 1975. Castleguard Cave, an alpine cave in the Canadian Rockies, invited paper. Studies in Speleology, 2: 299-310.

Harmon, R.S., Thompson, P., Ford, D.C. and Schwarcz, H.P., 1975. Uranium-Series Dating of Speleothems. National Speleogical Society of America, Bulletin, 37: 21-33.

Thompson P., Schwarcz, H.P. and Ford, D.C., 1975. U^{234}/U^{238} ratios in lime stone cave seepage waters and speleothems from West Virginia. Geochimica et Cosmochimica Acta, 39: 661-669.

Drake, J.J. and Ford, D.C., 1976. Solutional erosion in the Canadian Rockies. Canadian Geographer, 20: 158-170.

Ford, D.C., 1976. Evidences of multiple glaciation in South Nahanni National Park, Mackenzie Mountains, N.W.T., 1974. Canadian Journal of Earth Sciences, 13: 1433-1445.

Ford, D.C., Harmon, R.S., Schwarcz, H.P., Wigley, T.M.L., and Thompson, P., 1976. Geohydrologic and thermometric observations in the vicinity of the Columbia Icefields, Alberta and British Columbia. Journal of Glaciology, 16: 219-230.

Schwarcz, H.P. and Ford, D.C., 1976. Radiometric age studies of speleothems. Geological Survey of Canada, Paper 76-1B: 151-152.

Schwarcz. H.P., Harmon, R.S. and Thompson, P. and Ford, D.C., 1976. Stable isotopes of fluid inclusions in speleothems and their palaeoclimatic significance. Geochimica et Cosmochimica, 40: 657-665.

Brook, G.A., Ford, D.C. and Cowell, D.W., 1977. Comment upon "Regional Hydrochemistry of North American Carbonate Terrains", by R.S. Harmon, W.B. White, J.J. Drake and J.W. Hess, and "The Effect of Climate on the Chemistry of Carbonate Groundwater", by J.J. Drake and T.M.L. Wigley. Water Resources Research, 13: 856-868.

Harmon, R.S., Ford, D.C. and Schwarcz, H.P., 1977. Interglacial chronology of the Rocky and Mackenzie Mountains based upon $^{230}Th/^{234}$ U dating of calcite speleothems. Canadian Journal of Earth Sciences, 14: 2543-2552.

Thompson, P., Ford, D.C. and Schwarcz, H.P., 1977. Stable isotope geochemistry, geothermometry and geochronology of speleothems from West Virginia. Geological Society of America, Bulletin, 87: 1730-1738.

Brook, G.A. and Ford, D.C., 1978. The nature of labyrinth karst and its implications for climaspecific models of tower karst. Nature, 275: 493-496.

Ford, D.C. and Ewers, R.O., 1978. The development of limestone cave systems in the dimensions of length and depth. Canadian Journal of Earth Sciences, 15: 1783-1798.

Gascoyne, M., Schwarcz, H.P. and Ford, D.C., 1978. Uranium series dating and stable isotope studies of speleothems: Part 1 Theory and techniques. British Cave Research Association, Bulletin, 5: 91-111.

Harmon, R.S., Schwarcz, H.P. and Ford, D.C., 1978. Stable isotope geochemistry of speleothems and cave waters from the Flint Ridge-Mammoth Cave system, Kentucky: Implications for terrestrial climate change during the period 23,000 to 100,000 years B.P. Journal of Geology, 86: 373-384.

Harmon, R.S., Thompson, P., Ford, D.C. and Schwarcz, H.P., 1978. Late Pleistocene palaeoclimates of North America as inferred from stable isotope studies of speleothems. Quaternary Research, 9: 54-70.

Ford, D.C., 1979. A review of alpine karst in the southern Rocky Mountains of Canada. National Speleological Society of America, Bulletin, 41: 53-65.

Gascoyne, M., Benjamin, G., Schwarcz, H.P. and Ford, D.C., 1979. Sea-level lowering during the Illinoian Glaciation: Evidence from a Bahamas 'Blue Hole'. Science, 205: 806-808.

Harmon, R.S., Schwarcz, H.P., Ford, D.C. and Koch, D.L., 1979. An isotopic palaeotemperature record of the Late Wisconsinan in northeast Iowa. Geology, 7: 430-433.

Latham, A.G., Schwarcz, H.P., Ford, D.C. and Pearce, W.G., 1979. Paleomagnetism of stalagmite deposits. Nature, 280: 383-385.

Brook, G.A. and Ford, D.C., 1980. Hydrology of the Nahanni Karst, northern Canada, and the importance of extreme summer storms. Journal of Hydrology, 46: 103-121.

Cowell, D.W. and Ford, D.C., 1980. Hydrochemistry of a dolomite terrain: The Bruce Peninsula, Ontario. Canadian Journal of Earth Sciences, 17: 520-526.

Gascoyne, M., Ford, D.C. and Schwarcz, H.P., 1980. A palaeotemperature record for the mid Wisconsin in Vancouver Island. Nature, 285: 474-476.

Glew, J.R. and Ford, D.C., 1980. Simulation of rillenkarren. Earth Surface Processes, 5: 25-36.

Harmon, R.S. and Schwarcz, H.P., Ford, D.C. and Koch, D.L., 1980. An isotope palaeotemperature record for late Wisconsinan time in northeast Iowa, reply. Geology, 8: 263-265.

Drake, J.J. and Ford, D.C., 1981. Karst Solution: A global model for groundwater solute concentrations. Transactions of the Japanese Geomorphological Union, 2: 223-230.

Ford, D.C. and Ewers, R.O., 1981. The development of limestone caves in the dimensions of length and depth, first published in Canadian Journal of Earth Sciences,15(11), republished in International Journal of Speleology, 10: 213-244 (at editor's request).

Ford, D.C., Schwarcz, H.P., Drake, J.J., Gascoyne, M., Harmon, R.S. and Latham, A.G., 1981. On the age of existing relief in the southern Rocky Mountains in Canada. Arctic and Alpine Research, 13: 1-10.

Gascoyne, M., Ford, D.C. and Schwarcz, H.P., 1981. Late Pleistocene chronology and paleoclimate of Vancouver Island determined from cave deposits. Canadian Journal of Earth Sciences, 18: 1643-1652.

Brook, G.A. and Ford, D.C., 1982. Hydrologic and geologic controls of carbonate water chemistry in the sub-Arctic Nahanni karst, Canada. Earth Surface Processes and Landforms, 7: 1-16.

Latham, A.G., Schwarcz, H.P., Ford, D.C. and Pearce, W.G., 1982. The paleomagnetism of three Canadian speleothems. Canadian Journal of Earth Sciences, 19:1985-1995.

Schwarcz, H.P., Gascoyne, M. and Ford, D.C., 1982. Uranium-series disequilibrium studies of granitic rocks. (*In* G.W. Bird and W.S. Fyfe, eds., Geochemistry of Radioactive Waste Disposal, Proceedings of a symposium). Chemical Geology, 36: 87-102.

Smart, C.C. and Ford, D.C., 1982. Quantitative dye tracing in a glacierised alpine karst. Beitraege zur Geologie der Schweiz-Hydrologie, 28:191-200.

Ford, D.C., 1983. Alpine karst systems at Crowsnest Pass, Alberta-British Columbia. Journal of Hydrology, 61: 187-192.

____ 1983. Effects of glaciations upon karst aquifers in Canada. Journal of Hydrology, 61: 149-158.

____ 1983.The physiography of the Castleguard karst and Columbia Icefields area, Alberta, Canada. Arctic and Alpine Research, 15: 427-436.

____ 1983. The Winnipeg Aquifer. Journal of Hydrology, 61: 177-180.

Ford, D.C., Smart, P.L. and Ewers, R.O., 1983. The physiography and speleogenesis of Castleguard Cave. Arctic and Alpine Research, 15: 437-540.

Karolyi, M.S. and Ford, D.C., 1983. The Goose Arm Karst, Newfoundland. Journal of Hydrology, 61: 181-186.

Gascoyne, M., Latham, A.G., Harmon, R.S. and Ford, D.C., 1983. The antiquity of Castleguard Cave. Arctic and Alpine Research, 15: 463-470.

Gascoyne, M., Schwarcz, H.P. and Ford, D.C., 1983. Uranium-series ages of speleothem from Northwest England: Correlation with Quaternary climate. Royal Society of London, Philosophical, Transactions, B301: 143-164.

Roberge, J.S. and Ford, D.C., 1983. Karst of the Salmon River, Anticosti Island, Quebec. Journal of Hydrology, 61: 159-162.

Schroeder, J.J. and Ford, D.C., 1983. Clastic sediments in Castleguard Cave. Arctic and Alpine Research, 15: 451-461.

Smart, C.C. and Ford, D.C., 1983. Hydrogeology of Castleguard karst, Main Ranges, Rocky Mountains of Canada. Journal of Hydrology, 61: 193-201.

Ford, D.C., Andrews, J.T., Day, T.E., Harris, S.A., Macpherson, J.B., Occhietti, S., Rannie, W.F. and Slaymaker, H.O., 1984. Canada: How Many Glaciations? Canadian Geographer, 28: 205-225.

Gascoyne, M. and Ford, D.C., 1984. Uranium series dating of speleothems. Part II. Results from the Yorkshire Dales. British Cave Research Association, Transactions, 11: 65-85.

Gascoyne, M., Ford, D.C. and Schwarcz, H.P., 1984. Rates of cave and landform development in the Yorkshire Dales from speleothem age data. Earth Surface Processes and Landforms, 8: 557-568.

Ford, D.C., 1985. Dynamics of the karst system: A review of recent N. American work. Annales de la Société de Géologie de Belgique, 108: 283-291.

____ 1985. Plate tectonic morphology: A comparative survey. Canadian Geographer, 39: 315-323.

Yonge, C.J., Ford, D.C., Gray, J. and Schwarcz, H.P., 1985. Stable isotope studies of cave seepage water. Chemical Geology, Isotope Geoscience Section, 58: 97-105.

Ford, D.C., 1986. Genesis of paleokarst and strata-bound zinc/lead sulfide deposits in a Proterozoic dolostone, Northern Baffin Island – a discussion. Economic Geology, 81:1562-1563.

Latham, A.G. Schwarcz, H.P. and Ford, D.C., 1986. The paleomagnetism and U-Th dating of Mexican stalagmite, DAS 2. Earth and Planetary Science Letters, 79: 195-207.

Smart, C.C. and Ford, D.C., 1986. Structure and function of a karst aquifer, Canadian Journal of Earth Sciences, 23: 919-929.

Bakalowicz, M., Ford, D.C., Miller, T.E., Palmer, A.N. and Palmer, M.V., 1987. Thermal genesis of dissolution caves in the Black Hills, South Dakota. Geological Society of America, Bulletin, 99: 729-738.

Ford, D.C., 1987. Effects of glaciations and permafrost upon the development of karst in Canada. Earth Surface Processes and Landforms, 12: 507-522.

Ford, D.C. and Lundberg, J.A., 1987. Dissolutional rilling in limestone and other soluble rocks. Catena, Supp., 8: 119-140.

Latham, A.G., Schwarcz, H.P. and Ford, D.C., 1987. Secular variation of the Earth's magnetic field from 19.5 to 15.0 ka B.P., as recorded in a Vancouver Island stalagmite. Canadian Journal of Earth Sciences, 24: 1235-1241.

Gordon, D., Smart, P.L., Andrews, J.N., Ford, D.C., Atkinson, T.C., Rowe, P. and Christopher, N.S.J., 1988. Dating of United Kingdom Interglacials and Interstadials from Speleothem Growth Frequency. Quaternary Research, 31: 14-26.

Grun, R., Schwarcz, H.P., Ford, D.C. and Hentzsch, B., 1988. ESR dating of spring-deposited travertines. Quaternary Science Reviews, 7: 429-432.

MacPhee, R.D.E., Ford, D.C. and McFarlane, D.A., 1988. Pre-Wisconsinan mammals from Jamaica and models of late Quaternary extinction in the Great Antilles. Quaternary Research, 31: 94-106.

Ford, D.C. and Hill, C.A., 1989. Dating deposits from Carlsbad Cavern and other caves of the Guadalupe Mountains, N.M. Isochron/West, 54: 3-7.

Latham, A.G., Ford, D.C., Schwarcz, H.P. and Birchall, T., 1989. Secular variations from Mexican stalagmites: Their potential and problems. Physics of Earth and Planetary Interiors, 56: 34-48.

Li, W.-X., Lundberg, J., Dickin, A.P., Ford, D.C., Schwarcz, H.P., McNutt, R. and Williams, D., 1989. High precision mass spectrometric dating of speleothem and implications for paleoclimate studies. Nature, 339: 534-536.

Ford, D.C. and Gospodaric R., 1990. U series dating studies of Ursus spelaeus deposits in Krizna Jama, Slovenia. Acta Carsologica, 18: 39-57.

Lundberg, J., Ford, D.C., Schwarcz, H.P., Dickin, A.P. and Li, W.-X., 1990. Dating sea levels in caves. Nature, 343: 217-218.

Ford, D.C., 1991. Antecedent canyons of the South Nahanni River. Canadian Geographer, 35: 426-431.

____ 1991. Features of the genesis of Jewel Cave and Wind Cave, Black Hills, South Dakota. National Speleological Society of America, Bulletin, 51: 100-110.

Ghazban, F., Schwarcz, H.P. and Ford, D.C., 1991. Stable isotopic composition of the hydrothermal fluids responsible for the Nanisivik Zn-Pb deposits, Northwest Territories, Canada. Applied Geochemistry, 6: 257-266.

Ghazban, F., Schwarcz, H.P. and Ford, D.C., 1992. Correlated strontium, carbon and oxygen isotopes.in carbonate gangue at the Nanisivik zinc-lead deposits, northern Baffin Island, Canada. Chemical Geology, Isotope Geoscience Section, 87: 137-146.

Straus, L.G., Altuna, J., Ford, D.C., Marambat, L., Rhine, J.S., Schwarcz, H.P. and Vernet, J.-L., 1992. Early farming in the Algarve, southern Portugal: A preliminary view from two cave excavations near Faro. Trabalhos de Antropologia e Etnologia, 32:141-162.

Ford, D.C., Palmer, A.N., Palmer, M.V., Dreybrodt, W., Lundberg , J. and Schwarcz, H.P., 1993. Uranium series dating of the draining of an aquifer: The example of Wind Cave, Black Hills, South Dakota. Geological Society of America, Bulletin, 105: 241-250.

Ghazban, F., Ford, D.C. and Schwarcz, H.P., 1993. Multistage dolomitisation in the Society Cliffs Formation, northern Baffin Island, NWT, Canada. Canadian Journal of Earth Sciences, 29: 1459-1473.

Stenson, R.E. and Ford, D.C., 1993. Morphometric analyses of Holocene gypsum karst, Windsor and Cape North, Nova Scotia. Géographie physique et Quaternaire, 47: 239-243.

Lundberg, J. and Ford, D.C., 1994. Canadian landform examples: Limestone and dolomite pavements, with an example from Dodo Creek, Mackenzie Mountains, NWT. Canadian Geographer, 38: 271-275.

____ 1994. Late Pleistocene sea level change in the Bahamas from U series dating of speleothem by mass spectrometry. Quaternary Science Reviews, 13: 1-14.

Shopov, Y.Y., Ford, D.C. and Schwarcz, H.P., 1994. Luminescent microbanding in speleothems: High resolution chronology and paleoclimate. Geology, 22: 407-10.

Frumkin, A. and Ford, D.C., 1995. Rapid entrenchment of stream profiles in the salt caves of Mt. Sedom, Israel. Earth Surface Processes and Landforms, 20: 139-152.

Frumkin, A., Schwarcz, H.P. and Ford, D.C., 1995. Evidence for isotopic equilibrium in stalagmites from caves in a dry region: Jerusalem, Israel. Israel Journal of Earth Sciences, 43: 221-230.

Worthington, S.R.H. and Ford, D.C., 1995. High sulfate concentrations in limestone springs: An important factor in conduit initiation? Environmental Geology, 25: 9-15

Brook, G.A., Cowart,.J.B. and Ford, D.C., 1996. Raised marine terraces along the Gulf of Aden coast of Somalia. Physical Geography, 17: 297-312.

Ford, D.C., 1996. Paleokarst phenomena as "targets" for modern karst groundwaters: The contrasts between thermal water and meteoric water behaviour. Carbonates and Evaporites 10: 136-145.

Ford, D.C., Salomon, J.-N. and Williams, P.W., 1996. Les Forêts de Pierres ou "Stone Forests" du Lunan (Yunnan-Chine). Karstologia, 28: 25-40.

Ford, D.C., 1997. Principal features of evaporite karst in Canada. Carbonates and Evaporites, 12: 15-23.

Lauriol, B., Ford, D.C., Cinq-Mars, J. and Morris, W.A., 1997. The Chronology of Speleothem Deposition in Northern Yukon and its Relationship to Permafrost. Canadian Journal of Earth Sciences, 34: 902-911.

Worthington, S.R.H. and Ford, D.C., 1997. Strategy for evaluating channelling in the carbonate bedrock at Smithville, Ontario, p. 42-45. *In* Annual Meeting, Air and Waste Management Association, Proceedings, Toronto.

Zambo, L. and Ford, D.C., 1997. Limestone dissolution processes in Beke Doline, Aggtelek National Park, Hungary. Earth Surface Processes and Landforms, 22: 531-543.

MacFarlane, D.A. and Ford, D.C., 1998. The age of the Kirkdale Cave paleofauna. Cave and Karst Science, 25: 3-6.

MacFarlane, D.A., MacPhee, R.D.E. and Ford, D.C., 1998. Body size variability and a Sangamonian extinction model for Amblyrhiza, a West Indian megafaunal rodent. Quaternary Research, 50: 80-89.

Tarhule-Lips, R. and Ford, D.C., 1998. Condensation Corrosion in Caves on Cayman Brac and Isla de Mona, P.R. Journal of Caves and Karst Studies, 60: 84-95.

Ford, D.C., 1999. Perspectives in Karst Hydrogeology and Cavern Genesis. Bulletin d'Hydrogéologie, 16: 9-29.

Frumkin, A., Carmi, I., Gopher, A. Ford, D.C., Schwarcz, H.P and Tsuk, T., 1999. A Holocene millennial scale climatic cycle from a speleothem in Nahal Qanah Cave, Israel. The Holocene, 9: 677-682.

Frumkin, A., Ford, D.C. and Schwarcz, H.P., 1999. Continental oxygen isotope record of the last 170,000 years in Jerusalem. Quaternary Research, 51: 317-327

Tarhule-Lips, R. and Ford, D.C., 1999. Morphometric studies of bellhole development on Cayman Brac. Cave and Karst Science, 25: 119-130.

Vezina, J., Jones, B. and Ford D.C., 1999. Sea-level highstands over the last 500,000 years: Evidence from the Ironshore Formation on Grand Cayman, British West Indies. Journal of Sedimentary Research, 69: 317-327.

Williams, P.W., Marshall, A., Ford, D.C. and Jenkinson, A.V., 1999. Paleoclimatic interpretation of stable isotope data from Holocene speleothems of the Waitomo district, North Island, New Zealand. The Holocene, 9: 649-657.

Frumkin, A., Ford, D.C. and Schwarcz, H.P., 2000. Palaeoclimate and vegetation of the last glacial cycles in Jerusalem from a speleothem record. Global Biogeochemical Cycles,14: 863-870.

Laval, B., Cady, S.L., Pollack, J.C., McKay, C.P., Bird, J.S., Grotzinger, J.P., Ford, D.C. and Bohm, H.R., 2000. Modern freshwater microbialite analogues for ancient dendritic reef structures. Nature, 407: 626-629.

Lundberg, J., Ford, D.C. and Hill, C.A., 2000. A preliminary U-Pb date on cave spar, Big Canyon, Guadalupe Mountains, New Mexico, U.S.A. Journal of Cave and Karst Studies, 62: 144-148.

McFarlane, D.A., Lundberg, J. and Ford, D.C., 2000. The age of the Dream Cave woolly rhino. Cave and Karst Science, 27: 25-28.

Vajoczki, S. and Ford D.C., 2000. Underwater dissolutional pitting on dolostones, Lake Huron-Georgian Bay, Ontario. Physical Geography, 21: 418-432.

van Beynen, P.E., Ford, D.C. and Schwarcz, H.P., 2000. Seasonal variability in organic substances in surface and cave waters at Marengo Cave, Indiana. Hydrological Processes, 14: 1177-1197.

Dubljansky, Y., Ford, D. and Reutski, V., 2001. Traces of epigenetic hydrothermal activity at Yucca Mountain, Nevada: Preliminary data on the fluid inclusion and stable isotope evidence. Chemical Geology, 173: 125-149.

van Beynen, P.E., Bourbonniere, R., Ford, D.C. and Schwarcz, H.P., 2001. Causes of colour and fluorescence in speleothems. Chemical Geology, 175: 319-341.

Blanchon, P., Jones, B. and Ford. D., 2002. Discovery of a submerged relict reef and shoreline off Grand Cayman: Further support for an early Holocene jump in sea level. Sedimentary Geology, 147: 253-270.

Ford, D.C., 2002. Depth of conduit flow in unconfined carbonate aquifers: Comment. Geology, 30: 93-94.

____ 2002. Ranges (amplitudes) of isotopic ratios in speleothems, with particular reference to samples from the centre of North America. Acta Geologica Polonica, 52: 31-34.

Bosak, P., Bella, P., Cilek, V., Ford, D.C., Hercman, H., Kadlec, J., Osborne, A. and Pruner, P., 2003. Ochtina Aragonite Cave, Slovakia: Morphology, Mineralogy and Genesis. Geologica Carpathica, 53: 399-441.