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CANQUA 1991 Late Glacial and Post-glacial Events in Coastal and Adjacent Areas

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On June 3-4, 1991, more than 65 people representing several Canadian and American universities, consulting companies, and federal and provincial government departments gathered for the biennial CANQUA meeting, hosted by the University of New Brunswick (UNB), Fredericton. Considering that this is the third CANQUA meeting in less than three years (because the AMQUA/CANQUA joint meeting last year fell between two regular meetings), this conference was very well attended. It drew many excellent papers concentrating on late glacial and post-glacial events in coastal and near-coastal settings, as well as on general Quaternary topics.

The conference kicked off with a wine and cheese ice-breaker, which provided a relaxed atmosphere for some spirited geological discussions. Bruce Broster, conference co-chairman, started the proceedings by welcoming everyone to UNB. Robert Burridge, Vice President (Academic), UNB, offered an official welcome on behalf of the university. He noted that UNB is the oldest Canadian university and was the first to graduate engineers.

The first session focussed on Late Quaternary events in the Atlantic Provinces. In addition to summarizing the University of Maine's Quaternary studies research program, Hal Borns (with C.C. Dorion) reviewed Maine's late Quaternary geological history. Al Seaman reported on recent research in striae patterns, deglaciation processes and paleoenvironmental reconstruction in New

Brunswick. After a till geochemistry study in the Miramichi Highlands, NB, Michel Lamothe recognized only two tills. In seismic profiles of the Esquiman Channel, NF, Dave Proudfoot (with A. Aksu) located a possible grounding line for ice where the three till units pinch out. David Piper reported that ice advanced over the outer Nova Scotia shelf at 21 ka and started to retreat at 18 ka, with the last glacial sediment having been deposited at about 14 ka. Using diatom communities, David Rawlence illustrated how increased *Fragellaria* populations indicate the Younger Dryas. He suggested that the Younger Dryas may have ended in as little as 20 years!

Steve Hicock demonstrated how the Erie-Ontario and Huron-Georgian Bay lobes influenced the till deposits along the Ontario Erie shoreline. Using the newly developed isochron technique to determine external dose rates, Blackwell *et al.* determined that the bone bed in Longola Spring Mound, Zambia, was deposited at about 150-200 ka. Aided by a computer modelling program and the pollen patterns seen in core from Crawford Lake, Ontario, Ian Campbell postulated that continued warming would see further decline in sugar maple and white pine in southern Ontario, but increased oak, beech and ironwood.

Studies of the Younger Dryas provided several papers. Alan Morgan reported that inland sites in southern Ontario do not show climatic deterioration, but that those near the proglacial lakes were 6°C cooler during the Younger Dryas, while European data suggest a major climatic deterioration. In Nova Scotia, according to Alan Morgan (with Randy Miller), the region had modern-looking boreal forest by 11.5 ka, but that a quick cold snap occurred between 11 ka and 10 ka. In pollen cores from several ponds in New Brunswick and Nova Scotia, Francis Mayle (with L.C. Cwynar) recognized the Younger Dryas onset at between 11.5 ka and 10.6 ka and its cessation at 10 ka.

On Monday evening, Alan Morgan presented a public lecture on Global Change, attended by about 70 people, including some children. The problems of pollution, rising global temperatures, species extinctions, habitat loss and ozone depletion all stem from our exploding population and the excessively wasteful lifestyle in the industrialized nations. The message was simple: we must clean up our act if we want to survive as a species. Given the discussion that ensued, perhaps a few new people got the message. Although poorly attended, this lecture did help to focus attention on our conference. If we are to help change the dim picture facing us environmentally, such public lectures must become part of every geological conference.

As Past President, Alan Morgan presented the W.A. Johnston Medal, awarded for professional excellence in Quaternary research, to Bill Matthews, Professor Emeritus

at UBC. A worthy recipient, Bill has published more than 130 papers in Quaternary volcanology and glaciology, 14 since retiring! He acted as the editor for the old Quaternary (pre-CANQUA days) newsletter in the 1960s, instructed many students in Quaternary studies and chaired the geology department at UBC. Bill thanked CANQUA and his colleagues.

Since most earthquakes in southern Ontario result from NW-trending compression which agrees with the trends suggested by pop-ups (stress relief structures visible at the surface), Joe Wallach *et al.* feel that pop-up densities can be used to predict seismic potential in areas now considered to be aseismic due to the short, spotty, historical seismic record. Using evidence such as off-set striae, flame structures and sand volcanoes, Bruce Broster related some neotectonic events in New Brunswick with glacial advance and retreat. Reporting for Pete Bobrowsky and John Clague, Norm Catto explained how the complex sealevel change history in the Tofino region, BC, was related to neotectonic movements and tsunami deposits.

In the Gulf Islands, BC, Norm Easton is excavating middens now drowned by higher sea levels. Along Smith Sound, in the high arctic, Wes Blake found evidence for a southward flowing ice sheet more than 1 km thick and an ice-free period in the middle Wisconsin. On Bylot Island, NWT, Michel Bouchard (with Bill Shiels) determined that organic sediments in the glacial snout were derived from the valley sides by freeze-on, from the basal beds and from some ponds on the ice surface that are incorporated into the stream.

Along the south shore of the St. Lawrence estuary, Jean-Claude Dionne has found evidence for two separate Holocene regressions at 7-8 ka and at 4 ka. In the Gulf of St. Lawrence, Heiner Josenhaus *et al.* found three deep terraces at 124 m, 164 m and 100 m, the latter of which may have been at sea level during the Wisconsin. Jim Syvitski reported a sea-level curve for the Baie de Chaleur. On a gravel-dominated tidal flat near Come-by-Chance, NF, Norm Catto found that very coarse glacial fluvial gravels are washed into the water during bank erosion, but then are not moved significantly, because the flow is not competent to move the cobbles.

Alan Morgan wrapped up the technical sessions with his annual "state of the global change program address". He emphasized that geologists must now start to interpret data not just gather it, since the correlation programs must produce predictive models. Several global change projects are now started, including Geological Survey of Canada (GSC) projects on the Agassiz Ice Cap on Ellesmere Island, in the Mackenzie River delta and in the Palliser Triangle in southern Saskatchewan and Alberta; a NASA project

to measure CO₂ flux from the James Bay Lowlands; a time-slice paleoenvironmental map series; the CELIA project to examine paleoenvironmental conditions during Stage 5e at high latitude North American sites, and the LIGA project to examine the last interglacial in the arctic and subarctic.

The CANQUA general business meeting followed. Alan Morgan offered thanks on behalf of CANQUA to Bruce Broster and his committee. Bruce thanked his committee, particularly the graduate students, and introduced the new President, Michel Bouchard, the new council and the executive. For the first time, women have been elected to council and the executive, with four women on council and a female vice-president. Toon Pronk reported that surplus revenue from the last three conferences had been pooled into an investment fund, from which funds will be drawn to cover some expenses for the W.A. Johnston Medal award winners and to cover the prize for the new student award. This new award, to be given to the best student presentation at the CANQUA conference, will be awarded first at the 1993 meeting in Winnipeg. Bruce reported on how the free trade agreement was affecting Quaternarists, and the upcoming problem of professional registration. Except for Québec, registration will probably be under the umbrella of provincial professional engineering societies. Accreditation will cause even more inflexibility in curricula for university departments. The CANQUA executive will continue to monitor the developments in each province. A Canadian national committee for geomorphology is currently being formed to interact with the International Association of Geomorphologists. The CANQUA executive will be endeavoring to establish a strong working relationship with this new group. Michel Bouchard thanked the outgoing executive, particularly Alan Morgan, and the new executive.

At the end of each day, two poster sessions were also presented, but the posters did stay up throughout the conference. J.M. Alysworth *et al.* reported on applications of the geographic information systems (GIS) to Quaternary mapping, while Ian Campbell and J.H. McAndrews displayed their new CANPLOT program to plot camera-ready laser-printed pollen diagrams with personal computers. Toon Pronk detailed the Quaternary mapping program in New Brunswick. Several posters described Quaternary stratigraphic mapping: in the Miramichi Highlands, northern NB (Mike Parkhill), along the Sandy River, Maine (T.K. Weddle) and at Lake George, NB (Solly Balzer and Bruce Broster). Sedimentological analyses were reported for deposits in Hall's Bay, NF (S. Scott *et al.*), Placentia Bay, NF (R. House and Norm Catto) and the Fredericton Aquifer, NB (G.G. Violette and D.I. Bray). E.R.C. Hornibrook and Bruce Broster used heavy mineral chemistry in tills to explore for gold

near Todd Mountain, NB, as did Vic Levson and D.E. Kerr in the Intermontane Belt in British Columbia. R.E. Stenson described the bedrock geomorphology in the Niagara Escarpment, while D.H. Huntley explained how paraglacial karst features developed in the Small River Glacier, BC.

Randy Miller described the echinoderm fauna from post-glacial marine deposits in New Brunswick, while S.W. Mathison and G.L. Chmura studied the foraminiferal test linings as salinity indicators in Louisiana salt marshes. Paleoenvironmental reconstructions were reported for lakes in southern Newfoundland (S.R. Vardy) and the Riding Mountains uplands (Rod McGinn), while several posters centred on detecting the Younger Dryas in lake cores, using diatom responses in New Brunswick (D.J. Rawlence, A.A. McAslan and D.J. Rawlence) and Nova Scotia (D.J. Rawlence and H.O. Black). P. Allen and D. Keenlyside discussed the evidence for Paleoindian cultures in New Brunswick. Having discrete poster sessions ensured that most people viewed the posters. Had the coffee been in poster session rooms, everyone might have seen them.

The conference officially ended with a banquet at the King's Landing historical village, where everyone enjoyed Atlantic salmon, roast turkey, fish chowder, and apple crisp in a quaint candle-lit inn. Many spirited discussions about the Quaternary, the state of research in Canada, environmental problems, and anecdotes about old friends could be heard during the evening.

Following the formal meetings, 21 people participated in a three-day field trip to see the local sections. Led by Al Seaman, Bruce Broster, Les Cwynar, Michel Lamothe, Jacques Thibault and Toon Pronk, the group was shown classic deltaic sections, including Keswick, Pennfield, Utopia and Little Lake; paleoenvironmental reconstruction sites at Killarney Lake and Little Lake; the glaciomarine sequence at Sheldon Point; multiple thrust sequences at Charlie Lake; some multistriated outcrops, and the Reversing Falls. Toon Pronk provided great sandwich fixings and ensured that all garbage was recycled or composted, a practice all field trips and conferences should emulate.

This year's presentations were extremely professional, with high-quality slides and overheads, while microphones ensured the talks were audible. Scientifically, all the data presented was the highest calibre. Certainly, the organizers did a great job, particularly co-chairmen Bruce Broster and Toon Pronk. I think the conference proved valuable for all who attended. The field trip guide book and the conference abstracts can be obtained from Bruce Broster, Department of Geology, UNB, Fredericton, New Brunswick E3B 5A3. The abstracts from the conference will also appear in a forthcoming issue of *Atlantic Geology*.

It was very pleasant, for a change, to attend a meeting where only two of the scheduled posters were not present, and only one talk was withdrawn (because the author's wife was in labour at the time the talk was to be given!). It is heartening that so many Quaternarists feel CANQUA is the worth the effort to come, in many cases, several thousand miles. I think this reflects CANQUA's vibrancy as an organization and its members' commitment, in addition to the excellent work by the executive and the local organizing committee. Perhaps we should consider making this an annual meeting, since the attendance has been so good recently.

The University of Manitoba will host the next CANQUA conference in 1993. People wishing to attend or present papers at that conference should contact Jim Teller, Department of Earth Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2 or via E-mail at geosci@CCm.umanitoba.ca. CANQUA is also a co-sponsor of the Quaternary session at the 1992 GAC-MAC meeting in Wolfville.

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