Wider aspects of a career in entomology. 20. Further field adventures

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 entomological activities, and some information about insects and their environments. This article recounts further experiences in Canadian habitats, including interactions with biting flies.

My introduction to Canada's fauna and environments (outlined in ESC *Bulletin* **54**: 11–20; **54**: 66–75; **54**: 128–136) was extended on two main fronts. First, additional experiences stemmed from entomological research beyond my initial focus on the overwintering of chironomid midges. Second, explorations of natural habitats continued with members of my family.

Professional activities in summer included participation in a project to assess the bottom fauna of lakes in Gatineau Park, Quebec. One of those habitats, Pink Lake (Figure 1), yielded a surprising result when the central sediments were sampled with an Ekman dredge (Figure 2)[1]. The sample was full of unusual light brown flocculent material. Sampling was repeated multiple times, whilst carefully feeling for the bottom in case it had been missed—but always with the same result.

Laboratory study of the samples confirmed that they contained no benthic invertebrates, unlike sediments from the other lakes, which were rich in chironomid larvae and other organisms. Evidently, Pink Lake is so small and steep-sided that it lacks the annual circulation typical of lakes at this latitude[2]. Therefore, deep central areas are anoxic all year, eliminating invertebrate colonists. The lack of circulation also makes the lake particularly susceptible to human disturbance. For example, peripheral substrates stirred up by swimmers, or products introduced by visitors, might settle into deeper water and stay there indefinitely. This feature of Pink Lake was unknown until then, but its discovery helped park authorities to develop appropriate guidelines for use of the lake.

My entomological activities in winter revealed more than insects. Mammals leave distinctive tracks in the snow. Several species of birds forage under bark to supplement their winter diets with dormant insects, and a few, like chickadees, even exploit larvae overwintering in cattail seed heads and goldenrod galls (see ESC *Bulletin* **53**: 188, 191).

[1]The Ekman dredge is lowered in the open position shown in Figure 2. After it reaches the bottom, a messenger is sent down the line to close the jaws, allowing the sample to be retrieved.

[2]Water in most temperate lakes turns over (circulates completely) twice per year. In summer, surface water warms up and forms a layer above the cool deep water (water is heaviest at 4°C, and progressively lighter at higher and lower temperatures). In winter, the surface is covered by ice (ice is much lighter than liquid water). As the surface water cools in fall, or warms after the ice melts in spring, the density gradient causing stratification breaks down, and the upper layers are mixed with deeper layers by wind and gravity, bringing oxygen to the sediments. In some lakes in which the basin is deep and narrow, the deepest waters do not mix and the lake remains stratified all year. Such lakes are termed meromictic. Some lakes in which the deep water is saline, increasing its density, are also meromictic.

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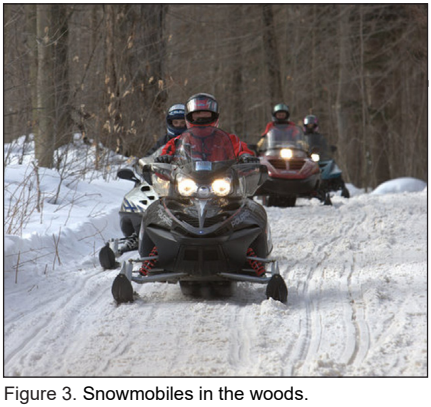
Figure 1. Pink Lake in 1969 (Gatineau Park, National Capital Region, Quebec).

Cole-Palmer Canada

Figure 2. Ekman dredge.



Peter Redman (CC BY-SA 3.0)

Figure 3. Snowmobiles in the woods.

My winter forays were disturbed occasionally by snowmobilers (Figure 3). Snowy places are quiet because of the snow blanket, so that the sudden arrival of snowmobiles is inordinately disruptive, especially when they are steered by groups of fanatics driving at excessive speed.

Some winter experiences stemmed from attempts to collect insect galls on goldenrod stems. The galls (illustrated in ESC *Bulletin* **53**: 190–191) are usually present wherever the hostplants are abundant, and therefore the easiest way to find potential collecting sites is to drive around during August and look for the bright yellow flowers, which stand out from a distance (Figure 4). Targeted winter collections can then be made relatively quickly, whereas roaming across fields to look for plants when they are not in flower takes much longer. Many of the neglected fields colonized by goldenrods are close to civilization, so lengthy searches also increase exposure to the stares of mystified passers-by.

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Figure 4. Goldenrods in flower.

Identifying suitable localities in summer has another advantage: safe places to park in winter can be found at the same time. It is possible to overestimate the width of the shoulder when pulling on to the snow-covered side of the road in an unfamiliar place, and to end up in the ditch (cf. Figure 5). Even after the car has been safely parked, the snow-filled ditch at the edge of the road is a potential barrier. Floundering across to collect the galls (or cattails, for example) is best avoided by wearing snowshoes.

After an extended snowstorm, the car might get stuck in the deep snow at the edge of the road. When this happened to me, I tried to rationalize my efforts to free the vehicle as useful driver training—although this sanguine attitude tended to fade as the day wore on and the temperature dropped!

Ann (CC BY-NC-SA 2.0), modified

Figure 5. Car “parked” in the ditch, a regular sight in winter.

One journey almost ended more dangerously, after I was forced to stop near the top of a steep and icy hill because a car suddenly appeared on an intersecting road. It was impossible to continue up the ice-covered slope from a standing start. Backing down to try a second climb came within a hair's breadth of disaster. It is difficult enough to maintain control when driving down a slippery hill that is long and steep enough to need significant braking. It is much more difficult backwards.[3]

Prosthetic Head (CC BY-SA 4.0)

Figure 6. Burs of burdock.

Some fields with goldenrods contain common weeds that disperse their seeds by means of burs (e.g., Figure 6). These hooked or barbed fruits, which have evolved to cling to animal fur, readily attach to gloves and clothes, and may become securely embedded in wool and other insulating fibres. Brushing against bur-laden plants led to lengthy struggles to remove the burs, and it took hours to liberate a pair of woollen mittens worn during an early encounter—serving as a lesson to wear only gloves with a hard leather surface.

Many overwintering galls of the goldenrod gall fly were gathered near Ottawa to ship to British Columbia for a joint project at the University of Victoria (outlined in ESC *Bulletin* **53**: 192). It was essential to keep the galls cold until they reached their destination. Stems with galls were collected directly into a cooler (to guard against warmth from the vehicle interior), then surplus lengths of stem were trimmed off out of doors, and finally the galls were transferred to a large, prechilled, high-performance vacuum bottle, which could be placed inside an insulated container for shipping.

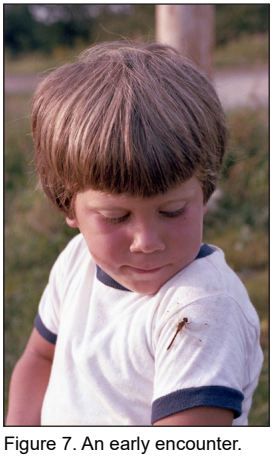

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Figure 7. An early encounter. Paul Danks admiring a dragonfly (the libellulid *Sympetrum* sp.) on his shoulder when he was 4 years old.

Despite these precautions, some shipments came close to being ruined by the cavalier attitude of a few of the couriers entrusted to deliver them. Delays in these and other shipments showed that some couriers are unreliable, and will leave urgent express packages sitting in airports for many hours.

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Figure 8. Starting a trail. L to R: Paul, David, and Philip Danks, about 7–10 years old (Arrowhead Provincial Park, Ontario).

Similar frustrations in summer were assuaged by spending leisure time in natural environments, especially hiking with my wife Thelma, and camping with our children. Insects were often seen, of course, even early on (e.g., Figure 7). Typical explorations included hiking during the day (Figure 8) followed by relaxation in the evening (Figure 9).

However, every camping vacation seemed to take place during the wettest possible period. Consequently, even when the children were too young to know about Murphy's Laws of Fieldwork, they had an instinctive feel for them. One summer I was seated on the front step at home on a day

[3]At the time, anti-lock braking systems were not available, except for a few elite cars.


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Figure 9. Around the campfire. L to R: Paul, Philip, and David Danks, about 5–8 years old (Silent Lake Provincial Park, Ontario).

that was unusually dull and rainy. One of the boys hurtled outside, but suddenly stopped. He looked up at the dismal sky. "Dad," he said, "are we going camping?"

Years later, another son noted that his exposure to camping (apart from instilling a love of the outdoors) proved useful in later life, because when it rained he would simply continue what he was doing, whereas most of his companions scurried for cover. I had already discovered that such a viewpoint is useful for entomological fieldwork.

The inevitability of rain was demonstrated many times. One day we had paddled a long way up the lake to admire the boreal scenery, observe the fauna, and fish in the bays. The campground lay far behind us as dark clouds started to build up (Figure 10), and then thunder began in the distance. Exposed on the lake and worried about lightning, we made for the nearby shore, and reached it just as a torrential thunderstorm began. Hunched motionless in rain gear to let the water cascade off, we were trapped on shore for nearly 2 hours as the heavy downpour continued. At last, a lull in the weather offered a chance to reach camp before more rain arrived. Paddling dementedly, and chased by the sound of thunder, we got back just before another extended thunderstorm ensued. No insects were noticed on that journey!

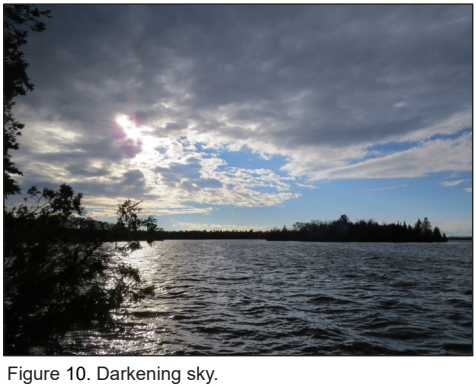
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Figure 10. Darkening sky.

On another occasion, a massive storm flooded the campground, requiring me to dig a channel around the tent in the middle of the night, in pouring rain, to divert the torrent that threatened to overwhelm it. The children were still young, but learned a useful lesson: if they allowed their sleeping bags to touch a soaking wet tent, water would penetrate the tent fabric and saturate the bedding. Drying everything out after such an episode was time-consuming (Figure 11).


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Figure 11. Campsite after a massive rainstorm (Grundy Lake Provincial Park, Ontario).

The pervasive dampness did have some advantages. For example, it often highlighted the abundance of spiders (Figure 12). In such conditions, webs may glisten with moisture, increasing the visibility not only of the scattered orb webs of large araneids, but also the thousands of sheet

webs built everywhere by tiny linyphiids, and the tangle-webs of theridiids.

Nevertheless, the most consistent "entomological" experience was the prevalence of biting flies. Biting midges were only rarely abundant, although the sensation of being jabbed with many tiny invisible needles came a few times whilst setting up camp in grassy areas in the Maritime provinces. "No-see-ums" are aptly named.

In contrast, mosquitoes were nearly always present (e.g., Figure 13). One hot, humid day was noteworthy for huge numbers of voracious mosquitoes, excessive even by Canadian standards. Overnight, however, the temperature dropped so sharply that not a single one was seen the following day … so everyone complained about the unseasonable cold instead!

Mosquitoes in some boreal and subarctic habitats are so numerous, and the constant bites and whine of wings of blood-seeking females so stressful, that workers there have been known to break down mentally and then run madly away. More than once I felt particular sympathy for them[4]. Caribou sometimes show similar behaviour, driven by mosquitoes or warble flies.

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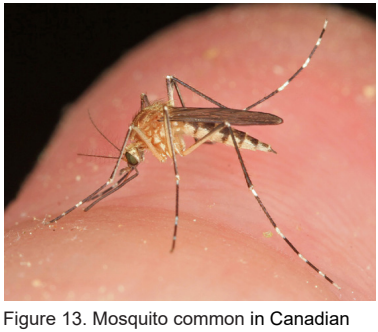
Figure 12. Spider webs on vegetation. Note the many water droplets on the webs in the bottom photograph.

Horse flies and deer flies were often encountered as well, and their bites caused extensive and painful inflammation. Many species are abundant near wetlands, as when we camped at Kouchibouguac National Park in New Brunswick. Few other users were present, perhaps because at that time the park was relatively new; but perhaps too because visitors had been driven away by the attacks of biting flies. In particular, overwhelming numbers of the salt-marsh horse fly (Figure 14) had emerged recently from the extensive salt-marshes.



Judy Gallagher (CC BY 2.0)

Figure 13. Mosquito common in Canadian woodlands, the culicid *Ochlerotatus* (formerly *Aedes*) *canadensis*, which aggressively bites a wide range of hosts during the day. Length about 0.6 cm.

Elsewhere, biting flies sometimes drove us away too. A landing site on the beautiful rocky, wooded shoreline of a lake in Ontario (Figure 15) seemed an ideal place for us to stretch our legs and take lunch. We came ashore, secured the canoe, and settled down … only to be set upon by scores of deer flies. They were so bad that, abandoning all other thoughts, we leapt back into the canoe, and paddled out—dementedly again—to reach an exposed part of the lake, where the wind could blow away the last of the horde of flies that had accompanied us as we left the shore. The species was or were uncertain (although probably the one shown in Figure 16)

[4]Some expeditions embraced this abundance instead. One of the Northern Insect Survey parties reputedly held a competition in which each person would briefly put their bare arm out into the throng of mosquitoes trying to gain access to the tent, then rapidly draw it in and try to swat as many individuals as possible with their other hand. The crew must have been *really* bored, because the winner acquired dozens of individuals.


A.W. Thomas (CJAI)

Figure 14. Salt-marsh horse fly, the tabanid *Tabanus nigrovittatus*. Length about 1 cm. Image from *Canadian Journal of Arthropod Identification*.


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Figure 15. Canoe landing site mentioned in the text (Grundy Lake Provincial Park, Ontario).


A.W. Thomas (CJAI)

Figure 16. A common Canadian deer fly, the tabanid *Chrysops vittatus*. Length up to about 1 cm. Image from *Canadian Journal of Arthropod Identification*.

because no specimens had been examined in detail or secured when self-preservation seemed more important.

One member of the family had severe local inflammation after black fly bites, and also a toxic reaction, producing nausea, headaches, and malaise. Comparable reactions are not uncommon, and may include fever and joint pain; in fact, toxic shock syndrome from too many black-fly bites can kill birds and even cattle. In any event, all of us had severe *verbal* reactions to the long-lasting itchiness of the bites, and so did not camp at the beginning of summer.

Early one June as we drove through the countryside, however, we did stop to admire a stunning waterfall. Within seconds, a dense cloud of black flies enveloped us, and we scrambled back into the car as frantically as we had once catapulted into the canoe to flee from deer flies.

Happily, not all of our experiences were dominated by biting flies. Canoeing and hiking brought us close to many aquatic insects, including some of the dragonflies characterized in ESC *Bulletin* **54**: 70–75.

One memorable journey saw us on an isolated lake, patrolled by a few dragonflies. The water was so still that the clouds and their reflections matched (Figure 17), giving a strange feeling of disorientation between the sky and the lake, and making the lake seem bottomless as we paddled across it. An eerie mist rose too as the evening cooled. The stillness was disturbed only when a colony of muskrats deemed that we were passing too close to their lodge.


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Figure 17. Lake reflections mentioned in the text (Parc national du Lac-Témiscouata, Québec [a provincial park, not a national park of Canada]).

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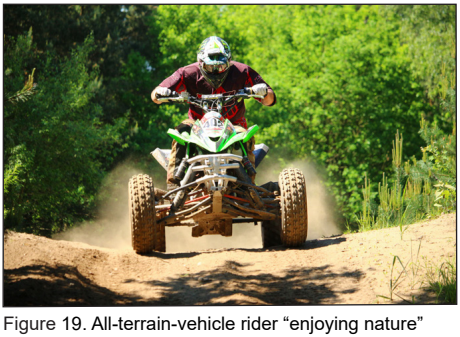
Figure 18. Whirligig beetle, the gyrinid *Gyrinus* sp. Length about 0.6 cm.

Greatly favoured by the children were whirligig beetles (Figure 18), which could be watched spinning on the surface and also caught in a pond net to reveal eyes split horizontally into two sections, enabling the beetles to see both above and below the water. Occasionally, lucky timing revealed mass emergences of caddisflies or mayflies.

The camping lantern attracted chironomids, mayflies, and various terrestrial species (such as those shown in ESC *Bulletin* **54**: 132). The shining golden eyes of green lacewings that settled around the lantern were particularly appealing. Some moths have similar eye-shine.

We visited mainly national and provincial parks, but discovered that each park has its own personality, which depends on size, facilities, terrain, and prospective use. In particular, natural environment parks were much preferable to those intended for recreational boating, swimming, and picnicking. Areas that permit power boats on lakes and powered vehicles on trails (e.g., Figure 19) have diminished opportunities for quiet enjoyment and observation of birds and insects. The disruptions parallel those caused by snowmobiles in winter.



CC0 (MaxPixel.net)

Figure 19. All-terrain-vehicle rider "enjoying nature" on a trail.

We sometimes stopped during a journey at unsuitable locations because places labelled on maps as "parks" were defined differently by different jurisdictions (and internet research was not yet possible). Some sites were very small, with little access to anything; some were just a boat launch; a few proved to be merely highway rest-stops with one or two picnic tables, where the abundance of visiting human hosts favoured the reproduction of biting flies.

On the other hand, the large unspoiled parks we preferred were not always in good condition throughout. Trails might include bridges of uncertain stability (Figure 20), or end at closed-off sections (Figure 21). Loose and broken planks on boardwalks were a frequent hazard.

Several campgrounds were memorable for the humans we met, rather than for other organisms. One gentleman was trying to find the campsite he had booked, and desperately asked

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Figure 20. Insecure bridge over a stream on a hiking trail.

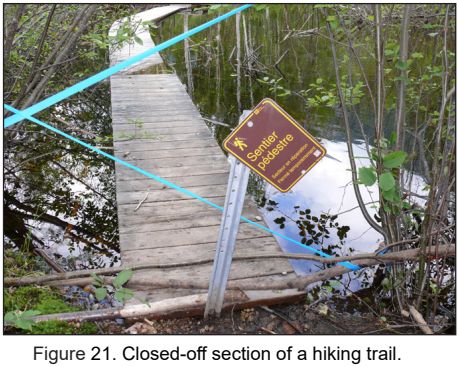

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Figure 21. Closed-off section of a hiking trail.

directions as it was getting dark. His destination lay 30 km to the south, but he had accidentally taken a similarly numbered highway.

A first-time camper wondered why he could not generate a blazing fire, while his young children waited anxiously beside him to toast the marshmallows they had been promised. He had laid a few bark offcuts (sold as firewood at the camp office although they were soaking wet), uncut and with no kindling, on a flat sheet of newspaper, and ignited one corner of the sheet. He was astonished to learn that starting a fire requires structure, not just a match.

Once, bedtime had been troublesome for one of the children. Quiet finally reigned, and I sat by the lantern as a few moths circled in. A ruggedly dressed fellow came over from another campsite. "Eh," he said, "me and me mates are on motorbikes, eh, and we've run out of beer. We'll pay you to go off and get some for us in your car, eh." The children were too young to be left alone at the campsite anyway, but I responded: "Sorry, I can't leave, because one of my boys has been playing up." "Oh," he replied, "Just give 'im an 'it to the 'ead!", as he accompanied these words with a matching gesture!

Subsequently, I saw the identical manner portrayed with great accuracy in television comedy sketches. "Bob and Doug Mackenzie" wielded beers and used "eh" repeatedly in two-minute parodies entitled the Great White North[5].

Many years later, I gave a public talk in a local park about "Bugs at night", and the accompanying field activity examined insects drawn to a light-trap. Because this format favoured interaction with participants, the event yielded as many findings about the different characters of the people who came to the talk as it did about the different kinds of insects that came to the light.

Indeed, the experiences outlined in this series[6] showed not only that insects display remarkably diverse structures and adaptations, but also that humans display remarkably diverse personalities and interests. My professional involvement with large numbers of both insects and entomologists confirmed those patterns!

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[5]These parodies on Second City TV, 1980–1982, by Rick Moranis and Dave Thomas, were introduced to ridicule a requirement for additional "Canadian content" in a show that was essentially Canadian anyway. The sketches became popular not only in Canada, but also in the United States, eh.

[6]This series is no longer accepted for the *Bulletin*, so I would like to thank all of my readers over the past 5 years, and acknowledge those who expressed appreciation.