Wider aspects of a career in entomology. 3. The high Arctic

Hugh V. Danks

This series of articles outlines some ancillary aspects of my entomological career, for the potential amusement of readers. It reports the sometimes unexpected challenges of working in new places and in the real world, an approach that serves also to expose some conclusions about research activities and some information about insects and their environments.

My first winter in Canada as a postdoctoral fellow, outlined in the preceding articles in this series (ESC *Bulletin* **50**: 25, 50), included planning for fieldwork in the high Arctic during the coming summer of 1969. The destination was Polar Bear Pass on Bathurst Island (location shown in Fig. 1), where the National Museum of Natural Sciences operated a research station from 1968 until 1993. Eight people participated, including three graduate students, although not all of them were present for the whole period. There were two entomologists, one mammalogist, and five ornithologists, one of whom studied mammals too.

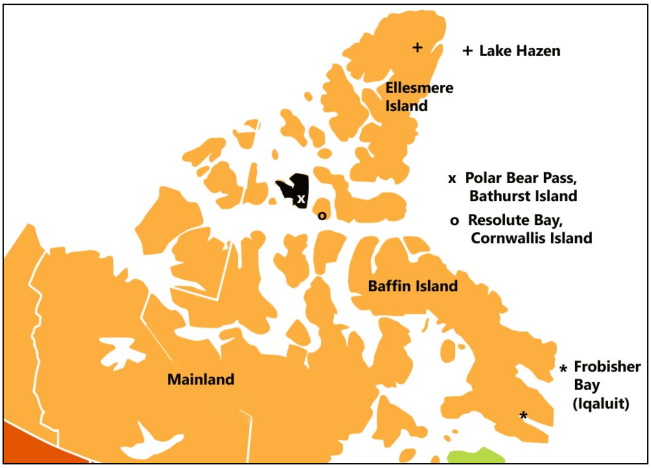

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Fig. 1. Location map of Bathurst Island (black) in the Canadian Arctic Archipelago, showing places mentioned in this article.

The second entomologist was my colleague J.R. (Bob) Byers, who like me worked at the Entomology Research Institute in Ottawa. We were visiting the high Arctic to carry out two kinds of research. First, we planned to collect a range of arthropods in various habitats to add to the knowledge of this region, which so far had not been examined for invertebrates. Second, we wanted to study aspects of insect cold hardiness to supplement our research in temperate regions.

The first part of our journey north was a scheduled jet flight from Montreal to Frobisher Bay, now Iqaluit, on Baffin Island. We continued to Resolute Bay, an Inuit settlement, Canadian Forces base, and weather station in the high Arctic. The final flight from Resolute to Bathurst Island used a Twin Otter aircraft organized through the Polar Continental Shelf Project, a program—still in place today—that provides logistic support for field research throughout the Canadian Arctic.

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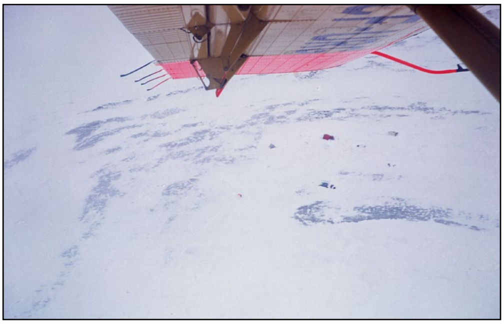
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Fig. 2a. The camp area on arrival, as seen from the air in early June. In the whiteness of the snow, the red Parcoll hut and white mess tent can just be made out below the wingtip.


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Fig. 2b. The same area in summer, six weeks after arrival.

Loaded to capacity with people and their baggage, many weeks of supplies, research gear, and a husky dog, the plane became airborne reluctantly, but then flew steadily to Polar Bear Pass. We crossed a largely snow-covered landscape for about 150 km, a distance considered conveniently short in the Arctic. Eventually, the field station came into view (Fig. 2a). The existing accommodation was intact, comprising one housing unit and a mess tent (Fig 2b).

We landed, unloaded gear and supplies, and immediately started to assemble an additional Parcoll hut, the portable, insulated, and wind-resistant housing unit developed for this sort of use. The manufacturer states that no tools are required for construction, which is reported to take about 3 hours by “unskilled labour”—a qualification that most of us certainly met. It was a typical day in the high Arctic in early June. Winter persisted. The ground was covered with snow, the air temperature was about −8°C, and the wind blew strongly. These June conditions had not been mentioned in the job description of an entomologist when I began my career! However, they reinforced my belief that one should do what is necessary to get the job done, without the expectation that any sort of precious status is conferred by particular qualifications.


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Fig. 3. Two major habitats on Bathurst Island: barrens (on the ridge in the foreground) and wetlands (background).

The terrain looked barren even after most of the snow had melted. However, habitats in the area were surprisingly diverse. For example, dry ridges—like the one on which the camp was located—bore scattered plant cushions, while in the low areas rich sedge meadows were well supplied with water from melting snow held above the permafrost (Fig. 3). In the lee of the ridges, deep snow banks had accumulated during the winter (Fig. 4). They supplied water as the snow melted not only to the wetlands, but also to some rich beds


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Fig. 4. Snow accumulated in the lee of a ridge (23 June). The lake is visible in the background.

of moss (Fig. 5). Associated with these snowbank habitats too are specialized vascular plants, which can exploit the meltwater despite the reduced period over which the ground is free of snow. A number of creeks cut though the ridges to the lower ground, which also held a lake.

The relative richness of the wetland habitats at Polar Bear Pass and similar sites has led them to be called "arctic oases". Such habitats, scattered within the polar desert, cover only a fraction of the land area in the 1,424,500 square kilometres of the Canadian Arctic Archipelago. All groups of the fauna and flora in these oases are more diverse there than in the surrounding lands.


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Fig. 5. Mosses growing below a snow bank.


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Fig. 6. The sun at midnight on Bathurst Island during June 1969.

Bathurst Island has continuous daylight from the end of April until the middle of August (cf. Fig. 6). As a result, people who arrive from farther south may be misled into working continuously until they become exhausted. Moreover, at first they may find the place cold and strange.

Therefore, eating properly was important to the wellbeing of the group. Every few days, cooking duty fell to the entomologists. I tended to do the cooking, while Bob tended to do the allied jobs. The main course of many meals was canned stew supplemented with canned vegetables. One can-opener was much more effective than the other, leading Bob to declare with some justification that the hardest part of cooking was finding the right can-opener. Years later, I sometimes used a similar canned stew as the base for a quick meal while camping. However, one young lady of the next generation was not used to this family tradition, and exclaimed disapprovingly as a can of stew was opened that it looked like dog food!

We tried hard to increase the variety and interest of the diet by preparing more than stew and vegetables. Once we served a cake, iced with a snow goose motif. A metal box on a Coleman stove served as the oven. When the cake had been eaten, each person received as dessert a small dish of chocolate pudding with the yellow dome of half a canned peach placed on top. One of the ornithologists declared, as he staggered away from the mess tent, that it was the dark brown "egg" that had finished him off.

A great advantage of shared meals and camp chores during fieldwork and other cooperative ventures is the interactions it encourages among the participants. We exchanged ideas and stories, albeit with a very strong emphasis on birds and other vertebrates. The same ornithologist confessed that during another trip, out alone for hours and somewhat weary and disorientated, he had raised his gun towards a distant bird in case it was worth collecting, but soon realized that his target was actually a mosquito at point-blank range. (Actually, after prolonged fieldwork in the northern woods it might even seem to entomologists that the voracious mosquitoes are as big as birds!)

The inevitable result of eating well and having plenty of exercise was regular use of the sanitary facility, which consisted of an empty oil drum topped with an appropriate seat. It was partly enclosed by low shielding to help protect the user from the cold wind, and was placed at an appropriate distance from the mess tent. David Gray, the camp organizer, referred to it as the biffy barrel. In due course, the biffy barrel had to be replaced, and David asked for a volunteer to help him. Most people were reluctant to assist, because making a mistake while moving the amply filled drum would have led to an even more unpleasant task. I offered to help for the reason noted above, that no-one is precluded from doing what is necessary to get the job done, regardless of their qualifications. Applied more broadly, this approach means that experienced people should help their junior colleagues, and professors should help their students, without any sense of superiority.

Our insect collecting began once the camp was well established. Various techniques became feasible as the season progressed. We searched on the ground, on leaves, and in flowers and vegetation mats, below snow banks, and in other habitats. Numerous pan traps were installed in different places. We watched for insect activity. In due course, sweep nets could be used in the sedge meadows, where the vegetation was just tall enough to bother. Substrate samples were taken from aquatic habitats, and a few emergence traps and stream nets were deployed. We also made sure to examine isolated sources of nutrients, such as the area used for garbage from the camp kitchen, muskox dung, and the remnants of old kills made by wolves.

We explored for a considerable distance around camp in an attempt to collect as many species as possible. I had completed my doctorate in England the year before, and during that project walked many kilometres daily in the summer to check experimental sites. Therefore, I had acquired a relatively high step to avoid tripping on grass clumps and other uneven terrain. This walking style led to some amusement from one of the ornithologists, who contrasted my “stair-climbing” gait with the minimal energy actually required to shuffle across the barrens.

My long walks on Bathurst Island sometimes passed through the nesting territories of birds. Perfectly camouflaged rock ptarmigans would burst from their nests to escape at the last minute, frightening the living daylights out of me. Jaegers (skuas) were more aggressive. Pomarine jaegers would fly hard directly at the threat (Fig. 7) but veer off at the last minute with their wing tips almost touching the head of the intruder. Long-tailed jaegers would hover just overhead, screeching. Snowy owls are especially aggressive near the nest, but fortunately the nests are conspicuous and widely dispersed, so that a visitor could avoid the powerful talons that might otherwise tear into his head.

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Fig. 7. A pomarine jaeger protecting its territory by flying rapidly towards the intruder.

Before leaving Ottawa we had been briefed by entomologists from the Canadian National Collection. Many of them had collected insects at Lake Hazen, another arctic oasis considerably farther north in the eastern Arctic (compare Fig. 1). They told us to watch for bumble bees, butterflies, and mosquitoes active above the ground; for aphids, thrips, coccids, and sawflies on the plants; for woolly bear and other moth caterpillars on the ridges; for water beetles and caddisfly larvae in the ponds; for many kinds of flies including more conspicuous species such as syrphids; and for various other arthropods. The whole area, and especially the wetlands, should be rich with insects, which supply food to the many birds that migrate there in summer to nest. Even the chicks of some otherwise herbivorous bird species rely on insect food.

Our general collecting began on the ridge barrens, in places where snow had been swept off by the wind, before the snow cover melted to expose habitats in more sheltered places and then in the valleys. For many days initially, therefore, we looked especially under frost-shattered rock fragments of various sizes and in “hot spots” of vegetation, notably mats of purple saxifrage (Fig. 8). We looked diligently for hours. Turning over countless plates of rock on the ridges yielded a few drab geometrid caterpillars and a few adult ichneumonid parasitoids, together with spiders and

Fig. 8. A mat of arctic saxifrage on a ridge barren. Note also the rock fragments, for example in the right foreground.

some other very small arthropods. Shorebirds and other arriving migrants foraged under stones on these ridges before their main food in the valleys became accessible, and one of the ornithologists had collected a few specimens of these birds. Their stomachs contained several of the same arthropods we had encountered, suggesting that the birds were better at finding them than we were.

However, even after snowmelt we saw few of the species expected to be active. Small flies predominated. We found many chironomid midges, and then still more. Some larger flies appeared later in the season, especially in the wetlands, but they were far outnumbered by chironomids. We searched harder and began to worry, thinking that we were no good at collecting. Even the pan traps caught mostly small or very small arthropods. Although there were sciarids and other species too, the diversity was very limited: no butterflies, no bumble bees, not even mosquitoes. There were no aphids, coccids or thrips. We failed to find any other kinds of caterpillars. Ponds and streams yielded only chironomids. Our only large catch, in fact, was a lemming. Lemmings were particularly abundant that year, and this one had fallen into a pan trap. It was sitting in the corner chattering at me.

After one typical long day of collecting, Bob returned to the hut, where I was sorting my own substantial haul of tiny chironomids. I asked him if he had found anything, meaning anything new. “No”, he replied, “just another ten thousand” of the little black midges.

In due course, mortified by the unexpected lack of diversity in our collections, we brought the material back to the Canadian National Collection for identification. It seemed that we had achieved very little despite the great effort and expense.

Nevertheless, our collections were shown eventually to be highly representative, and therefore of great interest. They revealed that faunal diversity in that region is strikingly limited by the extensive summer cloud cover, caused by cold seas that surround the small islands in the area and supply moisture to the air as the sea ice melts. Moreover, the year we were there proved to have been even more cloudy than usual. Most arctic arthropods do best in the sunniest regions, because they rely on sunshine to warm the plant cushions, ponds, and other microhabitats in which they develop. The sun-warmed ground surface also contributes to higher air temperatures, which favour adult activity.

Lake Hazen is on a much larger island to the northeast and so is far less cloudy. Also, that location is adjacent to mountains from which air drops into the valleys, warming as it does so because of the increase in atmospheric pressure (the same phenomenon responsible for the Chinook in Alberta). Therefore, its fauna is much richer than that of Bathurst Island, where arthropods are markedly disadvantaged by the frequent cloud and the flatter terrain. For the same reason, plants too are less diverse in this zone of smaller islands, which has been termed the “northwestern gap” because so many species that are typical of the high Arctic elsewhere do not live there.

At last, we could relax—we were not such ineffective collectors of insects after all! The next article in this series outlines some of our studies on the cold hardiness of insects, the onset of the high-Arctic summer, and our homeward journey.