A DAY IN THE CANADIAN HIGH ARCTIC

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It's the third week of June, the sun doesn't set and the temperature hovers just above zero degrees Celsius. After flying for about four hours in a Twin Otter we are dropped off in a U-shaped valley next to our cache of equipment that was left from last season. Fortunately, it has been a dry winter and our hand-made runway is clear of snow to allow the plane to land, and not much of the seasonal ice remains around our gear. It has taken me a total of about eighteen hours to fly from London, England, to our base camp. Our nearest neighbours, a group of glaciologists this year, are about 100 kilometres away. It's spring in the Arctic but the flowers have not yet bloomed and the glacial fed rivers are still clear of silt. The river is a few hundred metres away and it takes us over a half an hour to haul back just 10 gallons of water. We're the first crew to arrive to set up base camp

Otto Fiord, northwest coast of Ellesmere Island

Location map of field area within the rectangle on Ellesmere Island highlighted in red

before the senior geologists and helicopter crew get here. During the first week we set up the kitchen, mess, office, shower, storage, air crew, and personal tents.

GSC base camp at Otto Fiord, northwest coast of Ellesmere Island

Ellesmere Island is part of the Nunavut Territory which covers approximately 2 million square kilometres, about one-fifth of the area of Canada. Nunavut has a population of 24,730 and is Canada's newest territory, joining the federation of Canada on April 1st, 1999. The capital is Iqualuit on Baffin Island inhabited by 4,220 people. Three main languages are spoken here, Inuktitut, English, and French. Summer often lasts no more than two months from mid June to early August, once most of the winter snow has melted. During the summer, only a few plants are able to grow. Temperatures in the Arctic vary from minus 37°C during the winter months up to plus 13°C in the summer. Ellesmere Island is the furthest north of the Queen Elizabeth Islands in the Canadian High Arctic with its northern tip at a latitude just over 83°N.

Arctic wildlife is a unique phenomenon. Both marine and terrestrial animals need to be able to adapt to the harsh and quickly changing weather and I have been very fortunate to be able to see a variety of them. This includes seeing a polar bear, a pack of wolves, and a herd of muskoxen wander in and out of our camp. As well as flying over schools of Beluga whales and Narwhals, and also encountering foxes, Arctic hares, lemmings, Peary caribou, and walruses on traverses. The flora in the Arctic is also quite remarkable with 200 species of plants as well as abundant lichens and

mosses. Small flowers, some no higher than a centimetre manage to bloom for less than two months out of the year.

Arctic hare, Grinnell Peninsula, Devon Island

The Geological Survey of Canada has a long history of geological mapping in the Canadian Arctic with the first venture dating back to 1884 where expeditions were done by ship, dog sled, and skis. Nowadays research groups need to submit proposals before being allowed to conduct fieldwork anywhere in the Arctic. These proposals are required so that the activity done can be regulated. Two flights per week, one from both eastern and western Canada, fly to Resolute Bay on Cornwallis Island. Here, government expediters, the Polar Continental Shelf Project, organise and transport all research groups to their field locations via Twin Otter or helicopter. They have been taking on the tremendous task of coordinating and supplying all the field crews throughout the Arctic since 1958. Logistical support is also provided for eco-tourist groups, which have been increasing in numbers over the years.

Arctic fireweed, Grinnell Peninsula, Devon Island

Even though I had been swept away in a glacially fed river, charged by a muskox bull, and dangled in an ice carved river, that was not enough to deter me from ever returning to the Arctic. I did not hesitate to accept a Ph.D. project offered by the Geological Survey of Canada. This time I would partake in two of a three-year project with the

Institute of Sedimentary Petroleum Geology of the Geological Survey of Canada branch in Calgary and the Federal Institute for Geosciences and Natural Resources in Hannover Germany. My responsibility was to study the Cenozoic outliers on the northeastern coast of Ellesmere Island. Our base camp was located at 81°N and looked out onto Nares Strait with Greenland only about 20 miles away across the water. I was first asked if I would be interested in studying conglomerates which I agreed to without much hesitation before realising that these formations were up to 1 kilometre thick and occurred as bold cliffs along the coast. The remainder of the Cenozoic sediments have a similarly impressive thickness but fortunately do not form such inaccessible cliffs. As with most places in the Arctic, accessibility and weather are two main deciding factors as to how much can be achieved in one season. The most comprehensive study completed in my field area was about twenty years ago. Since then other Cenozoic outliers in the same area have been studied, but more for the regional synthesis. The objective of this three-year project is to complete a 1:250 000 bedrock geology map of the area and to integrate Cenozoic structural events in the Canadian Arctic with other Polar Regions. My work is intended to provide detailed sedimentology and stratigraphy of the five Cenozoic outliers that outcrop along the Judge Daly Promontory on the northeastern coast of Ellesmere Island. A more comprehensive understanding of the provenance, paleogeography, and paleoclimate will hopefully be reached.

Measuring the Cenozoic conglomerate units within the Cape Back outlier, Ellesmere Island. View is towards the northeast with Greenland in the background

A paper on the Cenozoic conglomerate units on Ellesmere Island has recently been published and can be viewed on the Geological Survey of Canada website www.nrcan.gc.ca/gsc/bookstore under Current Research 2001, Interior Plains and Arctic Canada.

Late summer at Otto Fiord, northwest Ellesmere Island

This special report is dedicated to my father,
P.J. Lee
(1934-1999)