

LIZA PIPER

Freeze-up, Break-up, and Colonial Circulation

ABSTRACT This paper examines the place of ice and snow in the process of Euro-Canadian colonisation of what are today the Yukon and Northwest Territories. Using oral histories and accounts of Indigenous life experiences from the late nineteenth and early twentieth centuries, the paper opens with an examination of the ways in which ice and snow, freeze-up and break-up, were inextricable from wider social and cultural relationships between Indigenous northerners and other-than-human nature. Intensified trade and missionary activity after the mid-nineteenth-century along the Mackenzie and Yukon rivers and their tributaries created new colonial geographies, rhythms, and knowledge. These paid close attention to the character of ice, the timing of freeze-up and break-up, and the transportation possibilities of the open water season especially. By examining the histories of a scarlet fever epidemic in 1865 and an influenza epidemic in 1928, this paper uses the role of ice and its transformations in shaping the movements of pathogens to trace emerging northern colonial ecologies between 1860 and 1930.

KEYWORDS epidemics, Indigenous history, ice, rivers, colonisation, fur trade, missionaries, influenza, scarlet fever

In high latitudes ice and snow do many things: they form and break, they fall and storm, they heave and sing, and they reflect light, especial-

ly moonlight, during long winter nights. Climate change in the twenty-first century has compelled us to better historicize ice and snow. The paths made by ice through fall, winter, and spring and the permafrost that holds up the ground are no longer certain things. The fabric of ice and snow is unraveling and with it the circumpolar world is experiencing rapid ecological, social, economic, and political change (Wright 2014). We are more alert now to moments in the past when climate changed and influenced human history. This essay asks you to turn your attention away from large climatic conjunctures, notwithstanding their crucial importance to our past and future, and to focus on the fabric and its role in historical change.

Specifically, this essay considers the role of the transition to and from ice and snow—the annual making and breaking of the cryospheric fabric—in the colonial relationships forged after 1850 in the lands that are now northwest Canada. Previous work has shown how northern Indigenous peoples had a divergent experience of ecological imperialism—the role of other-than-human nature in the European colonisation of the Americas—and specifically in their experience of post-contact infectious diseases (Piper & Sandlos 2007). My work in this area begins from the recognition that the movement of pathogens at high latitudes was not part of a seamless blanket of infection enveloping and devastating Indigenous America after 1492, but rather an uneven, disrupted, and redirected process that sometimes brought the movement of pathogens to a full stop, and at other times found pathogens in the North out of sync with their global circulation. Earlier scholars showed how the speed and devastation of infectious diseases shaped the character of colonialism (Crosby 1986; Denevan 1992; Ray 1974; Boyd 1999). So too, disruptions and unevenness shaped the character of colonialism at high latitudes and the relationships between peoples and with other-than-human nature that flowed therefrom. This essay draws on oral histories, archival and published sources to tie these two analytical threads together: to consider how freeze-up and break-up, moments which governed northern circulation but which were also differently experienced by colonizers and Indigenous northerners, in turn shaped the movement and experiences of infectious disease.

The lands and waters that became northwest Canada were formerly and remain to this day the lands of Inuvialuit, Gwich'in, Tłıchǫ, Dene, Tr'ondëk Hwëch'in, Tagish, Tutchone, Denesuline, and Metis. Between 1860 and 1930 and along the Mackenzie and Yukon rivers and their tributaries (in what are today Canada's Yukon and Northwest Territories), fur traders, missionaries, and the Canadian state began incorporating northern peoples and places into an emergent southern-based economy, society, and nation through a process of colonisation (Abel 1993; McCarthy 1995; Zaslow 1971). Northern

colonisation bears resemblance to the settler colonialism that transformed western Canada. Much of the Mackenzie was technically governed by numbered treaties (Treaty 8 and 11) that overlapped with the provincial west (Asch 2013; Fumoleau 2004). Northern residential schools opened as early as 1866. Yet colonialism in the North worked differently. Concern over access to resources like oil and gold shaped the treaty process less so than interest in agricultural settlement. Population pressures were at once intense and uneven in the North prior to 1930 and exemplified by the boom of the Klondike Gold Rush that brought 10,000 people to Dawson City by 1900, while only a handful of settlers moved to other trade posts and many outsiders sojourned rather than settling in the North. In this period, the still-young Canadian state exerted less power over, and expressed less interest in, its northern as compared to its western territories (Morantz 2002; Tester & Kulchyski 1994; Coates 1985).

To understand colonisation's character in the Mackenzie and Yukon between 1860 and 1930 requires close attention to the ways its logics, processes, and power remade interrelationships between humans and the rest of nature, producing colonial ecologies knit through natural and social worlds. Here, colonial ecologies refer not to colonized ecosystems but rather, drawing on Linda Nash, to "the dynamic relationship between a body and its environment," as shaped by and shaping the process of colonization, where not just physical changes, but changes in knowledge are key (Nash 2006). This is obviously a lot to parse. That is why this essay follows just one thread: the significance of freeze-up and break-up, and uses colonial experiences of these annual transitions with particular attention to their role in epidemics, to deepen our understanding of the roles water, ice, land, and snow played in the unfolding of northern history after 1860. As other scholars have established, ice and snow were essential to colonial relationships across North America (Wickham 2018; Cruikshank 2005). The lands and waters considered here flow north along the Mackenzie River and southwest down the Yukon River, rise to peaks in the Richardson, Ogilvie, and Mackenzie Mountains, and cover a huge geographical area (see Fig. 1). Across the region between 1860 and 1930, lands and waters normally froze by November, with the first new ice appearing as early as September. The land thawed in May, although waterways might not be free of ice until June or July. August was at once the height of summer and the arrival of fall. Lands and waters were frozen for more than half the year. Where others have emphasized the historical importance of winter as a season (Coates & Morrison 2001; Fingard 1974; MacFadyen 2014), the analysis here instead emphasizes the points of transition: from winter to spring and then from fall to winter.

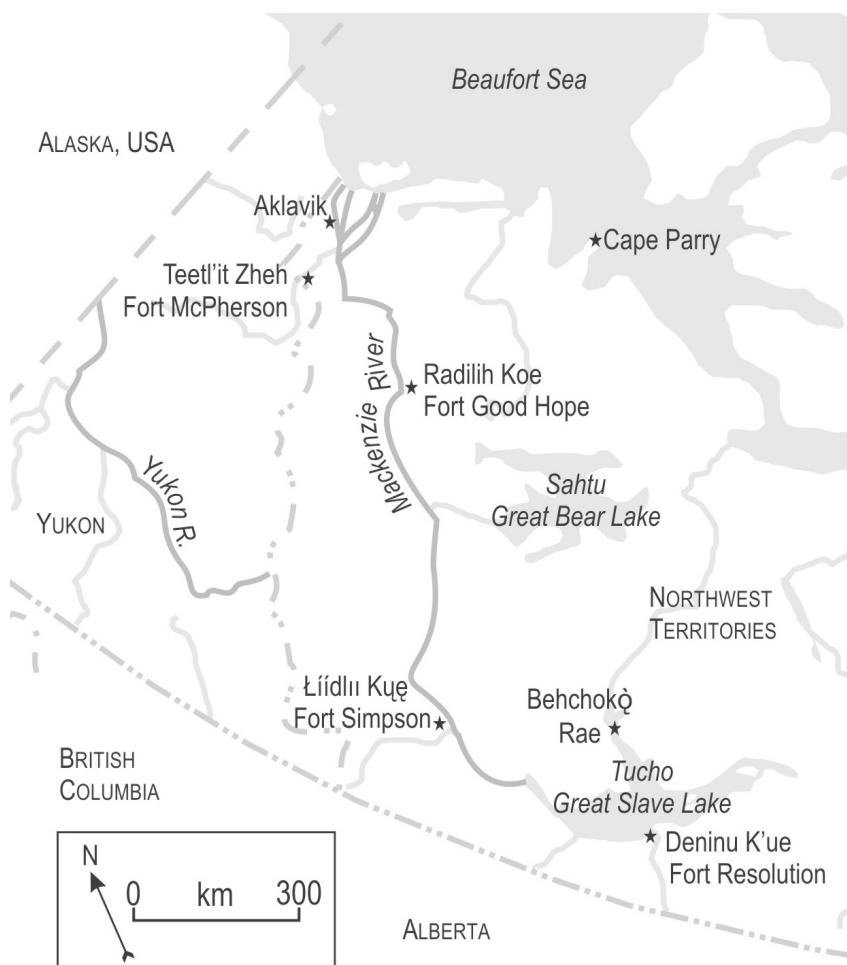


Fig. 1. Map of Mackenzie and Yukon rivers, 1860–1930. Some Indigenous place-names are official (e.g. Behchokò), others are unofficial and spellings vary.

Colonisers adapted to the cryosphere's rhythms as they settled into place. The large-scale movement of goods over long distances was essential to the extension of global economic networks (Friesen 2013) onto the Mackenzie and Yukon rivers in the form of the fur trade. Trading occurred year-round, but the most intense periods of exchange corresponded to the open water season. There was a similar coincidence in time with expansionary efforts by Christian missionaries to extend their proselytizing to new communities; efforts that ramped up and reached farther in the summer months. The fabric of ice and snow governed the movements of newcomers in ways that were independent of interrelationships between Indigenous northern-

ers and the cryosphere. Traders, missionaries, and after them agents of the Canadian state, sought knowledge of ice in particular and used the techniques of empirical observation and the authority of Western science to compensate for their recent arrival in a place otherwise unknown to them (Zilberstein 2016; Cruikshank 2005). From this, a new colonial geography and seasonality emerged—a new colonial ecology—that incorporated ice and snow and that built upon, while never entirely displacing, Indigenous lifeways and movement across the land. The latter part of this essay highlights this new ecology through attention to pathogenic co-travellers in two epidemics (scarlet fever in 1865 and influenza in 1928) that bracket a period of intense environmental, cultural, and economic change. These were the two most significant regional epidemics of the nineteenth and twentieth centuries. The analysis here traces how these pathogens took advantage of, or were curtailed by, the emergent colonial patterns of northern circulation before 1930.

The Melt/Freeze Months

For Indigenous northerners this was their land and there were rhythms, geographies, and practices that mapped to the seasonal shift from ice to water and back again. Experiences were not uniform across the region, but there are common themes from different places and different peoples that illuminate how ice and snow shaped collective experience. Many northern stories share embodied experiences of ice: how it felt, how to know it, and how to live with it. Eliza Andre (1908–1977) was Gwich'in and spent her younger years in the Anderson River area, where she learned to also speak Inuktituk. In her later years, Eliza Andre lived and travelled with her family in the Tree River area and was well-known for her skill at tanning moose and caribou hides (Heine *et al.* 2007: 247). She told a story about three brothers heading for a mountain. They had first to cross a big river. The eldest ran carefully across

from place to place to prevent from falling through. His other two brothers followed him in the same procedure. However, his youngest brother had the most trouble with his snowshoes. The ends kept catching the ice, which by now was loosened with the weight of his other brothers. Finally all three were safely across the river. (E. Andre 2010: 21)¹

Noted Dene elder and storyteller, George Blondin born in 1923, described the stories he had heard of long ago when it was so much colder than today that “you could hear trees and ice crack everywhere in the bush” (Blondin 1997: 20). There were stories about the importance of listening to elders

that were woven into the fabric of ice (Basso 1984). When elders or parents warned young people not to cross on weak ice, to be patient and wait for it to get strong, the younger people who did not listen went through the ice and died (Baptiste 2010b: 114).

Other accounts highlight the essential importance of the geography of ice to travel, movement, and staying still (Bonnetplume 2010a: 125). Inuvialuk elder Ishmael Alunik shared his life experiences as a hunter and trapper, as well as stories he was told by his elders in his 1998 book, *Call Me Ishmael*. Alunik told how in winter, without moonlight, Inuvialuit had to “watch the snowdrifts” to navigate for travelling.

Their fathers would make their sons learn if the wind is blowing from the North, West, South and East. Sometimes they would watch the drifting snow becoming snowdrifts if the wind lasted more than two days. (Alunik 1998: 91)

People anticipated a certain geography of ice: Gwich'in elder Pascal Baptiste spoke of coming to a creek called Willow Creek and finding it open—with no more ice—“we did not know how to get over” (Baptiste 2010a: 109).

Winters were spent with nets under the ice. The willow bark nets that the Dene used before twine nets were introduced in the fur trade had to be kept underwater all the time, they were ruined if they dried out or froze (Blondin 1997: 22). Families passed long periods at fish lakes, the most reliable source of food in winter months, while hunters would go out from these camps for caribou, moose, and other game. But life was focused on the frozen lakes. In recalling her childhood, Eliza Andre spoke about going with her father “in the evening when it was moonlight [...] to see the hooks under the ice and bring home lots of loche” (E. Andre 2010: 48). Along the coast, people set sweep nets in open water to harvest fish migrating between the rivers and the lakes. Once fall came and the inland lakes froze up, while the ice was “still thin,” Inupiat would set nets to catch whitefish (jumbos) and lake trout. “When the ice got two or more feet thick they would stop fishing with nets as their chisels were not strong enough for continual use in thick ice” (Alunik 1998: 63–65). Blondin shared the story about how a medicine man “placed permanent trout and herring bait” at a spot at the head of Sahu De, close to Sahu (Great Bear Lake) “where the water naturally stayed open” all winter. This site was thereafter a good fishing place all winter and into the present (Blondin 1997: 27).

But easily the most important presence was how the transformation of ice—going out in spring and forming in fall—shaped the rhythm of the year. This rhythm is apparent in the names given to the months in Inuvialuktun

and Gwich'in. Bob Cockney (1895–1966) in his writings later translated and published under the title *I, Nuligak* described how Naoyavak his grandfather's brother taught him the names of the moons. The April moon was Qiblalirvik, "because the sun has melted the top of the snow, and as we stare at it, it sparkles with whiteness." In October, "one of the first signs of cold is the forming of thin ice on the sandy shores of the ocean. This ice is called *tuglu*, and the moon *Tugluvik*" (Nuligak 1966: 61). In Gwich'in it was May and October that were described through reference to ice and snow. In the Gwichya Gwich'in dialect May is *gwiliu zrèe*, or 'snow crust month.' In this dialect October is *sree vananh' tadididitshii* or the 'month of freezing' (Andre & Mitchell 1999: 45, 109). Other months have names in these languages that correspond to animals, sunlight, colours, and important gatherings. That April, May, and October bear names that correspond to the changing character of the ice and snow speaks to its great importance at these times of year.

On Great Slave Lake to the south, Fort Resolution/Deninu K'ue elder Francois King, born in 1903 and skilled with Indigenous medicine, described how the run of suckers (used to make dryfish for dogs) began when the ice broke-up in spring (Fort Resolution Elders 1987: 40).² Gwich'in elder, Bella Alexie (1892–1995) described the changing seasons as when "the ice moved out" (Alexie 2010: 5). Julianne Andre, a Gwich'in woman born in 1887, spoke about one year when families were coming down from Tsiigehtchic and

just as they were unloading their things from the boat, someone yelled that the Mackenzie was starting to move. From up the Red River there came a rush of ice and water. Their boats were nearly swept away.

After this, Andre recounted, people started coming down the water on rafts (J. Andre 2010: 66). Paul Bonnetplume (1894–1974), a skilled hunter, trapper, and fisherman lived his life on the land up the Peel River and down in the Delta (CMH 2020).³ He told of how people were ready to make mooseskin boats for the long journey from the mountains, "after there was no more ice" and they could go by water (Bonnetplume 2010b: 151). It was not just the ice on the interior rivers and lakes that had to go to free up movement, Cockney described waiting for "when the sea ice finally opened" so that he could move on (Nuligak 1966: 76).

In the nineteenth century, the Hudson's Bay Company (HBC) traders overwintered at the fur trade posts that became the nuclei for many northern communities. It was in spring that the boats began to move, carrying people, furs, and goods, into, out of, and around the region along the Mackenzie and Yukon rivers and their principal tributaries. The ways that the

open waters were used changed over time but the underlying rhythm persisted. In the twentieth century, the HBC faced greater competition from independent traders like Peter Baker who “would come as soon as the ice went away in spring time,” recalled George Sanderson from Deninu K’ue (Fort Resolution Elders 1987: 37; Baker 1976). Other elders described finding work on the HBC’s steamships during the summer months (Francois King in Fort Resolution Elders 1987: 64). Victor Lafferty, born in 1914, worked as a labourer “after the snow thawed in the spring time,” cutting logs, hay, and then fishing. “After we were finished fishing,” Lafferty concludes, “we brought all the boats back here and took them out of the water” (Fort Resolution Elders 1987: 64).

The ice in fall and spring was dangerous, as it formed and broke up it was unpredictable and unstable. Cockney told about walking on the ice near Cape Parry once it had frozen in fall. “We were in the middle of the strait. It was windy and the new ice was so thin and soft that it bent under our weight.” At first Cockney and his companions enjoyed seeing the ice “sag under our feet.” Then

suddenly the thought came to me that everything was going to break around us. I recalled one of my grandfather’s stories, where the ice had collapsed under the feet of a band of Inuit.

Cockney hurries his companions off the ice to shore. “It was hare-brained of Putugor [his brother] and me to have acted that way.” Cockney concluded, “twenty minutes after we got to shore, our bridge of thin ice was completely destroyed” (Nuligak 1966: 113–114). We see not only the role of stories Cockney’s grandfather had told him in shaping his own knowledge of ice but also Cockney’s expectation that he and his brother (but not their other non-Inuit companion) must *know* the ice and whether it was safe for passage. Travellers could break through newly-formed ice, or get bound up in the ice as it broke and re-formed as happened to Victory Lafferty and his uncle at Rocher River (just east of Deninu K’ue). They were stuck for a week until the ice finally went out and they could return home (Fort Resolution Elders 1987: 88).

Ice and Colonisation

Indigenous northerners occupied a rich social world throughout the year. From the nineteenth into the twentieth century, this social world consisted of human and other-than-human nature (Heine *et al.* 2007: 7–8). Social life varied over the seasons with large winter gatherings an important part of the calendar. With the presence of fur traders and missionaries these winter gath-

erings were organized around Christmas and New Year's, but the timing of these celebrations built on pre-contact traditions. The Inuvialuktun name for "the December moon" was *kaitvitjvik* "because during this month of darkness the Inuit assemble, forget their worries, rejoice, dance, perform with puppets, and the like" (Nuligak 1966: 61). Beyond these large celebrations, families came together at fish lakes or elsewhere on the land in the winter months. Freeze-up was an important transition in the yearly cycle, marked by the changing character of snow and ice in spring and fall, the attendant hazards, and the different rhythms of movement in the winter months.

For colonisers, freeze-up and break-up took on much greater significance to their yearly cycle as markers of the imposition of, and then release from, isolation. Missionaries and traders would spend some time on the land in winter months but they travelled far more widely once the rivers opened in spring. The main traffic of people and goods was over water as it was much cheaper and easier to carry heavy loads that way. That it was easier and safer for long journeys to travel by boat in the summer months is also apparent in Indigenous accounts (even if only in contrast to the hazards of travel over ice). And so the system of navigation by which most colonizers and their goods entered this region was established in the fur trade and its rhythms mapped onto Indigenous lifeways.

Traders hired local boat men to take furs down to Portage La Loche, the height of land between the Hudson Bay and Arctic watersheds and from 1826 to 1886 the exchange point in the HBC's brigade system. It was here where the goods that arrived for each annual outfit from England and eastern Canada were exchanged with the returns in fur, castoreum, and sometimes leather and caribou tongues, from the Mackenzie River District posts. Posts were resupplied by the end of the summer. Through the nineteenth century, the HBC used twenty-eight-foot long boats that could carry up to three tons in weight and were crewed by eight to twelve voyageurs (Innis 1999: 293). After 1885, the *SS Wrigley* was the first steam-powered vessel to carry goods and people along the Mackenzie River. Its appearance brought new summer labour opportunities for Indigenous northerners as pilots, crew, and in cutting cordwood to feed the engine (Anderson *et al.* 2000: 13–15). Missionaries took advantage of the summer months to widen their field for proselytizing. Dignitaries visited and toured the posts. Roman Catholic Oblates and Anglicans stationed along the Mackenzie River travelled northward to more distant communities, including those along the Arctic coast. In the twentieth century, with growing interest in northern resource opportunities including mining, oil and gas, the spring transition was referred to as when the land "begins to show" (Finnie 1930). Geological exploration depended on the close examination of bedrock, work that could

not be done when the land was blanketed with snow.

Observing ice—its character, transitions, movements, and flows—became core to colonial experiences; it was a way that newcomers adapted to northern land and waterscapes. Ice was part of the larger process of weathering colonization as scientific meteorology came to play an essential role in defining Canada as a new northern nation (Zeller 1987). Daily if not hourly or even minute by minute measures of temperature and air pressure, duly recorded in ledgers, contributed to a meteorological network and a climate index essential to understanding Canadian environments and expanding colonial settlement (Piper 2019). Observation of ice rooted northern settlers and sojourners in specific places. Oblates of Mary Immaculate missionaries kept daily journals, with variable consistency, at each post. Émile Petitot and Jean Séguin at the place they called *Notre Dame d'Espérance* or *Fort Good Hope*, but which was called *Radilih Koe* ('home at the rapids') by the K'ahsho Got'ine, began a mission journal in 1868. Their temperature observations begin seven years later, when Petitot brought several spirit (alcohol) thermometers with him from Paris (Petitot 1889: 83). The mission temperature record was kept until 1966.

Séguin was primarily responsible for keeping these detailed records. He lived in the North for forty years and at Fort Good Hope for almost all of that time. Séguin was unequalled in the diligence and detail with which he kept meteorological observations. (Nevertheless, as is apparent in his letters, this attention to detail did not make Séguin a gentle colonizer. He viewed Indigenous northerners as primitive, inferior savages who needed his sacrifice to be saved.) The instrumental temperature series from Fort Good Hope is the oldest and most complete of all the posts along the Mackenzie and Yukon rivers. The only gaps in the record between 1876 and 1890 were in the summer months (from early July to mid-September) when missionaries travelled and left the thermometer, and the meteorological station that it constituted and represented, unobserved. From 1891 until Séguin's departure in 1901 the record is complete, with Séguin even adding Fahrenheit measurements from a second thermometer in 1897. With Séguin's departure the thermometer languished, its temperatures unrecorded for several years until July 1909 when a daily record resumed.

Break-up and freeze-up observations were kept from 1876 to 1940 with only one interruption in the spring of 1903 (OMI n.d.). The annual observation of ice shows elements of the process of colonization and the creation of colonial ecologies. The language conveys the Oblates' sense of ice coming apart (*débâcle*) in spring, then flowing full (*grosse*), then coming back together (*prise*) and the water stopping (*arrêt*).⁴ These transitions mirrored the onset and end of easy commercial and social travel over the waterways in summer. Observations were made from a stationary point looking outward,

rather than conveying an immersive sense of being on the land and water with the ice, which is apparent in how Indigenous northerners recollected ice and its transformations.

In his decades at Fort Good Hope, Séguin paid close attention to the ice in spring noting when water first appeared at the edge of the river, then when it began to break up—this is the date reported in the Oblate records as *débâcle*—and then observing the ice as it started to move. Some years, Séguin observed when the river was open to a certain point but the date of full opening, when the break up was complete, only arrived when the “big ice” moved out (OMI 1876–1879). The spring thaw was not a moment but a process. To achieve the accuracy that clearly appealed to Séguin meant having fixed points to signal the opening of the river, including using the break-up of ice at the rapids as the point in time that marked the opening of the river. Petitot explained how once the ice began to break up at the rapids, very shortly thereafter would follow “la grande débâcle” and the big ice. He went on,

Nothing can give a more striking sense of the primal chaos and confusion that arose [from the great break-up]. It is a monstrous mixture, shapeless, unique, of gigantic masses, as tall as houses, as big as rocks, which move through groaning, roaring, majestic or wrathful, breaking against others that are even more monstrous still; then fall back covering with their debris the flanks of the giants against which they have collided. They are swallowed by the flow of the river, to reappear further on, surging up in the midst of smaller bits of ice, which they move, raise, and disrupt.⁵ (Petitot 1889: 152)

Petitot writes how once the largest masses of ice moved downstream. This was not only visually arresting, but also that the noise of the big ice (“de formidables detonations,” “un fracas infernal”) made it an unmistakable moment in the seasonal calendar.

The emotional character of break-up can be further understood in reference to the experience and description of freeze-up. As in the spring, Séguin, Petitot, and other missionaries detailed the process of freezing over several weeks. In some years they commented first on the formation of ice along the banks of the river. However, it was not until ice formed in the river itself that they marked the start (*prise*) of freeze-up. In the days or weeks that followed, the missionaries might note details about the amount of ice on and flowing in the river (*la rivière charrier*). In many years, but not always, they marked when the rapids had frozen and then when the freeze-up was complete as when the ice, or the river had stopped (*arrêtée*) or frozen (*gelée*). This was often followed by comments on the beauty of the frozen river.

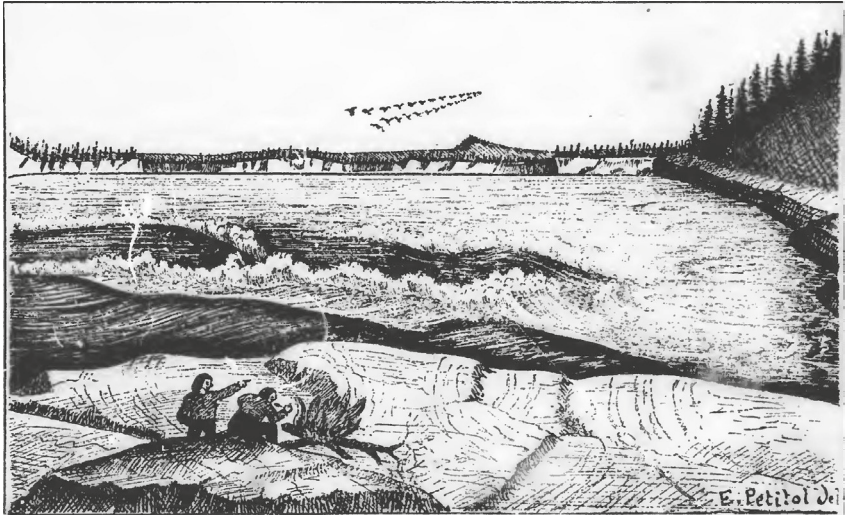


Fig. 2. The Great Rapids of the Mackenzie River Ramparts.
Source: Originally published in Petitot, *Quinze Ans sous le Cercle Polaire* (1889: 27).

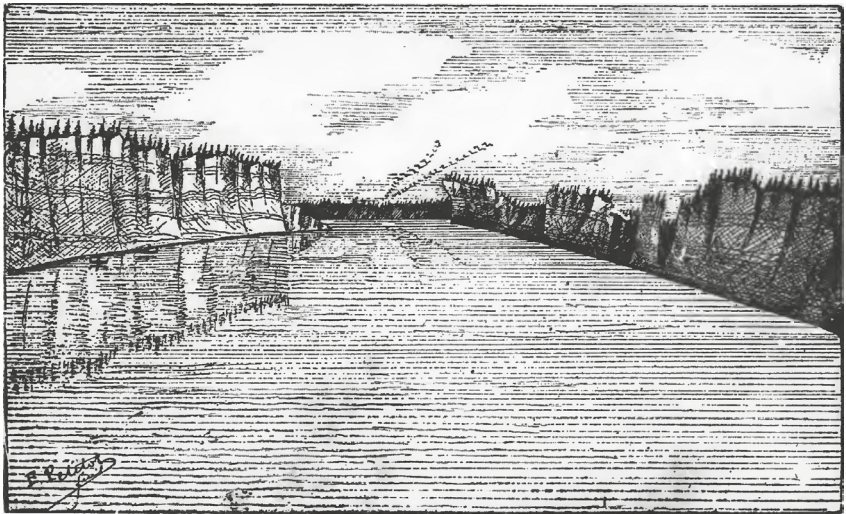


Fig. 3. The Mackenzie River Ramparts.
Source: Originally published in Petitot, *Quinze Ans sous le Cercle Polaire* (1889: 91).

After 1904, the Oblates distinguished that freeze-up was complete when the Ramparts froze over. This formalized the observations that Séguin had been recording for years as the *arrêt*. The towering limestone cliffs three kilometers downstream from Radilih Koe form a canyon where the river narrows, creating the rapids for which the community is named and which were an essential spiritual and fishing site for the K'ahsho Got'ine from ancient times (Auld & Kershaw [eds.] 2005: 19). Given the narrowing of the river at the Ramparts, when the river had frozen here this marked when the waters flowing past Fort Good Hope/Radilih Koe effectively stopped for the winter months. However, the Ramparts occupied greater significance than even that in the minds of the missionaries. The Ramparts were, in Petitot's words, the "door" to their mission post (Petitot 1889: 62) and he included two illustrations of them in his published work on the region (Figs. 2 and 3).

Petitot characterized the freezing river, as when "the Great Giant is imprisoned in its vast icy bed from which it will not leave for more than nine months" (Petitot 1889: 85). It is clear elsewhere in his writings that Petitot felt that it was not just the river that was imprisoned, but he and the others at the mission post as well. While Séguin detailed the dull isolation of the winter months after freeze-up (Séguin 1867), for Petitot, enduring the winter isolation was a test put to him by his god. He described how winter brought with it nervous melancholy and a "morbid depression" (Petitot 1889: 82–83). That Petitot suffered from mental illness, including what appears to be manic depression at times culminating in episodes of violence, is described by Oblate historian Robert Choquette (1995: 59–66). Winter isolation and imprisonment was a colonial discourse. When the door of the Ramparts closed in the fall, it slammed shut only on those who cherished their connection via the Mackenzie River to worlds outside—to the south and more distantly, to Europe and France where Petitot would travel for medical treatment, and to which Séguin returned home in 1901 to live out his final years before dying at the age of seventy in 1903.

With the arrival of the Canadian state in the north after 1890—first and foremost in the form of the North West Mounted Police (NWMP), later the Royal Canadian Mounted Police (RCMP 1921–1935)—there came a greater need for colonisers to adapt more fully to travel in wintertime. Police enforced southern Canadian laws in the northern territories by patrolling, which in many parts of the Mackenzie district and Yukon was "not only the chief, but the sole activity of the detachments" (Morrison 1985: 132). Routine patrols were carried out on a schedule to deliver mail, to make a regular visit to a community or camp, to obtain supplies, collect customs returns, and to enforce new game laws. Special patrols investigated crimes and provided aid. The Mounted Police carried out patrols by boat in summer, and by airplane

after the 1930s, but the majority of patrols were carried out by dog teams over ice. Summer was busy, particularly after treaties 8 and 11 were signed after 1898 and 1921 respectively: Dominion Day (1 July) became an annual celebration when treaty annuities, rations, and supplies were distributed while Indigenous northerners gathered, feasted, and traded at the posts. The police, as agents of the Dominion, played a central role on the government side of these proceedings. Winter was when the routine of patrolling set in.

Detailed descriptions of ice survive from the patrol reports that convey a different perspective on the land. If the Oblate missionaries were relatively stationary in the winter months, the police were much more in motion. Dog teams permitted them to move with ease across the ice and snow. For the police stationed at Fort Resolution breaking through ice that had not fully formed on Great Slave Lake was a threat in the early winter. One year the ice was so rough on the lake it cracked the boards on the police sled. Kristjan Fjeldsted Anderson, born in Iceland in 1866 and who came to Canada in 1887, was the police officer in charge of the Great Slave Lake sub-district from 1917 until 1921. He described travelling across the lake in February 1920 where “the wind had taken all the snow off the ice in large patches, leaving the jagged edges of the broken ice sticking up which was very hard on the sleighs” (Anderson 1920). Dogs also found these conditions difficult, as they did too when the weather was cold and the ice harder on their feet. Dry lake and river ice in the late spring was covered in what the trapper Helge Ingstad described as a “carpet of sharp-pointed needles which bring blood to the paws of the dogs” (Ingstad 1992: 135). The men might spend several days at the detachment caring for the dogs after a patrol over rough ice. A local Metis woman held at the Resolution detachment in the early months of 1924 for “vagrancy” (the charge used for women held for prostitution) was put to work sewing shoes for the dogs during her incarceration (RCMP 1921–1935: 6 Feb. 1924). Alongside catching fish and preparing dog food, generally caring for dogs became essential labour at RCMP posts in the early twentieth century, reflecting the centrality of the patrols (Dobrowolsky 2013: Ch. 11).

In the fall, a major source of anxiety was pulling out the boats before they got frozen in at too great a distance from the detachment, as well as ensuring a good fall fishery. The fish caught during spawning runs were dried and preserved through the winter months for dogs and men. Anderson described how in 1919 an early freeze up and bad weather (fall was a stormy time of year on Great Slave Lake) wreaked havoc among the missions, traders, and police. The Roman Catholic and Anglican mission “steamers” were frozen in at a distance from the post, as were a large steamer and a fish scow belonging to the HBC. Then,

Fairweather's gas boat [...] was [coming] in from Rocher river with fish, and got caught in the storm, and was compelled to throw all or most of the fish overboard, to save the boat from being swamped, the R.C. Mission Fort Providence lost 80 nets and 2 scows and a skiff in the ice and LHC Co. [Lamson Hubbard] of the same [place] lost 20 nets, several of the Police nets at Fort Resolution get [sic] damaged by the ice but Corpl. Walters got them all out. (Anderson 1920)

Boats frozen in had to pass the winter exposed to elements, often sustaining significant damage that needed repair after spring break-up when they could finally be freed. Once water appeared on the ice, police stayed off the thawing waterways but still patrolled over land. The RCMP described the land as it thawed and became like a quagmire. At the police detachments, built in the communities that had emerged around the fur trade and mission posts, the spring thaw saw men dig ditches to drain the barrack yard and detachment quarters. Travel over land—the routine and special patrols—persisted but became an ordeal as the trails were bad and “soft” (RCMP 1921–1935: 23 April 1924). Longer patrols during springtime might involve the RCMP carrying canoes or other boats with their sleds, so that they could take advantage of open water when it arrived (Wood 1921). Break-up was a social event and spectacle which people gathered to watch (see Fig. 4). As anthropologist June Helm observed from Jean Marie River in the 1950s, “the interest surrounding break up is intense,” followed soon thereafter by the arrival of visitors (Helm 2000: 35).

*

Epidemics. Scarlet Fever 1865 and Influenza 1928

For most of the middle decades of the nineteenth century (1820–1880) a pandemic of scarlet fever led to thousands of deaths in Europe and North America (Swedlund & Donta 2003: 159). In dense urban populations the disease had highest mortality among children. Infection by the bacteria *Streptococcus pyogenes* that causes scarlet fever does produce immunity to subsequent infection in most instances and, given the degree to which these pathogens circulated in urban settings, many adults would have been previously exposed. Those who had not, though, could fall ill and die. In the mid-nineteenth-century the *S. pyogenes* bacteria was particularly virulent. “The deadliest of fevers” as reported in an 1865 article in *The Lancet*,

often pestilential in its progress, sparing neither the young nor the old, but chiefly infecting the very young, and not unfrequently sweeping off the whole of the children of a family—its irruption into a household is regarded with dismay. (N.a. 1865: 129)



Fig. 4. Ice break-up at Aklavik, Mackenzie Delta, 1922.

Source: NWT Archives/Fred Jackson fonds/N-1979-004: 0242.

S. pyogenes is a pathogen that has demonstrated considerable variation in its virulence over time and which, is like plague and cholera, an “epidemic-prone bacterial infection” meaning that it can produce significant epidemics (Wong & Yuen 2012: 1).

Scarlet fever arrived with boat crews in the Mackenzie River District in August of 1865. Dene and Gwich'in men worked for the HBC in the summer months as voyageurs, responsible for the transshipment of goods and furs into and out of the North. The boat crews, like ship crews on the coast, acted as vectors for infectious diseases in the nineteenth century (Hackett 2002: 180; Boyd 1999: 34–37). The waterways of the fur trade in the open months enabled boat crews to transport goods over long distances and with considerable speed. From the perspective of pathogens this worked like the better-known example of horses and the spread of smallpox on the Great Plains: an infected person could travel far while incubating a disease and before they even knew they were sick. Pathogens, like *S. pyogenes*, had the opportunity to reach farther into the interior by rivers and lakes than by any other means. Indeed, boats on open water were even more dangerous than horses as sick people could be carried in a boat, they did not need the energy to sit up and ride. This was what happened in 1865. Several men from Radilih Koe and elsewhere died in Portage La Loche in northwest Saskatchewan, far from their lands and families. Twenty others, according to Petitot, lay ill in the boat when it reached Fort Good Hope/Radilih Koe. The crews and other passengers, and even the goods they carried may have helped to convey the bacteria over

long distances. *S. pyogenes* main reservoir is humans, but they can survive in some foodstuffs including flour and cornmeal (Parish 2004: 35). That said the disease also disrupted normal movement. William Hardisty, the HBC Chief Trader at the district headquarters in Fort Simpson/Líídlı Kųę, was unable to “raise a crew” for Fort Halkett, near the confluence of the Smith and Liard rivers in what is today northern British Columbia (Hardisty 1865: 61a). The Fort went without its outfit, but with two exceptions (Halkett men who were at Fort aux Liards when the scarlet fever passed through that place), the forty-three families that made up “the Halkett branch of the [Tsek’ehne] tribe” escaped the epidemic (Hardisty 1866: 93b; Wright 1976: 88–89).

The scarlet fever had about a month of open water when it travelled with boats and spread to communities along the Mackenzie and Yukon rivers. With freeze-up, the movement of people and the pathogen slowed considerably, although it did not stop. In October 1865, Revered McDonald at Fort Yukon wrote of two young men who arrived “from Netsi-kutchin [sic] country. They brought news of all being well.” When McDonald travelled to them two months later, he reported that twenty-seven people had died in the interim when the bacteria reached their community (possibly from Fort Yukon itself), amounting to about a third of the band (McDonald 1865: 8 Oct.; 26 Dec.). Thirty-two of thirty-eight “Mountain Indian” (Shita Got’ine) hunters were also reported to have died from scarlet fever or suicide in the winter of 1865–1866 (Flett 1866), a devastating loss.

Indigenous northerners who caught scarlet fever in the trade and mission posts moved on to their wintering grounds where, according to Séguin, they “could breathe a little.” Out on the land their families cared for them, “so long as the one who was sick could light a fire” (Séguin 1866). Some camps were spared on their wintering grounds, such as a family Petitot described who evaded the epidemic in their camp on Colville Lake/K’ah-bamitue. However, the close social world of the north meant only that the immediate family was spared, not their friends and wider kin. Néyollé, the head of the family, on learning of the deaths of his younger brother, his two sisters, and many cousins and nephews: “[...] sat, with his head in his hands,” wrote Petitot in a letter to his superiors, “and stayed in this position for a long while saying nothing. He then sat up, shed countless tears and sobbed so hard as to rent his soul” (Petitot 1868: 285).

By the summer of 1866, when traders and missionaries reflected on the scarlet fever outbreak, they estimated over one thousand deaths from a regional population that would not have exceeded ten thousand at the time. The vast majority were Indigenous people, in part because there were still relatively few (possibly no more than a few hundred) non-Indigenous people then in the northwest interior. Many Euro-Canadians (including

William Hardisty, Jean Seguin, and others) also fell ill with the scarlet fever in this epidemic, and some died. The death toll varied significantly between communities and camps, although mortality appears to have been as high as 25 percent of the population. The scarlet fever endures in the oral history of the Northwest as one of the most prominent epidemics at a time of significant historical change (Vuntut Gwitchin First Nation & Smith 2009: 91; Sax & Linklater 1990: v–vi). Scarlet fever's appearance in late summer in 1865 slowed the progress of the epidemic and helped to ensure that some camps and families survived the winter months.

Infectious pathogens circulated throughout the Northwest in the decades that followed, with varying degrees of intensity and, at times, devastating local impacts (see for example Nagy 1994: 55). Yet it was not until 1928 that another major epidemic reached across most of the region. This time it was an influenza outbreak that killed at least 10 percent and possibly as much as 20 percent of the population. People living along the Mackenzie had not been hit by the 1918–1919 influenza pandemic, the so-called Spanish flu, although influenza had travelled through the northwest interior repeatedly in the nineteenth century. It is therefore most likely that this later virulent epidemic was the first appearance of the same, devastating H1N1 influenza in the region. In 1928, the influenza virus arrived on the Mackenzie soon after the spring breakup. The different timing of these two epidemics, in 1865 and 1928, highlights the different character of movement, sociability, and mobility in the early as compared to late summer, as well as some of the changes that had transformed the Mackenzie and Yukon rivers in this formative period. There are therefore important similarities that become apparent in the ways that colonial circulations influenced the movement of infectious pathogens and their effects upon northern peoples and communities.

In 1928 the HBC's main supply steamship, the *SS Distributor*, carried the influenza virus along the Mackenzie River from Hay River on the south shore of Great Slave Lake to Kitigaaryuit (Kittigazuit) a major Inuvialuit settlement at the mouth of the delta. The trip took eleven days, including the stops at posts to deliver goods and pick up and drop off passengers. It became clear on this first trip of the *Distributor* that it was hurrying the virus across the region. Shortly after the steamer arrived, people at each post would fall ill with almost the entire community affected. Dr. W.A.M. Truesdell, the Dominion physician stationed at Fort Simpson (where the Mackenzie and Liard rivers meet) boarded the *Distributor* on 6 July. Truesdell noted that crew and passengers were sick with the flu but he chose not to stop the vessel from continuing on its way, believing that it was more important that the communities to the north be restocked with supplies after a long hard winter than that the virus be contained (Truesdell 1928).

Truesdell failed to anticipate the severity of the outbreak.

The *Distributor* provided speed and range, but the fuller dispersion of influenza came as a result of treaty gatherings and other spring and summer activities that brought Indigenous peoples, non-Indigenous residents and visitors, trappers, and traders together at this time of the year. On 23 June, 1928 Denesuline families travelled down the Buffalo River to Hay River with furs. The Reverend A.J. Vale remarked in his journal, “thus life begins again in the Community” (St. Peter’s 1928: 23 June). We hear echoes of Petitot and Séguin decades earlier describing the isolation of the winter months from the perspective of the mission posts looking out. Just as Denesuline families came into Hay River, so too did other Dene and Gwich’in land their canoes and boats at Deninu K’ue, Behchokò, Zhahti Kù, Lídli Kù, Radilih Koe, and—along with Inuvialuit—they arrived at Aklavik and Kitigaaryuit up on the Beaufort coast. At Hay River, the majority of families arrived before the *Distributor* came in and thus awaited the arrival of not only that season’s goods but also the virus itself. At Providence, the *Distributor* landed and left while most families were still out on the land (Bourget 1928: 3). This did not mean those families were spared. Instead, it was a smaller boat that arrived from Resolution/Deninu K’ue a few days later, after families had reached the community, that carried the virus on. These frequent movements between communities meant that few camps or communities were spared.

Further north, in Fort McPherson/Teetl’it Zheh, as soon as the influenza arrived and many villagers fell ill a canoe with an outboard motor was sent to Aklavik for help. Such trips carried the virus to new sites as well. The greatest opportunities for spread, however, came from seasonal gatherings. Julianne Andre described the days before the flu came.

The Eskimos wanted to dance for us, and then we had to dance for them. They danced all night. That night after mass they all went down to dance. A chant was sung. We really had lots of fun. Everybody danced—some rested and then took the place of the dancer. That’s when the flu came. Everybody was sick and lots of people died. (Heine *et al.* 2007: 272)

Rae/Behchokò, a major Tłı̨chǫ community nestled in the rocks of the Canadian shield on the North Arm of Great Slave Lake, was the site of important treaty festivities in the twentieth century. In 1928, Dominion government officials postponed treaty payment for a few days, “to give a chance to all the stragglers to arrive:” in effect they gave the disease greater opportunity to take hold among the 800 or more Tłı̨chǫ people who had gathered. By “Sunday the first of July the disease started with terrific spread,” according to Dr. Clermont Bourget (Bourget 1928: 1). Not only did the Treaty party, itself infected with the virus, then travel to nearby families and camps but some

Tẖcẖo and Dene left Rae/Behchoḵ before they had received their payment to purchase goods, or the rations that were a part of the treaty provisions, in fear for their health and in the hopes of escaping the illness (Halliday 1928).

What happened at Rae/Behchoḵ illustrates a pattern of very effective disease dispersion independent of the path of the *Distributor*, as people came together to visit and for treaty or trade and then left carrying the virus with them. This kind of mobility and movement was much more common in the summer months, particularly in the early decades of the twentieth century, and with the advent of regular steamship trips along the Mackenzie River. The 1928 influenza does not appear to have been virulent as the 1865 scarlet fever, with the average mortality closer to 12.5 percent. It was higher in communities where the *Distributor* stopped and higher still in smaller communities and bands where almost everyone fell ill and therefore could do less to care for one another in the midst of the epidemic. The wide geographic spread, compared to many previous epidemics, reflected the timing and movement of people in the summer months along the Mackenzie River.

*

Not immediately apparent from the accounts provided here was the persistence and resilience of Indigenous northerners in the face of epidemic outbreaks. There are some hints. Alongside the lower mortality in larger communities noted here, there are oral and written accounts of how those who could, provided food and care to the sick during these epidemics (Thom & Blondin-Townsend [eds.] 1987: 59–61). Such care was the most effective means of healing the sick available at this time (Humphries 2013: 121–122). Even when families suffered devastating losses, survivors were not abandoned but in keeping with practices common among the different northern Indigenous peoples, adopted into other families.

The purpose here is to turn attention away from Indigenous communities as sites of vulnerability and onto the colonial ecologies, that fabric interwoven between bodies and places, connecting Indigenous people and settlers along the Mackenzie and Yukon rivers and their tributaries between 1860 and 1930. An examination of the two most significant regional epidemics in this period reveals the character and rhythm of colonial circulation that connected the northwest interior to distant disease pools and brought pathogens into the region. Once in the northwest interior, the course of these epidemics was shaped in place, by the disruptions and flow created in the annual transition to and from ice and snow. The impact of freeze-up and break-up came not only through the phase change from liquid to solid and back again, but also through the knowledge, desires, and power that decided when goods and people would move and how far and where they

would travel. The anticipation, quagmire, and hazards of spring, followed by the frequency, distance, and intensity of summer travel with a final rush of activity before the freeze up, and then the slowness of winter—connect to both the dynamics of ice and colonial prerogatives (the cheapest and easiest movement of trade goods, the desire for police patrols over ice, the settling of missionaries into place) and illuminate how this cryospheric colonial ecology shaped the northern history of disease.

ACKNOWLEDGEMENT

The author gratefully acknowledges the Gwich'in Tribal Council Department of Cultural Heritage for granting permission to publish material from the Gwich'in COPE stories interview transcripts with Gwich'in elders.

NOTES

- ¹ The interviews, like that with Eliza Andre, are drawn from the COPE collection. COPE refers to the Committee for the Original People's Entitlement and was formed in the context of the 1970s land claims. The COPE collection includes interviews conducted as part of the land claim in the 1970s, as well as stories shared between 1963 and 1979 on a CBC radio program hosted by Nellie Cournoyea called, "A Long Time Ago." (Introduction, "Gwich'in COPE Stories" 2010: x)
- ² Place-names are given with their English and Dene or Gwich'in names in the first instance, and thereafter are referred to depending on which perspective and sources are being presented—settler or Indigenous. If it's the author's perspective, the Indigenous name will also be used.
- ³ Paul Bonnetplume's biography was collected as part of the Gwich'in Social and Cultural Institute's Elders Biographies project. For more information see www.gwichin.ca/projects/elders-biographies; access date 3 February 2020.
- ⁴ All the Oblate material cited here is in French in the original and where quoted in English has been translated by the author.
- ⁵ English cannot quite capture Petitot's expressiveness. In the original he writes: "Il n'est rien qui donne une idée plus frappante du chaos primitif et de la confusion dernière. C'est un mélange monstrueux, informe, unique, de masses gigantesques, hautes comme des maisons, grosses comme des rochers, qui s'en vont mugissant, hurlant, majestueuses ou courroucées, se rompre contre d'autres plus monstrueuses encore; puis retombent en couvrant de leurs débris les flancs des colosses contre lesquels elles se sont heurtées. Elles s'engloutissent dans le flot qui marche, pour reparaître plus loin, surgissant au milieu de glaçons moindres, qu'elles déplacent, soulèvent et culbutent."

REFERENCES

Unpublished Sources

- Alexie, Bella. (2010). "Marriages," in "Gwich'in COPE stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 4–7. Transcript.
- Anderson, K.F. (1920). Inspector In Command of Great Slave Lake Sub District and Patrol to "G" Division, Edmonton, 3 February. Northwest Territories Archives, June Helm Fonds, N-2002-021, box 3.
- Andre, Eliza. (2010). "Without Fire (Kyan Et Dun) and Little Beads (Nah Ghing Tsull)," in "Gwich'in COPE stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 20–28. Transcript.
- Andre, Julianne. (2010). "Life story of Julianne Andre," in "Gwich'in COPE stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 61–92. Transcript.
- Baptiste, Pascal. (2010a). "Living with Eskimos," in "Gwich'in COPE stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 109–110. Transcript.
- Baptiste, Pascal. (2010b). "Man called Indian Headband," in "Gwich'in COPE Stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 114–15. Transcript.
- Bonnetplume, Paul. (2010a). "Arctic travels with the Hudson Bay Company," in "Gwich'in COPE stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 148–149. Transcript.
- Bonnetplume, Paul. (2010b). "Travels in the Yukon," in "Gwich'in COPE stories," Fort McPherson, NT: Gwich'in Social and Cultural Institute, pp. 150–152. Transcript.
- Bourget, C. (1928). Medical report for the Great Slave Lake Agency from June to September first, 1928, 19 September. Library and Archives Canada, RG 85 C11-a, vol. 789, file 6099, pp. 1–6.
- Finnie, O.S. (1930). Letter to V. Stefansson, 4 June. Library and Archives Canada, RG 85, C-1-a, vol. 808, File 6774, pt. 2, Reel T-13312.
- Flett, Andrew. (1866). Letter to William Hardisty, 1 February. Hudson's Bay Company Archives, B. 200 / b / 36, fo. 40–41.
- Halliday, J.L. (1928). Great Slave Lake Sub-District, Rae Detachment to Officer Commanding, RCMP, Great Slave Lake Sub-District, 6 August. Library and Archives Canada, RG 85 C-1-a, vol 789, file 6099.
- Hardisty, William. (1865). Letter to W.J. McLean, Fort Aux Liards, 29 September. Hudson's Bay Company Archives, B. 200 / b / 35, fo. 61a–b.
- Hardisty, William. (1866). Letter to Governor, Chief Factors, Northern Department, 30 July, Hudson's Bay Company Archives, B. 200 / b / 35, fo. 93a–b.
- McDonald, Robert. (1865). Diaries. Archives of the Ecclesiastical Province of Rupert's Land, Winnipeg & Yukon Archives. Robert McDonald fonds, 86/97, MSS 195.
- OMI = Oblates of Mary Immaculate (n.d.). "Fort Good Hope, NWT. Notes on crops (potatoes), extracts from Codex Historicus." Provincial Archives of Alberta, Oblates of Mary Immaculate Fonds, Acc. 97.109/Box 90 (7), item 1988.
- OMI = Oblates of Mary Immaculate (1876–1879). "Codex Historicus." Provincial Archives of Alberta, Oblates of Mary Immaculate Fonds, Acc. 97.109, Box 90(7), item 1990.
- RCMP = Royal Canadian Mounted Police (1921–1935). G-Division, Fort Resolution Journals. Library and Archives Canada, RG 18-C-6, vol. 3470.
- Séguin, Jean. (1866). Letter to mother and sister, 1 June. Provincial Archives of Alberta, Oblates of Mary Immaculate Fonds, Acc. 71.220/7343.
- Séguin, Jean. (1867). Letter to mother and sister, 1 June. Provincial Archives of Alberta,

Oblates of Mary Immaculate Fonds, Acc. 71.220/7344.

- St. Peter's. (1928). *Missionary Journals*, Hay River, Great Slave Lake. Provincial Archives of Alberta, Anglican Diocese, MacKenzie River, MR 4/5 box 1.
- Truesdell, W.A.M. (1928). Letter to O.S. Finnie, 28 September. Library and Archives Canada, RG 85 C-1-a, vol. 789, file 6099, pp. 1–4.
- Wood, S.J. (1921). Inspector Commanding Arctic Sub-District report from Herschel Island Detachment, to the Officer Commanding, RCMP, Edmonton, 1 January. Northwest Territories Archives, June Helm Fonds, N-2002-021, box 3.

Published Sources

- Abel, K. (1993). *Drum Songs. Glimpses of Dene History*, Montreal: McGill-Queen's University Press.
- Alunik, I. (1998). *Call me Ishmael. Memories of an Inuvialuk Elder*, Inuvik, NT: Kolausok Ublaaq Enterprises.
- Anderson, D.G., Wishart, R., Murray, A. & Honeyman, D. (2000). *Sustainable Forestry in the Gwich'in Settlement Area. Ethnographic and Ethnohistoric Perspectives*, Edmonton: Sustainable Forest Management Network.
- Andre, A. & Mitchell, E. (1999). *A Dictionary of the Gwichya Gwich'in and Teetl'it Gwich'in Dialects*, Tsiigehtchic, NT: Gwich'in Social and Cultural Institute.
- Asch, Michael. (2013). "On the land cession provisions in treaty 11," *Ethnohistory*, 60: 3, pp. 451–467.
- Auld, J. & Kershaw, R. (eds.) (2005). *The Sahtu Atlas*, Norman Wells, NT: Sahtu GIS Project.
- Baker, P. (1976). *Memoirs of an Arctic Arab. A Free Trader in the Canadian North the Years 1907–1927*, Saskatoon: Yellowknife Publishing Company.
- Basso, K. (1984). "'Stalking with stories.' Names, places and moral narratives among the western Apache," in *Text, Play, and Story. The Construction and Re-construction of Self and Society*, ed. E.M. Brunner, Prospect Heights, IL: Waveland Press, pp. 19–55.
- Blondin, G. (1997). *Yamoria the Lawmaker. Stories of the Dene*, Edmonton: NeWest Press.
- Boyd, R. (1999). *The Coming of the Spirit of Pestilence. Introduced Infectious Diseases and Population Decline among Northwest Coast Indians, 1774–1874*, Vancouver and Toronto: University of British Columbia Press.
- Choquette, R. (1995). *The Oblate Assault on Canada's Northwest*, Ottawa: University of Ottawa Press.
- CMH = Canadian Museum of History/Musée Canadien de l'Histoire (2020). "Storyteller Paul Bonnetplume;" www.historymuseum.ca/gwichin/storytellers/paul-bonnet-plume/; access date 30 January 2020.
- Coates, K. (1985). *Canada's Colonies. A History of the Yukon and Northwest Territories*, Toronto: J. Lorimer.
- Coates, K.S. & Morrison, W.R. (2001) "Winter and the shaping of northern history. Reflections from the Canadian North," in *Northern Visions. New Perspectives on the North in Canadian History*, eds. K. Abel & K.S. Coates, Toronto: University of Toronto Press, pp. 23–36.
- Crosby, A.W. (1986). *Ecological Imperialism. The Biological Expansion of Europe, 900–1900*, Cambridge: Cambridge University Press.
- Cruikshank, J. (2005). *Do Glaciers Listen? Local Knowledge, Colonial Encounters, and Social Imagination*, Vancouver: UBC Press.

- Denevan, W.M. (1992). "The pristine myth. The landscape of the Americas in 1492," *Annals of the Association of American Geographers*, 82: 3, pp. 369–385.
- Dobrowolsky, H. (2013). *Law of the Yukon. A History of the Mounted Police in the Yukon*, rev. ed., Madeira Park, BC: Lost Moose Publishing.
- Fingard, J. (1974). "The winter's tale. The seasonal contours of pre-industrial poverty in British North America, 1815–1860," *Historical Papers*, 9: 1, pp. 65–94.
- Fort Resolution Elders (1987). *That's the Way We Lived. An Oral History of the Fort Resolution Elders*, Yellowknife, NT: Northwest Territories Culture & Communications.
- Friesen, T.M. (2013). *When Worlds Collide. Hunter-Gatherer World-System Change in the 19th Century Canadian Arctic*, Tucson: The University of Arizona Press.
- Fumoleau, R. (2004). *As Long As This Land Shall Last. A History of Treaty 8 and Treaty 11, 1870–1939*, Calgary: University of Calgary Press.
- Hackett, P. (2002). "A Very Remarkable Sickness." *Epidemics in the Petit Nord, 1670–1846*, Winnipeg: University of Manitoba Press.
- Heine, M., Andre, A., Kritsch, I., Cardinal, A. & the Elders of Tsiigehtshik (2007). *Gwichya Gwich'in Googwandak. The History and Stories of the Gwichya Gwich'in, As Told by the Elders of Tsiigehtshik*, Tsiigehtshik, NT: Gwich'in Social and Cultural Institute.
- Helm, J. (2000). *The People of Denendeh. Ethnohistory of the Indians of Canada's Northwest Territories*, with contributions by T.S. Carterette & N.O. Lurie, Iowa City: University of Iowa Press.
- Humphries, M.O. (2013). *The Last Plague. Spanish Influenza and the Politics of Public Health in Canada*, Toronto: University of Toronto Press.
- Ingstad, H. (1992). *The Land of Feast and Famine*, transl. by E. Gay-Tifft, Montreal: McGill-Queen's University Press. Originally published New York: Knopf, 1933.
- Innis, H.A. (1999). *The Fur Trade in Canada*, reprint ed., Toronto: University of Toronto Press.
- MacFadyen, J. (2014). "Cold comfort. Firewood, ice storms, and hypothermia in Canada," *The Otter—La Loutre*; <http://niche-canada.org/2014/01/05/cold-comfort-firewood-ice-storms-and-hypothermia/>; access date 24 January 2020.
- McCarthy, M. (1995). *From the Great River to the Ends of the Earth. Oblate Missions to the Dene, 1847–1921*, Edmonton: University of Alberta Press.
- Morantz, T. (2002). *The White Man's Gonna Getcha. The Colonial Challenge to the Crees in Quebec*, Montreal: McGill-Queen's University Press.
- Morrison, W.R. (1985). *Showing the Flag. The Mounted Police and Canadian Sovereignty in the North, 1894–1925*, Vancouver: University of British Columbia.
- N.a. (1865). "The limitation of scarlet fever," *The Lancet*, 4 Feb., pp. 129–130.
- Nagy, M.I. (1994). *Yukon North Slope Inuvialuit Oral History* (Occasional Papers in Yukon History No. 1), Yukon: Heritage Branch.
- Nash, L. (2006). *Inescapable Ecologies. A History of Environment, Disease, and Knowledge*, Berkeley: University of California Press.
- Nuligak [Cockney, Bob]. (1966). *I, Nuligak*, transl. by M. Metayer, Toronto: P. Martin Associates.
- Parish, J.M. (2004). "An Analysis of the 1875–1877 Scarlet Fever Epidemic of Cape Breton Island, Nova Scotia," diss., University of Missouri-Columbia.
- Petitot, É. (1868). "Good Hope, 15 janvier 1866," *Missions de la Congrégation des Missionnaires Oblats de Marie Immaculée*, 7, Paris: Typographie Hennuyer et Fils, pp. 282–292.
- Petitot, É. (1889). *Quinze Ans sous le Cercle Polaire. Mackenzie, Anderson, Youkon*, Paris: E. Dentu.

- Piper, L. (2019). "Climates of our times," in *The Nature of Canada*, eds. C.M. Coates & G. Wynn, Vancouver: On Point Press, pp. 319–333.
- Piper, L. & Sandlos, J. (2007) "A broken frontier. Ecological imperialism in the Canadian North," *Environmental History*, 12:4, pp. 759–795.
- Ray, A.J. (1974). *Indians in the Fur Trade. Their Roles as Trappers, Hunters, and Middlemen in the Lands Southwest of Hudson Bay, 1660–1870*, Toronto: University of Toronto Press.
- Sax, L. & Linklater, E. (1990). *Gikhyi. One Who Speaks the Word of God*, Whitehorse, YT: Diocese of Yukon.
- Swedlund, A.C. and Donta, A.K. (2003). "Scarlet fever epidemics of the nineteenth century. A case of evolved pathogenic virulence?" in *Human Biologists in the Archives. Demography, Health, Nutrition and Genetics in Historical Populations*, eds. D.A. Her-ring & A.C. Swedlund, Cambridge: Cambridge University Press, pp. 159–177.
- Tester, F. & Kulchyski, P. (1994). *Tammarniit (Mistakes). Inuit Relocation in the Eastern Arctic, 1939–63*, Vancouver: UBC Press.
- Thom, M.M. & Blondin-Townsend, E. (eds.) (1987). *Nahecho keh/Our Elders*, Fort Providence, NT: Slavey Research Project.
- Vuntut Gwitchin First Nation & Smith, S. (2009). *People of the Lakes. Stories of our Van Tat Gwich'in elders/Googwandak Nakhwach'anjoo Van Tat Gwich'in*, Edmonton: University of Alberta Press.
- Wickham, T.M. (2018) *Snowshoe Country. An Environmental and Cultural History of Winter in the Early American Northeast*, Cambridge: Cambridge University Press.
- Wong, S.S.Y. & Yuen, K.-Y. (2012). "Streptococcus pyogenes and re-emergence of scarlet fever as a public health problem," *Emerging Microbes and Infections*, 1:7; doi: 10.1038/emi.2012.9.
- Wright, A.A. (1976). *Prelude to Bonanza. The Discovery and Exploration of the Yukon*, Sidney, BC: Gray's Publishing.
- Wright, S. (2014). *Our Ice is Vanishing/Sikuvut Nunguliquaq. A History of Inuit, Newcomers, and Climate Change*, Montreal-Kingston: McGill-Queen's University Press.
- Zaslow, M. (1971). *The Opening of the Canadian North*, Toronto: McClelland & Stewart.
- Zeller, S. (1987). *Inventing Canada. Early Victorian Science and the Idea of a Transcontinental Nation*, Toronto: University of Toronto Press.
- Zilberstein, A. (2016). *A Temperate Empire. Making Climate Change in Early America*, New York: Oxford University Press.

AUTHOR

Liza Piper is a specialist in the histories of northern and western Canada. She teaches environmental history and the history of disease at the University of Alberta and is the author of *The Industrial Transformation of Subarctic Canada* (UBC Press 2009).

epiper@ualberta.ca