



# Studying

The chance to explore an englacial channel makes the whole field season worthwhile.

## An Initiation to the North

Text and Photos by Sarah Boon

**W**e are beakers: scientists from the south come to discover the secrets of the unexamined North. We are camped on a flat piece of land in front of a glacier, our cook tent 500 metres from our sleeping tents because this is polar bear country. Numerous streams and rivers cross the flats, and while our cook tent is relatively safe from migrating waterways, our sleeping tents are another story. Every day I measure the 11-pace distance to the nearest stream bank. One morning the stream begins to rise, the water flows faster and large boulders can be heard rumbling along the bed. I pace the distance carefully: nine paces. Two hours later: eight paces. The banks fall into the stream if I stand too close. Should I move my tent, or risk it and wait until morning?

I measure the distance again. Three paces. Another chunk of bank hits the water with a resounding splash. I wrench the tent pegs out of the gravel and hastily drag my home several metres from the bank. I am glad of the constant daylight as I sit outside at midnight, banging metal stakes with a large stone like an early Neanderthal. Next morning, the dry spot left by my tent has disappeared.

It's hard to believe that only a month ago our plane lifted out of Edmonton on a course that took it from the patchwork quilt of the prairie landscape to the windswept bleakness of the northern tundra. This was the adventure of a lifetime: two months on a glacier in the remote backwaters of northern Canada, nothing to entertain us but our books, our radio and each other.

# Glaciers





Above: Work isn't too bad when you have views like this. Drilling a stake overlooking the Eugenie Glacier.

Right: Adjusting meteorological station sensors sometimes requires quite a balancing act!

Our first stopover was in Yellowknife, where the sun blazed low on the horizon and the bugs began to emerge as we walked along the shores of Great Slave Lake. The hard granites of the Canadian Shield extended into the distance, undulating greys interspersed with greenish-black patches of boreal forest, a Tom Thompson painting come to life.

Our second stop was Resolute Bay, a flat, treeless place where the winds blew snow horizontally across the tundra, obscuring the small town and its inhabitants. However, the landscape began to change: snow-covered wastelands free of vegetation gradually gave way to rocky ridges with glaciers poured onto them like cream. There was no sign of life — not a caribou, polar bear or seal. Sea ice pancakes floated in the water below us, great sheets of ice cracked parallel to the coast, leaving only an undulating ice foot behind.

By the time we arrived at John Evans Glacier, we were 50km southeast of the Agassiz Ice Cap and 79 degrees north of the equator. We set up our first camp amidst piles of shattered grey and brown sedimentary scree; viscous grey-white glaciers filled the valleys around us. Yellow Arctic poppies struggled towards the light, a patch of dryas exploited the sparse nutrients of its environment to bring forth



Supraglacial streams can become a travelling hazard, especially with the pulk (sled).

purple blossoms and an abandoned eider duck nest lined with warm feathers waited for expected eggs.

We spent the first two weeks hauling equipment between our camp and the glacier, setting up monitoring stations in the surface streams and lakes. I documented the changes taking place in the drainage system, measured water discharge with salt slugs and made sure my water sensors hadn't been sucked into a moulin. Karen, another Masters student, collected multitudes of water samples to



take back to Edmonton, while Rob, a British PhD student, plodded around the ice with a heavy differential GPS system, measuring the slow down slope movement of the glacier.

In 1890 John Evans travelled from Britain through Canada, crossing the ice caps of Ellesmere Island. In a region peppered with Norwegian and Scandinavian names, he saw fit to leave his own on





**Above:** All roped up and ready to go. Safety is an important issue at our field site.

a patch of ice that covers a lonely bluff on the east coast of Ellesmere Island. The ice stretches from Dobbin Bay in the north, across 15km of barren rock to Allman Bay in the southeast. Across the water sits Greenland, a dark smudge on the horizon that disappears when the fogs roll in.

At our second camp in the valley, the rock walls rise up around us, steep and debris-covered, striped in mauve, red and black. Behind us looms the glacier, a solid mass of ice that breathes cold katabatic winds onto our camp, heaving and creaking as it prepares to greet the summer. Rivers gush from its belly, boulders roll and the wind whistles across the rocks.

Early each morning we turn on the radio voices come in from Tanquary Fjord, Alexandra Fjord, Carl Ritter Bay, Alert and other locations.

Now that I am accustomed to the scenery, it seems to change daily. We have been examining this glacier for weeks and are beginning to understand its workings like the thoughts of a close friend. We walk over its length and breadth, watching and measuring all signs of change as it creaks beneath us. When we arrived in June the snow was knee-deep, a thin crust that broke open beneath our feet and plunged us into the empty layers below left by the formation of depth hoar. The surface streams were silent, covered in ice and bubbling mysteriously through cracks in their beds and there was no sign of water at the glacier front.

The clear, sunny skies of late June melted the snow and added water to the surface streams; these in turn fed water to the glacier bed, where water volumes built until reaching a critical pressure, bursting from the ice front in a shower of turbid water and fresh crevasses at the beginning of July. This is what we have come for: to determine what causes this outburst and how it happens. But our time here is also an initiation to the North: its stillness and light, its constant surprises in the midst of assumed desolation.

**Below:** Another day on the job: transporting field equipment with the pulk.







One of at least eight moulins on John Evans Glacier. Water that enters this hole doesn't re-emerge until it reaches the glacier snout.

The results of our research solidify our supervisor's unproven theories of drainage system behaviour on this polythermal glacier, so different from the temperate glaciers of the Canadian Rocky Mountains. As the melt season progresses, drainage evolves from a series of disconnected reservoirs to one continuous system. This evolution corresponds with sudden pulses in glacier flow. Not only have

our research questions been answered, but new ones have emerged. What volumes of water are being moved through the drainage system? What role does climate play in drainage evolution and what will be the consequences of climate change?

On our last day on the glacier a helicopter takes us to the head of the ice, flying low over the glacier surface and marvelling at the scale of the features over which we have been scrambling every day. From the top of the glacier, my gaze stretches into the pale blue of the distant horizon, discovering small ridges covered with toffee-like ice, while to the north lie the inland mountain ranges of Ellesmere and their broad valleys.

By the time we leave I am considering a PhD to properly address all the questions this visit has sparked. It will allow me two more summers in the North, two more seasons to watch Arctic flowers grow and streams overflow their banks, two more seasons of constant daylight and only radio contact with the outside world. ☺

View from the top: John Evans Glacier flows around this nunatak, which provides excellent views in all directions.

