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CANQUA 1989 Late Glacial and Post-Glacial Processes and Environments

Bonnie Blackwell

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under-cooling and the older liquid immiscibility hypothesis. The group next observed the spectacular spinifex-textured komatiites of Pyke's Hill in Munro Township. Various origins for spinifex texture were discussed and concensus favoured the dynamic model presented by S-J. Barnes during the conference portion of the meeting. The final stop in the morning was at the Centre Hill gabbro (R. Thériault's thesis area) where equally spectacular, 40-50 cm long, branching (fractal) pyroxenes were seen. Here, discussion centred on the timing of events and the mechanisms of differentiation-infiltration that could give rise to such unusual features in a gabbro.

In the afternoon, the group travelled to the Matachewan area to visit a couple of alkali-feldspar syenite plutons and associated gold mines. At the Young-Davidson Mine (abandoned), gold had been extracted from a small trachytic syenitic body. Also visited was a large syenite body, the Cairo stock, which has associated gold and barite deposits. Recent work by S. Rowins and A. Lalonde (U of Ottawa and OCGC) on ferromagnesian silicate minerals has shown that these syenitic magmas evolved under unusually oxidizing conditions. Aware of this, the group discussed the relationship between these syenites and the gold deposits of the area, since the latter can be related to oxidized fluids.

This year's Friends of Igneous Rocks meeting was a great success. The "Friends" are looking forward to next year's meeting which will be hosted by Roger Nielsen, Ocean. Admin. 104, College of Oceanography, Oregon State University, Corvallis, Oregon, 97331-5503; telephone (503) 737-2484. If you wish to be on the mailing list for next year's conference contact Roger Neilson, or Kelly Russell (U. of British Columbia).

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CANQUA

CANQUA 1989 Late Glacial and Post-Glacial Processes and Environments

Bonnie Blackwell
Department of Geology
McMaster University
Hamilton, Ontario L8S 4M1

On 25-27 August 1989, 94 participants from across Canada and the US attended the biennial CANQUA (Canadian Quaternary Association) conference in Edmonton. No doubt remains that CANQUA has come of age as a viable scientific association. This conference was well attended and extremely well organized, with a wealth of excellent presentations on a variety of Quaternary interests. Each province and territory was represented by participants, in addition to several US states. Participants were split between industry, government, and university research personnel.

The conference kicked off with a mixer on Friday night at which many old friends had an opportunity to catch up on recent events. Bright and early Saturday morning, the scientific sessions started with a welcome from Nat Rutter. He then recalled the career of, and some anecdotes about, the late Lou Bayrock, to whose memory the conference was dedicated. Bayrock (1930–1989) spent most of his career studying the Quaternary geology in Western Canada.

The first session concentrated on Quaternary landscapes and their sediments. Tom Morris discussed his discovery of several eskers and related subglacial fan deposits near Windsor, Ontario. Derald Smith presented both a talk and a poster session on the catastrophic paleoflood channel and deposits in the Fort McMurray area. The flood was caused as glacial Lake Agassiz drained at about 9.9 ka during the Campbell phase. Eric Neilsen described flutes, striae, and iceberg scours found in the Interlakes district, Manitoba. Rene Barendregt and Archie Stalker delivered Part 2 of their thesis on the origin of hummocky moraine. They feel donut moraines are caused by pingo-like development associated with water-saturated sediment at the glacier margin. Alexis Dreimanis with John Elson showed at least three different processes which form fluted ground moraine. Vic Levson with Nat Rutter discussed the sediment deposited in tributary valley lakes dammed by ice in the Athabasca Valley. Using examples from the Bugaboo Glacier, BC, Gerry Osborn demonstrated how complex lateral moraine sequences can be built when a moraine is overtopped by later ice advances. P.T. Davis compared Neoglacial sediment from moraines, and debris flows on Baffin Island. In the Cypress Hills, Rudy Klassen identified evidence of at least three moraines from two or more advances, plus a pre-late Wisconsin scabland development. Pollen from that area studied by D.J. Sauchyn shows that the Altithermal occurred locally at 7.2 ka, in agreement with TL dates from Dinosaur Park.

Bob Young kicked off the afternoon session on Quaternary environments with an animated discussion of the glacial features in the Hand Hills, Alberta. Ice thrusting and flutes on the summits of the hills overlying a mid-Wisconsin prairie dog town, led him to discount the controversial Ice-free Corridor hypothesis. J.R. Desloges with June Ryder used tree ring dating to determine that the Neoglacial began earlier and ended later in the Coastal Ranges. Brian Luckman synthesized several years of tree ring study in the Rockies. Bill Mahaney described the glacial features found on Mt. Kenya, noting that there were no early Holocene advances until the Neoglacial. G.T.S. Gill with Jim Teller analyzed the sediment in the Assiniboine Delta of glacial Lake Agassiz. Oswald Sawicki with Derald Smith described a pre-Fraser Glaciation delta into glacial Lake Invemere dated at 36 ka. W.J. Vreeken with Rene Barendregt determined that loess deposition in the southern prairies did not change appreciably after the Mazama ash deposition at 6.6 ka. Alan Morgan wrapped up the day with series of marvellous cartoons and photos shot from space. Unfortunately, his message was anything but a joke. For example, with details such as the fact man moves more rock each year than all the forces of nature, that more than 1000 towns in Canada, including Halifax and Victoria, dump raw sewage into the environment, that we loose 1% of our topsoil each year, that Canada was not self-sufficient in food production last year, he reminded us of the need for input from geologists into the global change program.

The CANQUA Annual General Meeting followed, during which the W.A. Johnston Medal was presented to Professor Alexis Dreimanis. In the evening, participants went to a reception hosted by the Alberta Provincial Museum. Included in the entertainment was a particularly appropriate play put on by the staff entitled "Indiana Bones and the Lost City of Ice".

Sunday morning's session continued the theme of Quaternary sediment and landscapes. Lynn Halsey discussed the form and development of dunes found in the Grande Prairie dune field, Alberta. Bob Fulton

explained why ice could not have been present in the Columbia River Valley before 21 ka in the upper valley and 17 ka in the southernmost portion. Unfortunately, without a microphone it was almost impossible to hear the details of this talk. In southern and central New Brunswick, Al Seaman has found over 20 sets of striae directions, of which 6 align with local till fabrics. By correlation, he has developed a model of ice flow changes for the area. In the Grande Prairie area, Dave Liverman only found evidence of late Wisconsin Laurentide ice, while montane ice occurred locally at 30-35 ka. In the lively discussion which followed, John Shaw noted that fluting is caused when meltwater is confined on the uplands. Brent Ward discussed the stratigraphy along the Pelly River, Yukon.

John England started off the session on mountains and people with a discussion of the post-glacial emergence of Ellesmere Island. He suggested that tectonic uplift related to the Sverdrup Basin and the Franklin Mobile Belt may be partially responsible given the evidence of 500 to 1000 m of post-Tertiary uplift, and 70-80 m since 70 ka. A. Gottesfeld, with L. Gottesfeld, related interesting local aboriginal folk lore with the history of a debris flow in BC. Nat Rutter discussed the global change project on the international level, while Alan Morgan detailed how it relates to Quaternary geology. In the ensuing discussion, several people expressed the concern that directed research funding such as this project will kill or severely reduce the money available for original research, especially given the experience of Lithoprobe.

In the afternoon general session, A. Pronk with M. Parkhill discussed striae and erratics in northern New Brunswick. In the southern Okanagan, June Ryder has found an extensive early Wisconsin glaciation, but no Fraser equivalent. D. Vitt with S. Zoltai determined that drier and warmer conditions during the Hypsithermal (7-5 ka) in Alberta severely restricted peatland development. Don Kvill feels the esker systems of the Brazeau River valley are the result of active valley ice during regional deglaciation. In the following discussion, Carole Mandryk informed us that Charlie Schweger's 23 ka date for the basal sediment in Goldeye Lake could have been contaminated by coal, but that the 15 ka age still appears valid. G. Brooks described glacial deposits from Mt. Cayley, BC. Bonnie Blackwell detailed how rapid fossilization of bones proceeds in hypersaline environments. D. McCarthy explained his dendrochronology for Holocene moraines at Bennington Glacier, BC. Jim Burns demonstrated the mid-Wisconsin fauna found at January Cave (31-34 ka) and in the Saskatchewan River gravels around Edmonton (22-36 ka).

Posters presented included discussions of glacial stratigraphy and sedimentology from all over Canada, including BC (Bobrowsky and Rutter), NWT (Dud-Rodkin; Richardson and Blake), Rockies (Jones), Newfoundland (Liverman and St. Croix), Manitoba (McGinn and Giles), Alberta (Smith; Traynor and Campbell; Young *et al.*; Feltham), and China (Wilson). Several emphasized paleoenvironmental reconstructions, including Alberta (Beaudoin and Halsey; Burns; Mandryk; Young *et al.*), Saskatchewan (Sauchyn and Sauchyn); Cordilleran Ice Sheet (Roberts), Great Lakes-St. Lawrence (Anderson and Lewis), Colorado (Zielinski and Leonard), Montana and Idaho (Locke *et al.*). All the posters were high-calibre presentations scientifically, and, for a pleasant change, graphically also.

The conference wrapped up with a barbeque at Nat Rutter's place where plenty of good food and beer lubricated the discussions, including the morphology and genesis of the glacial deposits among which we sat. Even the untimely demise of the mass transport could not dampen the spirit.

As with any conference there were minor technical and organizational problems. Microphones for speakers are a must. Many speakers are not experienced in delivering a talk unaided to a lecture room that can seat 400. Twice the talks fell badly behind the schedule, but since only one session was running, it was not a major problem, particularly because the lively discussions, rather than speaker "run-on", had forced the delays. The idea of having a designated time for the poster sessions which did not conflict with any talks was good, but unfortunately, the room with the posters became very crowded.

Following the conference, 40 people participated in the three-day field trip through the Jasper region. Led by Brian Luckman, Vic Levson, and Alwynne Beaudoin, the trip was a model of organization. Only the weather could have been improved.

In the immediate vicinity of Jasper, Vic Levson explained his interpretations of the Pokahontas, Roche Miette, Jasper Reservoir, Portal Creek, and Astoria Creek sections. Much of these sections are now thought to represent glaciolacustrine sediment overtop debris flow gravels. In several side valleys, tills were preserved as flanking terraces. Two distinct till lithologies are preserved and indicate the first ice in the area deposited locally derived debris, which was covered by the second till derived from the other side of the Rocky Mountain Trench.

Brian Luckman led us on a healthy hike across the lateral moraines and snout of the Cavell Glacier on Mt. Edith Cavell. He demonstrated how the difference in lichen development can be used as an indicator of the relative age of the lateral moraines. A walk down Maligne Canyon enabled us to take some spectacular photos, while Brian outlined some of the post-glacial karst development. He then led us across the outwash deposits and snout of the Athabasca Glacier, detailing its advance and retreat history as determined from dendrochronology and lichenometry. Continuing south on the Icefields Parkway, we were treated to the awesome scenery of the Rockies and chances to see extensive canyon development in the South Saskatchewan drainage. We also stopped to examine the deposits left by the August 2, 1989 debris flow which covered the highway to a depth of 2.5 metres on a front 30 metres wide. Boulders as large as the vans are found in the deposit.

The final day concentrated on deposits in the "Alberta corridor", also sometimes called the "Ice-free Corridor". Allwyn Beaudoin described sections that the Alberta Archeological Survey has been studying which include several with multiple tephra layers. At the Nordegg Bridge section, Prof. Dreimanis discussed the tephra layers present. Several of his former students presented him with a set of onyx bookends. Carole Mandryk showed us Goldeye and Mitchell Lakes where the lowest layers were deposited well before 15-17 ka. A stop at the Rocky Mountain House erratic provided Archie Stalker with the chance to discuss his work tracing the various Rocky Mountain erratic trains. Near Edmonton, John Kulig discussed his work sorting out the till lithologies in the Cooking Lake Moraine. Although the mysterious "pink zone" occurs, Kulig feels only one till is present, which was deposited as debris flows during stagnation and downwasting.

I must compliment the organizers of the fieldtrip. The trip was extremely well organized. Rarely do we experience a trip that makes allowances for the fact that not everyone is a young field geologist who relishes the rain, sleet, and snow. This trip was a pleasant exception, since contingency plans included fair and foul weather plans, options for the super-fit, fit, and the not-so-fit. Each stop was well presented with lots of time allocated for discussion and photos, while the guidebook was exceptionally detailed. Although we did not get to every stop, I doubt that anyone felt cheated. Stops that were missed were well covered in the guidebook, and can be visited in the future. Finally, it was heavenly to be on a trip where the food included lots of salads, juice, and fruit. Jenni Blaxley, Alwynne Beaudoin, and Carole Mandryk must be praised for the sumptuous main courses and home-baked desserts. I am sure everyone gained at least 2 kg on the trip!

The CANQUA conference in Edmonton was a worthwhile endeavour. I'm sure that future CANQUA conferences will prove as good, but only with hard work by the organizers. People wishing copies of either the conference abstracts or fieldtrip guidebook can obtain them from N.W. Rutter, Department of Geology, University of Alberta, Edmonton, Alberta T6G 2E3. The next CANQUA meeting is scheduled as a joint CANQUA/AMQUA meeting in Waterloo, Ontario, July 2-6, 1990.

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