Method and Meaning in Canadian Environmental History

EDITED BY

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NELSON EDUCATION
Dedicated to

51°50'1.93" N 122°33'22.54" W
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46°10'26.32" N 63°18'20.75" W
# Contents

Geographical and Temporal Coverage Chart ........................................... vi
Alan MacEachern, “An Introduction, in Theory and Practice” ........................ ix

**Section I: Approaching Environmental History** ................................... 1
Graeme Wynn, “Travels with George Perkins Marsh: Notes on a Journey into
Environmental History” ................................................................. 2

**Section II: Reading Landscapes** .......................................................... 35
Peter E. Pope, “Historical Archaeology and the Maritime Cultural Landscape
of the Atlantic Fishery” ................................................................. 36
Carolyn Podruchny, “Writing, Ritual, and Folklore: Imagining the Cultural Geography
of Voyageurs” ............................................................................ 55

**Section III: Manipulating Scale** ........................................................... 75
Lyle Dick, “People and Animals in the Arctic: Mediating between Indigenous
and Western Knowledge” ............................................................... 76
Liza Piper, “Colloquial Meteorology” ...................................................... 102
R. W. Sandwell, “History as Experiment: Microhistory and Environmental History” ........ 124

**Section IV: Learning by Looking** .......................................................... 139
Colin M. Coates, “Seeing and Not Seeing: Landscape Art as a Historical Source” .......... 140
Catriona Mortimer-Sandilands, “Finding Emily” ........................................ 158

**Section V: Finding the Nation in Nature** ............................................... 181
John F. Varty, “Trust in Bread and Bologna: Promoting Prairie Wheat
in the Twentieth Century” ............................................................... 182
Alan MacEachern, “Lost in Shipping: Canadian National Parks and
the International Donation of Wildlife” ............................................. 196

**Section VI: Reading Cities** ................................................................. 215
Michèle Dagenais, “The Urbanization of Nature: Water Networks and
Green Spaces in Montreal” ............................................................ 216
Joanna Dean, “Seeing Trees, Thinking Forests: Urban Forestry at the University
of Toronto in the 1960s” .................................................................. 236
Section VII: Thinking Spatially ................................................. 255
Matthew Evenden, “Mapping Cold War Canada: George Kimble’s Canadian Military Geography, 1949” .................................................. 256
Stéphane Castonguay and Diane Saint-Laurent, “Reconstructing Reforestation: Changing Land-Use Patterns along the Saint-François River in the Eastern Townships” ... 273

Section VIII: Negotiating Expertise .............................................. 293
Stephen Bocking, “Nature’s Stories? Pursuing Science in Environmental History” .......... 294
William J. Turkel, “It Costs Something to Learn Something: Property Rights, Information Costs, and the Struggle at Fish Lake” ........................................... 311

Index ..................................................................................... 327
## Geographical and Temporal Coverage Chart

<table>
<thead>
<tr>
<th></th>
<th>North America</th>
<th>Canada</th>
<th>Arctic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>up to 1800</strong></td>
<td>Donald Worster, “Ice, Worms, and Dirt: The Power of Nature in North American History” (p. 24)</td>
<td></td>
<td>Lyle Dick, “People and Animals in the Arctic: Mediating between Indigenous and Western Knowledge” (p. 74)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1800s</strong></td>
<td></td>
<td>Graeme Wynn, “Travels with George Perkins Marsh: Notes on a Journey into Environmental History” (p. 2)</td>
<td>Lyle Dick, “People and Animals in the Arctic: Mediating between Indigenous and Western Knowledge” (p. 74)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1900s onward</strong></td>
<td></td>
<td>Graeme Wynn, “Travels with George Perkins Marsh: Notes on a Journey into Environmental History” (p. 2)</td>
<td>Lyle Dick, “People and Animals in the Arctic: Mediating between Indigenous and Western Knowledge” (p. 74)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alan MacEachern, “Lost in Shipping: Canadian National Parks and the International Donation of Wildlife” (p. 194)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matthew Evenden, “Mapping Cold War Canada: George Kimble’s Canadian Military Geography, 1949” (p. 254)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stephen Bocking, “Nature’s Stories? Pursuing Science in Environmental History” (p. 292)</td>
<td></td>
</tr>
<tr>
<td>Pacific</td>
<td>Prairies</td>
<td>Central</td>
<td>Atlantic</td>
</tr>
<tr>
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<td>---------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>R. W. Sandwell, &quot;History as Experiment: Microhistory and Environmental History&quot; (p. 122)</td>
<td>Carolyn Podruchny, “Writing, Ritual, and Folklore: Imagining the Cultural Geography of Voyageurs” (p. 54)</td>
<td>Colin M. Coates, “Seeing and Not Seeing: Landscape Art as a Historical Source” (p. 138)</td>
<td>Peter E. Pope, “Historical Archaeology and the Maritime Cultural Landscape of the Atlantic Fishery” (p. 36)</td>
</tr>
<tr>
<td>Joanna Dean, “Seeing Trees, Thinking Forests: Urban Forestry at the University of Toronto in the 1960s” (p. 234)</td>
<td></td>
<td>Joanna Dean, “Seeing Trees, Thinking Forests: Urban Forestry at the University of Toronto in the 1960s” (p. 234)</td>
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</tr>
</tbody>
</table>
An Introduction, in Theory and Practice

ALAN MACEACHERN

First, the practice.

When preparing for my Ph.D. comprehensive exams in the early 1990s, I read George Perkins Marsh’s groundbreaking 1864 book, *Man and Nature*, which systematically chronicled how humans have shaped the natural environment. I came across this Canadian content in a footnote: “The great fire of Miramichi in 1825, probably the most extensive and terrific conflagration recorded in authentic history, spread its ravages over nearly 6,000 square miles [15,500 sq km], chiefly of woodland, and was of such intensity that it seemed to consume the very soil itself.”¹ I learned subsequently that this New Brunswick fire had also wiped out communities and killed scores, if not hundreds, of people. I took it for granted historians had written about the fire, and since I was interested in environmental topics, expected to learn a lot more about it from them. But over time I realized that historians had all but completely ignored the Miramichi Fire.

That surprised me. How could a forest fire said to have burned one-fifth of New Brunswick not have had a great impact on a colony devoted to forestry? How could it not have reshaped the settlement, society, economy, and ecology of New Brunswick? How could it not be a topic of historical interest? So in 2000, when working on my postdoc, I decided to devote one month at Library and Archives Canada to finding out as much as I possibly could about the Miramichi Fire. This meant poring over standard historical sources such as newspapers, government records, land records, diaries, correspondence, and travel accounts. Completely immersing yourself like this in historical research is the best way I know to gain a sense of a past society, a feeling for what life was like on the ground. But it is the accumulation of hundreds of tiny details that gets you hooked, that will remind you that you are learning about real, three-dimensional people. I read about the British immigrants who arrived that October to find the forest still in flames and sailed right back. The owls that flew to the south of the colony to escape the great fire, only to be shot in great number. The insurance company that began advertising fire insurance in a New Brunswick paper one week after the fire; the ad ran for years. A song written in Wales about the fire. A charity pamphlet filled with gory descriptions of deaths by immolation. My reading spiralled outward, to include almanacs, maps, literature, forestry journals, sermons. Pretty soon, everything seemed to relate to the fire in some way: the Erie Canal’s opening two weeks after the fire; John Constable’s
paintings of clouds; Henry David Thoreau’s writings on plant succession; the invention of the matchstick in 1827. Everything seemed worth reading about. That’s always a good sign that you’re becoming obsessed (which is not to say it’s time to stop).

The fire was pulling me out of my comfort zone as a historical researcher. I wanted to better document the weather in New Brunswick in the summer and fall of 1825, so that meant both tabulating the meteorological records in the U.S. Army’s Fort Sullivan in nearby Maine, and also learning about hurricanes and cold fronts. I wanted to know how far the smoke from the fire spread, so that meant not only contacting one of the world’s experts on using ice cores to reconstruct climate records, to ask if his Greenland samples showed evidence of an 1825 fire (nope), but also learning about wind and glaciochemistry. And I needed to understand a lot more about forest ecology, forestry technology and practices, and forest fire dynamics. I did not become an authority on any of these subjects, but I learned to read their literatures, and to ask experts in these fields what I hope were sufficiently intelligent questions.

My sense of the Miramichi Fire was by now taking shape, and I believed I knew how it had faded from historical memory. In the first generation after the fire, almost every single commentator agreed that it had been as massive as first reported. I took this as very strong evidence—given that the accounts were written after the smoke had cleared, were sometimes very precise, and were frequently made by locals to locals, who would know if statements were exaggerated. But the Miramichi forests were healthy, ecologically diverse, and resilient, so they grew back quickly after the fire, and in a matter of decades there was little obvious physical evidence of the fire. In 1906, the foremost chronicler of New Brunswick’s past, historical geographer W. F. Ganong (of the chocolate Ganongs), decided to map the fire’s boundaries. He worked through some of the same sources I did, and he sought the opinion of a well-known lumberman, who assured him that the fire could not possibly be as large as was believed: there were simply too many big trees standing within the presumed fire area. Ganong’s essay, “On the Limits of the Great Fire of Miramichi of 1825,” argued that there was one intense fire around settlements on the Miramichi River, and a less intense one that just did limited damage here and there over the 6,000 square miles. Ganong didn’t quite extinguish the fire, but he poured water on it. He even included a map, showing how the fire burned hardest around populated areas. His method seems to have been to assume that unless there was specific documentary evidence that an area had been damaged, it hadn’t been—and since unpopulated and less-travelled areas are less likely to offer such evidence, there are large blank spaces on his map, suggesting the fire was not such a big deal. Ganong’s theory became the standard way to understand the fire in the 20th century. I imagine Ganong in 1906 looking out over the Miramichi, trying to conform the historical record of the Miramichi Fire to the mature forests he saw around him. And so, I believe, he unwittingly used nature against itself; he used its restorative power to discredit its destructive power.

That was it, then. I’d write up what I believed and try to publish it somewhere.

Except that I wondered if I could find out more. Forest fires can leave material evidence of their passing on the trees that survive them. They leave fire scars, and since trees grow a new ring each year, it is possible to date those scars. What if there were still fire scars on 1825 tree rings to be found in areas that, according to Ganong’s map, were not supposed to have been badly burned? (I told you I was obsessed.) I was soon talking to the Dean of Forestry of the University of New
Brunswick, and learned that the New Brunswick Department of Natural Resources and Environment (NRE) regularly surveys every single provincially owned forest stand in the province, taking core samples from 5 to 10 somewhat-representative trees in the stand. What if, I asked, we weed out all trees in the survey database that are over 180 years old (there turned out to be fewer than 200 such trees for the entire province), find which are around the fire’s presumed perimeter, and go visit some of them, on the assumption that there is already evidence of one tree in that stand being alive in 1825, and there may be more? The Dean’s reply: “We?”

That’s how I found myself bouncing along northeastern New Brunswick forestry roads in a 4 × 4 with a UNB forestry grad student at the wheel. We drove and then walked to track down specific stands of trees, looked for what might be surviving old trees, and with an increment borer—an auger that you manually screw into the tree—collected core samples from the tree’s north, south, east, and west points. We also ate mosquitoes, slogged through swamp, and fell periodically in thick brush. We took the samples back to the forestry lab, where not a single trace of an 1825 fire scar appeared under the microscope. Not one.

This was not really a surprise; I had already come to realize how quixotic my New Brunswick woods research was. After all, we were looking for a tree that was within the fire’s perimeter but outside Ganong’s estimate, that was in an area likely to burn (for example, not a bog), that did get burned, that got scarred, that was old enough in 1825 to have survived the fire (in effect, more than 20 years old or so at that time), and that was not only still standing but also still alive, since dead trees rot from the middle, making tree-ring dating next to impossible.2 We might have had more luck finding a human survivor of the 1825 fire.

Yet the research trip was not a failure. I learned lots about my topic, about forest ecology, Miramichi geography, and dendrochronology. (For example, straws duct-taped together serve as perfect containers for the long, cigarette-like tree cores. Straws from Subway have the best diameter, arguably. But if taking several dozen straws from a Subway, it’s polite to order a sandwich first.) Beyond that, our method of using the NRE forest surveys was more effective than anyone had expected. We found a number of very old trees, including a 341-year-old red pine—quite unusual in a province that has been logged extensively for the past 200 years. And we may have just missed more. Sometimes, we broke through dense brush and came upon a clearing where the stand we were looking for should have been. A forestry company had gotten there first.3 To the NRE, the presence of an old tree on its forest survey signalled a stand’s “overmaturity,” and was a factor in deciding which stands it would give the companies license to remove. Each year, about 2 percent of New Brunswick forests are systematically cut down, so within a 50-year period there will be very few trees more than 50 years old. This may have been my last chance to see many of the trees from the era of the Miramichi Fire.

Now, the theory.

The research experience I just described exemplifies much about environmental history. First, environmental historians argue that because nature is central to human affairs, it is an appropriate, even necessary subject for historical study. In the Miramichi case, nature not only destroyed communities, but also fostered them in the first place, shaped their development, and was the source of their dealings with the wider world. Yet, as in the Miramichi case, most historians have tended to
treat nature—when they treat it at all—as the setting for history, rather than a participant or an agent of change. Environmental history has emerged as a field in recent decades to explore how people have thought about and interacted with nature. In a well-known formulation, Donald Worster describes environmental history as addressing three “clusters of issues”: nature itself as it has existed through time (including how it affects us), the socioeconomic realm (how we use nature), and the intellectual realm (how we think about nature). Others have built on this model, but its simple and coherent structure resonates with many in the field. Some scholars seek to understand how these levels of analysis work together, while others tend to focus on a particular level.

Key to environmental history is the dialectic belief that we shape our environment and it shapes us in turn. In *Changes in the Land*, one of the classic works in the field, William Cronon writes, “Environment may initially shape the range of choices available to a people at a given moment, but then culture reshapes environment in responding to those choices. The reshaped environment presents a new set of possibilities for cultural reproduction, thus setting up a new cycle of mutual determination. Changes in the way people create and re-create their livelihood must be analysed in terms of changes not only in their social relations but in their ecological ones as well.” This dialectic has some profound implications. For one, it tells us that, though the precedents environmental history offers are instructive, they are necessarily limited because they are specific to the context of the past. For another, it reminds us that there is no steady-state environment that humans can return to even if we wished; our mere presence guarantees change.

A second attribute of environmental history, evident in the Miramichi Fire research example, is the field’s tendency to relate to present-day environmental concerns. In the Miramichi case, New Brunswick’s long history of forestry has set the context for the province’s highly managed forest industry today; my “race” with forest companies to find old trees is an ironic embodiment of the connectedness of past and present. Environmental history’s relevance is in part a product of the field’s own history. It grew out of the environmental movement of the 1960s and 1970s, and of historians’ growing recognition (like that of scholars in many fields) of nature’s importance to humans and of what humans have been doing to nature in turn. The field was at first mostly devoted to self-evidently environmental topics as national parks, natural disasters, and wildlife. But increasingly researchers start with some point of engagement with nature, and read outward from that to shed light on a larger issue like culture, politics, or gender. Much work today is on topics that may not immediately strike you as “environmental,” such as cities, technology, and consumerism. It might be argued that since all human experience intersects with the natural world, everything can be a potential topic for environmental history.

The field not only grew up alongside environmentalism, but also, for many of its practitioners, became an outlet for their activism. They found history useful in explaining how we got to the state we’re in and how we might prevent repeating mistakes made by our ancestors (and, let's face it, ourselves). Many such activist scholars tell narratives that are implicitly or explicitly declensionist, suggesting that things are getting worse. But more and more historians see the field open to narratives as varied as life itself. This is not to suggest that environmental history used to boil down to “Earth good, people bad”—or that it today boils down to “Earth bad, people good”—but rather a reminder that scholarship may or may not be tied to activism, and that it is worth considering the activist implications of the work you are reading.
There is another simple reason why environmental history is so suffused with contemporary concerns: the environment being discussed is still very present. A military historian might visit a battle site to better understand the lay of the land, but an environmental historian visits a park or a city—or the Miramichi—because the land in some sense is the research topic. Moreover, the environment maintains material traces of its past. That leads to a third attribute of environmental history epitomized in the Miramichi case: it is intensely multidisciplinary. To understand the environmental characteristics that were the subjects or objects of change, an environmental historian might need to learn from geology, geography, anthropology, biology, art history, or any other number of disciplines. It is fair, I think, to suggest that environmental historians possess both a humility and an arrogance about knowledge: we appreciate the many insights that other disciplines, forms of knowledge, methodologies, techniques, and technologies can offer in making sense of the world, and yet believe historians are temperamentally well suited to integrating and applying them. We agree with Alfred W. Crosby’s argument that the goal should be to bring the arts and the sciences together—what he calls a marriage of the twits and the nerds. Or better yet, why create twits and nerds in the first place? Create twerds.

Which leads to the thinking behind this book. Just as my Miramichi research experience exemplifies some things about environmental history, the two together exemplify something about this book: it is less about presenting an overarching narrative of Canada’s past than about the theory and practice of environmental history. When approached about organizing a reader, William J. Turkel and I decided that we wanted students to learn about methodology, to learn how to do environmental history. Most history textbooks are created by bringing together articles from peer-reviewed, scholarly journals. Such articles assume considerable familiarity not only with the field’s content but also with how history is researched and written. It is apparently expected that students will learn how to do history by reading good history—a not unreasonable hope, but rather indirect. For this volume, Turkel and I asked contributors to use a case study that they had already worked on as the basis for writing a specially produced essay that explained their process, and how their specific fields (such as historical archaeology), sources (such as maps), and practices (such as microhistory) assisted them in telling the stories they wanted to tell. We asked the authors to imagine the reader looking over their shoulder and asking questions: Why have you chosen those sources? How did you find and interpret them? What kind of questions did you ask yourself or other people during the research? And we asked that they imagine this questioning reader be an undergraduate student. Finally, we had the contributors read one another’s essays, to seek out places where their discussion aligned with or differed from someone else’s. By developing the book in this fashion, we hope that besides introducing students to a wide range of sources and methods, it will show historical researchers the utility of incorporating environmental history elements into their own research practice.

William Turkel and I toyed with calling this book EHP but our editor at Nelson Education talked us out of it. EH is a familiar short form for environmental history used widely in the field, the question mark would have signalled our interest in asking methodological questions—and, of course, “eh?” is the quintessentially Canadian figure of speech. For this is a reader in Canadian environmental history. Canada is the place its editors and most of its authors—and many of its presumed readers—call home. But beyond that, Canada offers an unusual and constructive case for environmental history.
It is the second largest nation in the world, home to diverse ecosystems, and neighbour to three oceans. It is the embodiment of the developed world, though much of it remains, by global standards, undeveloped. It has been home to many varied, extensive, and ongoing aboriginal histories; host to French and then British colonial eras; and long in the shadow of the world’s one remaining superpower. The fact that it is united to the United States longitudinally by climate, geology, and biology, and separated latitudinally by history and culture makes it particularly well suited to comparative study. In this book we will make a case that you should be interested in Canadian environmental history—no, scratch that, we will let the field be its interesting self, and hope you agree.

A note on terms. In keeping with our desire to have authors introduce their fields, each with its own language and grammar, we have generally kept the terms they use rather than impose a consistency throughout the volume. For example, we preserve their use of “aboriginal,” “indigenous,” “First Nation,” “native,” and even our American contributor’s “Indian,” a word that has retained more currency in the United States than Canada. Similarly, dates are expressed in three different forms. The traditional BC/AD calendar dates require no explanation. BCE (Before Common Era)/CE (Common Era) are preferred by some authors for calendar dates, to avoid the religious connotations inherent in BC/AD. BP (Before Present) refers to temporal durations that have been estimated from radiocarbon dating or other physical measurements. As such, BP suggests less precision than BCE/CE; whereas one can be confident that an event of 12,000 BP occurred approximately 12,000 years ago, it did not necessarily occur in or around the calendar year 10,000 BCE.

The editors wish to thank our fellow founders of NiCHE: Network in Canadian History & Environment—Colin Coates, Stéphane Castonguay, and Matthew Evenden—for assisting in the book’s conceptualization, and to Social Sciences and Humanities Research Council of Canada for the support that allowed NiCHE to provide seed funding for this project. Thanks also to Laura Macleod and Heather Parker at Nelson Education for their guidance and countless insights in moving the book forward; Karen Rolfe for her fine copyediting; Jessica van Horssen for her editorial assistance every step of the way; and H. V. Nelles for his early support of the project. In addition, we would like to thank our reviewers for keeping us honest: Claire Campbell, Dalhousie University; Chad Gaffield, University of Ottawa; Richard Rajala, University of Victoria; Bill Waiser, University of Saskatchewan; and two anonymous reviewers. Finally, thanks to all the contributors for their enthusiasm, hard work, and fine essays.

NOTES


2. And if we had found a single tree such as this, it would not in itself have proven anything. For one thing, the tree might have burned in an 1825 fire unassociated with the Miramichi one. For another, although Ganong had argued that most of the burn occurred within core areas, he allowed that trees did burn elsewhere.
3. Occasionally, some of the very largest trees were still standing, not for sentimental reasons, but because they were too broad to be grasped by the feller-buncher.


6. I am obviously biased, but believe the best discussion of this is my co-editor William J. Turkel’s *The Archive of Place: Unearthing the Pasts of the Chilcotin Plateau* (Vancouver: University of British Columbia Press, 2007).


8. The one exception is Donald Worster’s “Ice, Worms, and Dirt: The Power of Nature in North American History,” a version of which had been published in French. We felt this excellent essay deserved the attention of more anglophone readers.
SECTION I

Approaching Environmental History

Graeme Wynn

“Travels with George Perkins Marsh: Notes on a Journey into Environmental History”

Donald Worster

Travels with George Perkins Marsh: Notes on a Journey into Environmental History

GRAEME WYNN

Graeme Wynn teaches Geography at the University of British Columbia.

George Perkins Marsh died in 1882, so I never travelled with him in the conventional sense. Metaphorically speaking, however, he has been a regular, if not entirely constant, companion in my journey to and through environmental history these last three, going on four, decades. I found Marsh in the words he left behind, in an important book he published in 1864, and I came to know him better over the years by revisiting that volume, by engaging with several shorter pieces of his writing, and by reading and listening to what others have had to say about him. Thus this essay is a reflection on two intertwined intellectual voyages, one traced by a set of insights and claims articulated in the 19th century, the other a more autobiographical journey from neophyte graduate student to aging professor. Together, these passages constitute a story about ideas and influences, about the ways in which we (as students, scholars, and individuals) frame and trace our routes through the world, and about the roles of time, space, and chance—or history, geography, and serendipity—in the shaping of academic disciplines and scholarly careers. The essay also points to the importance of contexts in the interpretation of texts, and suggests why history is a lively, contested discipline, rather than a catalogue of dreary facts. So it helps to explain why historians are forever re-envisioning and rewriting the past. This is a lot of ground to cover and it is as well to recognize at the outset, in words written by one of the travellers and taken almost as his own by the other, that “in these pages, as in all I have ever written or propose to write, it is my aim to stimulate, not to satisfy curiosity, and it is no part of my object to save my readers the labour of observation and thought.”
Converging Paths

Born in 1801 in Woodstock, Vermont, George Perkins Marsh led a remarkably full and varied life. Sheep farmer, lawyer, teacher, lumber dealer, mill owner, newspaper editor, businessman, railroad speculator, founder of the Smithsonian Institution, politician, statesman, traveller, and nature lover, he was competent in 20 languages and perhaps the most impressive American scholar of his generation. Indeed, the poet, literary critic, and social commentator Matthew Arnold described him, with all the hauteur of his position among the English cultural elite, as a “rare bird”—an unusually “well-bred and trained American.” Into his 60s, Marsh’s scholarly reputation rested on his work in linguistics and on the history and philology of the Scandinavians and Goths of northern Europe. Erudite visitors from these areas made special trips to meet Marsh in Vermont, and at least one considered him “the most eminent Scandinavian scholar” and perhaps “the most learned man” in the United States. But most of this has been completely forgotten, overshadowed by his book Man and Nature; or, Physical Geography as Modified by Human Action, published in 1864 and described by Marsh’s biographer, David Lowenthal, as “the most important and original American geographical work of the nineteenth century.”

Begun in Burlington, Vermont, in the spring of 1860 and completed in Italy, where Marsh served as the American envoy for some 20 years before his death, Man and Nature was imagined as “a little volume” that would challenge the prevailing conviction that “the earth made man” by showing that “man in fact made the earth.” But Marsh soon recognized that he was producing a “burly volume,” the “object of which,” he wrote tongue-in-cheek some three years into his task, was “to tell everything I know & have not told” elsewhere. In the end, the first edition of the book ran to 465 pages (later editions were longer and included a good deal of additional material). Here Marsh brought together an astonishingly diverse array of sources: the book is a heady, and often difficult, brew of quotations from classical texts, from the works of engineers and foresters, from newspapers and plays, from dictionaries and personal letters, all of which are blended in a “stylistic mélange” with data from censuses and accounts from life.

Four years in the writing, Man and Nature is clearly the product of a lifetime of experience and observation. Indeed, David Lowenthal suggests that Marsh began his study of human–nature relations as a five-year-old child, when he learned from his father about different species of trees and the pattern of watersheds in the Green Mountains of his home state. Years of working and exploiting the land, watching sheep crop the grass on steep slopes, recognizing the growing scarcity of wood in once heavily timbered New England, and charting the erosion of hill slopes bared of their vegetation in the sand and gravel spread over floodplains and the sediment deposited behind mill dams—these were robust foundations upon which to assemble an account of the disturbing agency of humans that turned “the harmonies of nature” into discords. Travels in “Asia Minor,” in Turkey, Egypt, Palestine, Lebanon, and Syria in the 1850s, when Marsh served as the United States minister to Turkey, were another source of detail about and understanding of environmental change.

A diligent diarist (he stressed “the extreme importance of keeping a most full and minute record of every observation and every noteworthy occurrence” especially when in places “where all—nature, art, man—is new”), Marsh rivalled the great geographer Alexander von Humboldt in his dedication to collecting data (on winds, altitude, temperatures, rainfall, stream flows, etc.) and
specimens (plants, insects, animals, birds, fish) during his excursions. But he was also impressed by the antiquity of eastern Mediterranean landscapes. Temples and tombs marked the presence of ancient peoples, but no more than did “the meadows levelled and the hills rounded . . . by the assiduous husbandry of hundreds of generations.” In Marsh’s eyes, the contrast between old world and new, between the ancient scrubland and desert of the Levant and the lush but unstable hills of New England, between the “hoary” Middle Eastern landscape suggestive of a “worn-out planet” and “the thousand fresh existences of the new world” was stark—and ultimately telling.

This is to say that Marsh came gradually to the central argument of *Man and Nature*. In 1847, he had commended members of the Vermont Agricultural Society for filling “with light and life, the dark and silent recesses of our aboriginal forests,” but urged them to recognize that the signs of industry and improvement evident in their local landscapes were “mingled with tokens of improvident waste.” The conversion of forests to farms had quickened runoff, increased the violence of spring freshets, and threatened the loss of productivity as soils were carried downslope and sand and stones were deposited across valuable meadows. Six years later, after his travels in the Levant and to other countries on the Mediterranean littoral, Marsh lamented that he lacked “the knowledge of nature that every traveller . . . ought to have.” Seeing “strange stones, plants, animals, [and] geographical formations,” he found himself gazing “vacantly at them” and wondering at their significance. Back in the United States in 1856, the meaning of what he had seen became clearer, and he used his observations of the old world to frame a cautionary lecture for citizens of the new. Americans should heed the environmental calamities that had beset ancient civilizations, limit their assault on nature, and emulate the efforts of those in Tuscany and other places who had worked to restore soils and landscapes “once used, abused, exhausted, and at last abandoned.” A year later, Marsh advocated European approaches to restocking and sustaining fisheries to remedy the ravages of economic growth that had led to the depletion of fish stocks and the destruction of fish habitat by the construction of dams, the deforestation of riparian zones, and the dumping of sawdust into streams.

By 1864, the implications of the evidence had been refined; the lesson had become clearer and the tone of its delivery was more stentorian. Forty-two pages into Marsh’s magnum opus, a general discussion of “the ravages committed by man” conjures images of the Green Mountains of Vermont, the deserts of Sinai, and the marshes of the Italian piedmont without mentioning these locales. By removing the forest, humans opened the land to desiccation and erosion. “[T]he well-wooded and humid hills are turned to ridges of dry rock, which encumbers the low grounds and chokes the watercourses with its debris, and . . . the whole earth . . . becomes an assemblage of bald mountains, of barren turfless hills, and of swampy and malarious plains.” There are, continued a now impassioned and clear-sighted author,

parts of Asia Minor, of Northern Africa, of Greece and even of Alpine Europe, where the operation of causes set in action by man has brought the face of the earth to a desolation almost as complete as that of the moon. . . . The earth is fast becoming an unfit home for its noblest inhabitant, and another era of equal human crime and human improvidence . . . would reduce it to such a condition of impoverished productiveness, of shattered surface, of climatic excess, as to threaten the depravation, barbarism and perhaps even extinction of the species.
This was not the only message offered by *Man and Nature*, but like many similarly apocalyptic visions, it captured attention and focused minds, not least because it echoed through some of the most direct and evocative writing in an often long-winded book. Pithy, incisive variants on the theme of human destructiveness drew the attention of readers working through convoluted sentences and lengthy paragraphs: “Man has too long forgotten that the earth was given to him for usufruct alone, not for consumption, still less for profligate waste”; “man is everywhere a disturbing agent. Wherever he plants his foot, the harmonies of nature are turned to discords”; “we are, even now, breaking up the floor and wainscoting and doors and window frames of our dwelling for fuel to warm our bodies and seethe our pottage, and the world cannot afford to wait until the slow and sure progress of exact science has taught it a better economy.”11 Despite Marsh’s fear that his effort would bring ruin to his publisher, *Man and Nature* sold more than 1,000 copies within months of its release. Within a decade, suggests Lowenthal, the book “was a classic of international repute.” A contributor to *The Nation*, reviewing the enlarged but not greatly changed second edition, described it as “one of the most useful and suggestive works ever published” and thought that it carried “the force of a revelation.”12

Marsh’s words had their strongest impact on those anxious about the future of America’s forests. Large expanses of the northeast had been denuded of trees by the 1860s, and in Boston, New York, and other major cities, the prices of fuelwood and lumber were rising. The consequences that flowed from the destruction of the woods were central to the apocalyptic arguments of *Man and Nature*, and leaders of the nascent North American forestry movement were quick to utilize Marsh’s insights. Franklin B. Hough, the first United States forestry commissioner, hoped that Marsh might lead the foresters’ campaign against indiscriminate clearing. His successor, N.H. Egleston, credited Marsh with identifying “our destructive treatment of the forests and the necessity of adopting a different course.”13 In the last quarter of the 19th century, a few prescient Americans were recognizing the limits of their country’s resources and praising Marsh for teaching them “to attribute unwelcome [environmental] changes to our restless disturbance of the equilibrium of nature.”14 Even Gifford Pinchot, widely regarded as the founder of the American forest conservation movement, described Marsh’s book as “epoch-making,” although (ever anxious to portray himself as “breaking new ground”) he elsewhere insisted that few Americans had read it and that it had little impact upon popular opinion.15

Beyond the United States, *Man and Nature* similarly influenced scholars and foresters in the decade or two after its publication. In France, Elisee Reclus incorporated its insights into his *La Terre*, published in 1868; geologists Charles Lyell and Arnold Guyot acknowledged its importance; and Italian legislators incorporated references to the book in forest laws approved in the 1870s and 1880s. From distant India, Hugh Cleghorn of the Imperial Forest Service wrote Marsh in 1868 to say that he had “carried . . . *Man and Nature* with [him] along the slope of the Northern Himalaya and into Kashmir and Tibet.”16 A third edition of the book was published in 1884, and reprinted as late as 1907, but by 1889 Harvard Professor and public intellectual Charles Eliot Norton believed that Marsh’s warnings had fallen “upon deaf ears,” and less than two decades later Charles S. Sargent, an eminent botanist and director of Harvard University’s Arnold Arboretum lamented that “the younger generation” seemed to know nothing of Marsh’s book.17
Perhaps this is the fate of most books and ideas: to burst or creep into being, to have their moment in the sun, and to fade, having had greater or lesser impact, from public consciousness. A few views and volumes avoid this transitory fate, and others sink below the horizon of popular consciousness for a while, only to be resurrected at some future date. Such was the destiny of *Man and Nature*. Brought to the attention of the American historian of cities and technology Lewis Mumford by the Scottish thinker Patrick Geddes, *Man and Nature* was characterized by the former, early in the 1930s as “the fountainhead of the conservation movement.” Almost 25 years later, when Mumford and geographer Carl Sauer convened a symposium to consider “man’s role in changing the face of the earth” it was dedicated to Marsh. A year earlier, Sauer’s student Andrew Hill Clark had described Marsh as “among the first, and . . . one of the greatest of, our historical geographers”—although, he had to add, “all too few modern geographers” think of him “as one of their own.”

I knew nothing of this in 1968, when I first came to Canada with a good and broad grounding in geography, signalled by a newly minted B.A., and additional courses in history and geology. Three years before, fate and good fortune rather than deliberate, knowledgeable choice had made me a student at the University of Sheffield when its department of geography was among the best in Britain. There, the discipline’s traditional emphases were honoured, but the new seed of quantification, fruitfully and famously transplanted from a handful of American institutions, was also being nurtured. Physical geography, geomorphology, biogeography, climatology, statistics, social, historical, urban, agricultural and economic geography, spatial analysis, and regional studies (complemented by field trips) formed the core curriculum and tutorials exposed us to the history of geographical thought. I learned a good deal about geographical practice as well as geography’s traditions, about geomorphological mapping and chi square tests and urban morphological analysis as well as environmental determinism, possibilism, and genres de vie. I learned the names and contributions of many stars in the geographical firmament—Humboldt, Ritter, Davis, Strahler, Semple, Taylor, Tatham, Vidal de la Blache, Fleure, Jones, Evans, Barrows, Hartshorne, and Sauer among them—but Marsh remained invisible. No matter. Like many undergraduates, I was convinced that the future of geography lay with the new rather than the old, in the identification, description, and analysis of spatial patterns using quantitative techniques. Pointed this way, encouraged to venture to North America for further study, and steered north by a Commonwealth scholarship, I arrived at the University of Toronto, the Canadian hotbed of the quantitative revolution in geography.

These were invigorating times. Early in the 1970s, William O’Neill titled his informal history of America in the 1960s *Coming Apart*, and popular historian Mark Kurlansky would later call 1968 the year that rocked the world. Americans were deeply divided over the war in Vietnam. Student protests disrupted many campuses in France, the United States, Germany, Mexico, Italy, and Argentina. In April 1968, Martin Luther King was assassinated and Pierre Elliot Trudeau was elected prime minister of Canada. In midsummer, Trudeaumania swept Canada, and in August, Warsaw pact troops invaded Czechoslovakia to put an end to the political liberalization movement at much the same time as police confronted militant opponents of U.S. domestic and foreign policies at the Democratic Convention in Chicago. The University of Toronto campus was also a lively place. Discussions of the Vietnam War, of the counterculture, of student governance, and of
political philosophies ran long and late. Thanks to Marshall McLuhan, who held almost legendary
class status in some corners of the campus, many discussed the implications of “over-extending” tech-
nology, and (echoing McLuhan’s 1964 claim that “the medium is the message”) grew skeptical
about the ways in which ideas are framed and communicated, and about the changes in the scale,
pace, and patterns of life produced by new technologies. Before the year ended, an experiment
in alternative student-run education and co-operative living began at Rochdale College, on the
edge of the campus. Nearby Yorkville was the city’s bohemian cultural centre and a major centre
of the hippie movement. Probably inspired by Rachel Carson’s much-talked-about book *Silent
Spring*, a series of articles on pollution in the student newspaper, *The Varsity*, early in 1969 asked,
“Is there a future for our generation?” The response led a small group of Toronto students and
faculty to found Pollution Probe and begin a campaign for the environment that quickly secured
reductions in the use of DDT and restrictions on the use of phosphate in detergents. The orga-
nization’s widely noticed mock-funeral for the Don River, and other attention-grabbing events,
have come to be regarded as precursors of “an environmental ethic that would energize renewed
public commitment.” Later that year, Jane Jacobs, celebrated author of *The Death and Life of
Great American Cities*, arrived in Toronto fresh from a battle against the Lower Manhattan
Expressway in New York City and added weight to the growing grassroots protest against the
Spadina Expressway. At much the same time, I also encountered reform-minded architects Jack
Diamond and Barton Myers at informal “drop-in” seminars promoting new visions for the city.

In this context, I soon began to wonder whether I wanted to spend the rest of my life immersed
in the matrix algebra, Fortran programming, and Central Place Theory upon which my graduate
courses focused. “Models are undeniably beautiful,” as Chorley and Haggett claimed with the
opening quotation of their influential *Models in Geography*, but they are also simplifications and
abstractions, and the buzzing, howling world beyond the elegant-equation-filled classrooms of
U. of T.’s Sidney Smith Hall seemed much more insistently interesting to me. Urban reform and
environmental concern were in the air, and the university campus was abuzz with the possibilities
of change. Among my fellow students, there was a good deal of interest in the phenomenology of
Edmund Husserl and Maurice Merleau-Ponty, well-thumbed copies of Aldo Leopold’s *Sand
County Almanac* were in circulation, and when Ian McHarg’s *Design with Nature* appeared in 1969
its “personal testament to the power of sun, moon, and stars, the changing seasons, seedtime and
harvest, clouds, rain and rivers, the oceans and the forests, the creatures and the herbs” struck a
resonant chord. There was much that attracted us in its claim that “our eyes do not divide us from
the world, but unite us with it. . . . Let us then abandon the simplicity of separation and give unity
its due. Let us abandon the self-mutilation which has been our way and give expression to the
potential harmony of man–nature. The world is abundant, we require only a deference born of
understanding to fulfill man’s promise. Man. . . . must become the steward of the biosphere.”
Seeking escape from the path on which I had embarked, and recognizing, belatedly, that I was
more at ease seeking understanding in the past than in prescribing the future, I sought solace in
historical geography.

In a course on American cities taught by Jim Lemon, I encountered David Ward’s work and
learned of the “Wisconsin School” of historical geography led by Andrew Hill Clark. I found
much that interested me in their approach to the past, although friends who were focused on
contemporary issues showed little mercy in twisting a common phrase to sardonic purpose by suggesting that the best a historical geographer could hope for would be an understanding of “where it was at.” It was a joke that worked on several levels. The spatial-analytical tide still ran strong, and its proponents believed that they were carrying geography to new analytical respectability. Self-styled radical geographers were demanding “relevance”—engagement with urgent current issues—of the field. So historical geography was the subject of trenchant criticism from several quarters of the discipline, some of which prompted Cole Harris to essay an important response, and all of which generated a great deal of lively debate.31 As the 1960s gave way to the 1970s, the Toronto department of geography offered a wonderfully dynamic, challenging intellectual environment in which to be a student.

Finding Marsh in Canada

As I sought to reconcile my interest in historical geography with the clamour of the times, someone suggested I read George Perkins Marsh. His was a historical treatment of environmental issues, and Man and Nature was back in the limelight. Harvard University Press had reprinted the book just a few years before, to mark the centenary of its initial publication and David Lowenthal was quick to endorse Mumford’s view of Marsh as “the fountainhead of the conservation movement” in his introduction to the now readily available volume. Attention was also drawn to Marsh’s work by former U.S. Secretary of the Interior Stewart Udall’s characterization of it as “the beginning of land wisdom in this country” in his widely read and influential The Quiet Crisis. Man and Nature, announced the back cover of the Belknap Press edition, was “the first book to attack the American myth of the superabundance and the inexhaustibility of the earth.”32

By this time I had become interested in the migration of New Englanders to the lands from which the Acadians had been removed by le grand derangement of 1755, and was both intrigued and informed by Marsh’s account of “land artificially won from the Waters,” which seemed to me to add important dimensions to the discussion of Acadian diking (land reclamation) on the Bay of Fundy in Andrew Clark’s recently published Acadia.33 But therein lay a dilemma that I neither fully understood nor had the capacity to transcend at the time. Despite my flirtation with spatial analysis as an undergraduate, I had relished geography’s capacity to integrate the human and the biophysical. Rather unsuspectingly, I had been beguiled by what little I had read of those who worked across this interface early in the 20th century to develop a material–ecological perspective on human–environment interactions, and I had produced my best undergraduate essays on topics related to this theme. But as I encountered it, historical geography in North America paid little attention to ecological and environmental questions. For all of the discipline’s lip service to the importance of the “man–land tradition,” members of the “Wisconsin school” focused, fairly resolutely, upon the spatial patterns of ethnic group settlement and economic activity.34

Only later did I recognize the reasons for this. The story is a complicated one, but it has much to do with Richard Hartshorne’s efforts to identify and codify the field in The Nature of Geography (1939) and its sequel, Perspective on the Nature of Geography (1959).35 Taking his lead from a particular reading of early German geographers, Hartshorne argued that geography was the study of areal differentiation (the variation in phenomena from place to place) on the surface of the
earth and that it had two major component parts: systematic studies (of particular phenomena: climate, vegetation, agriculture, cities) and regional description. Initially, Hartshorne allowed no place for time in geography. As he saw it, the field was concerned with patterns and places; processes and people were for others to investigate. Some, including Sauer and Clark, resisted this narrow formulation, and in 1959 Hartshorne begrudgingly conceded the possibility of certain limited forms of historical-geographical study, focused on small isolated territories and concerned with the geography of areas at particular times in the past. Ultimately, however, it was the widely honoured division of the subject into systematic and regional branches that spelled the end, as the English geographer Jack Langton later noted, of the earlier materialist–ecological conception of “geography as an integrative discipline concerned with the ways in which [hu]mankind, through work, is related” to the environment. Such a view of the field, essentially humanistic in its search for “understanding” of complex circumstances and intertwined relationships, is incompatible with the view developed by Hartshorne and enshrined and elaborated by others that “geography is concerned with the explanation of spatial patterns.”

When I moved the focus of my scholarly interests from the marshlands of the Bay of Fundy to the forests of New Brunswick, I agonized again over the tension created by my interest in human modification of the environment and the prevailing emphases and expectations of the field into which I was writing. Marsh’s long disquisition on “the woods” (it accounts for about a third of Man and Nature), full of arcane facts and striking insights, was a continuing source of challenge and inspiration. So too was Roderick Nash’s Wilderness and the American Mind, published in 1967. But no one I knew ever uttered the phrase “environmental history.” Although retrospective accounts of the emergence of this new historical field frequently point to Nash’s book as foundational, it was seen in the late 1960s and early 1970s as a contribution to the then vibrant field of intellectual history. Although I spent many weeks in the botany and forestry libraries of the University of Toronto, reading about the spruce-fir forests of Maine, the relation of grey birch to the regeneration of white pine, the place of fire in the ecology of pines, the effects of wind on the vegetation of Chignecto and other fascinating things, I was ever-conscious, as I wrote the dissertation, of disciplinary norms and the sharp editorial pens of my advisors. The result was a compromise. I thought of my project as a work in historical geography, designed to document the imprint of the timber trade on the landscape, and concerned with the transformation of the colonial environment. There was a certain amount of both forest ecology and intellectual history in the finished dissertation, but not enough, in retrospect. When I came to revise this rather sprawling, multifaceted work, the route to probity and coherence turned the central argument of Timber Colony in a different direction again, to elucidate the relations between people and place as they were affected by the spreading tenets and technologies of early industrialism.

As I look back on the making of the dissertation, I recall being influenced, at the outset, by Marsh’s brief discussion of the “Principal Causes of the Destruction of the Forest” in the new world, which alluded both to agricultural clearing and the basic cost–price equation of the timber market, particularly the observation that because the value of trees “increases with [their] dimensions in almost geometrical proportion” the “tallest, most vigorous, and most symmetrical . . . fall the first sacrifice,” and that “the impatient lumberman contents himself with felling a few of the best trees, and then hurries on to take his tithe of still virgin groves.” I was also struck by his comments, essentially
en passant, about the micro-scale effects of shanty clearings, dams, and river driving, as well as his scattered ruminations on the importance of understanding systems of forest governance and his final observations on the instability of American life: “the landscape [was] as variable as the habits of the population” but it was, thought Marsh, time “for some abatement in the restless love of change” that made Americans an almost nomadic rather than sedentary people.43

I pursued most of the questions implicit in these observations, with more or less success, in the New Brunswick archives. Careful analysis of timber license records revealed the rapidity of the lumberers’ initial surge upstream and through the forest in search of “still virgin groves”; early efforts to administer new world forest resources according to ideas shaped by centuries of experience in very different English contexts proved fascinating (and yielded one of my earliest scholarly articles); the effects of logging and sawmilling on ecologies and landscapes intrigued me mightily, but a paucity of sources meant I could not say as much about these things as I wished.44 In the end, I also came to realize that there was just too much in Marsh—ranging from speculation about the first forest clearing by humans and sections on the “electrical influence of trees” and “Trees as a Protection against Malaria” through pages and pages of detailed commentary on European trees and torrents and sediments and “sylviculture”—and that I had too little experience to discover definitive answers to some of the things he encouraged me to know in the thickets of the still barely organized provincial archives. Finding Marsh rich in facts and ideas but difficult to digest, I sought more direct help in the works of other scholars—such as J. Willard Hurst’s pioneering inquiry into the legal history of the Wisconsin lumber industry; the Canadian “staples theorists”; the lively prose of A.R.M. Lower; and reflections on the practice of historical geography by H.C. Darby—which were more useful in addressing the very practical challenges entailed in shaping disparate fragments of archival evidence into a form both logical and familiar enough to gain the assent of dissertation examiners.45

Encountering Marsh in New Zealand (and New Zealand with Marsh)

After submitting “The Assault on the New Brunswick Forest” in two volumes to the University of Toronto in December 1973, I had not been long in my first academic job in New Zealand before the editor of the national geographical journal asked me to review a popular history of the country’s forest industry. I had little local knowledge with which to do this, and I wondered, secretly, whether the editor believed that if I knew about one tree then I knew about them all. But in the pages of that book, Kauri to Radiata, I discovered that a series of lively speeches on the subject of forest conservation, delivered in the House of Representatives between 1868 and 1874, included several familiar (albeit often unattributed) phrases from Man and Nature.46 Intrigued, I began to read my way through the record of New Zealand parliamentary debates, to track down contributions in related vein in various New Zealand publications and to trace the biographies of several of the main protagonists in the debates. Quickly I realized that Marsh had reached New Zealand long before I had, that his words had not only been carried along the slopes of the Himalaya and into Tibet, but also across the ocean to these isolated islands in the southern Pacific
in remarkably short order and with striking consequences. Indeed, one route of their passage was through the Imperial Forest Service in India, and in a way that seemed remarkable to me at the time, they were clearly critical in persuading legislators in a still sparsely settled young country to attempt to check the heedless destruction of trees and to decree the establishment of state forests.

The story, as I saw it, was this: in the late 1860s, a small but influential group of educated New Zealanders, lawyers, botanists, engineers, natural history enthusiasts, and so on, became aware of *Man and Nature*. All about them, in this recently settled place (sealing, whaling, and missionary activity had brought Europeans to New Zealand long before it became an official British territory in 1840, but “organized” colonization gained momentum only later in that decade), they saw evidence of environmental instability. Forest and brush were being cleared for sheep and settlements. Braided rivers flowed through enormous beds of shingle; flooding seemed to occur more frequently than they were accustomed to. Reading Marsh and gazing out of their windows, they put words and landscapes together to echo *Man and Nature’s* dark warnings. New Zealand offered a fine example of “the equilibrium arrived at [by nature being] disturbed with more or less violence when man appears as an actor in the scene”; the colony was “fast becoming an unfit home for its noblest inhabitant.” Historians would conclude that New Zealanders had “received a fertile country, but by criminal want of foresight, transmitted to posterity a desert.”

In truth, many of these claims misread the New Zealand landscape. Large parts of the South Island are volatile country, in which recent orogenic uplift (associated with the movement of the earth’s crustal plates) has generated active erosion and the downslope/downstream movement of enormous amounts of detritus. Here, at least, the claim that large rivers once ran placidly through the countryside before they were turned into raging torrents by the destruction of the forest, owed more to “theory” (the transference of Marsh’s arguments from one environment to another) than to “fact.” Whether they suspected as much or simply refused to see their prospects blighted by the imposition of restrictions on resources and development, some New Zealanders resisted the ready conclusions of those who adopted and adapted Marsh’s ideas during the 1860s and 1870s. But in the short term, at least, they were unable to resist the tide. “The cogency of Marsh’s illustrations, the irresistible weight of his conclusions and the sweep of his geographical insights,” I wrote in an article reporting my first New Zealand encounter with Marsh, carried the day for those who enacted the *Forests Bill* in 1874.

Drawn to further work by this encounter, I projected a larger study of the environments and forests of New Zealand, but it was substantially aborted by my return to Canada in 1976, and the accumulation of other demands on my time. Still, my interest in this part of the world remained high, not least because it offered magnificent scope for investigation of the sorts of environmental historical geographical problems in which I was increasingly interested. To be sure, the rapid and radical human transformation of the New Zealand environment had already been noted, and explored in a preliminary way by historical geographers. As early as 1941 Kenneth Cumberland had captured the essential elements of this story in his article “A Century’s Change: Natural to Cultural Vegetation in New Zealand.” Andrew Clark’s doctoral dissertation, completed at Berkeley, had charted some of the dimensions of this transformation in considering *The Invasion of New Zealand by People, Plants and Animals* and a few years on, Alfred Crosby, one of the standard bearers of the fast emerging field styled environmental history, devoted a chapter of his widely noticed

Travels with George Perkins Marsh: Notes on a Journey into Environmental History 11
and influential book *Ecological Imperialism* to New Zealand. But there was plenty of scope for further work.51

Marsh identified “The Transfer, Modification and Extirpation of Vegetable and of Animal Species” as one of the major means by which human actions altered physical geography in 1864, and in the 1990s I had opportunity to travel again in his company when invited to contribute to the *New Zealand Historical Atlas*. With Marsh’s wonderful phrase “vegetable emigration” in memory, and his insistence that “whenever man has transported a plant from its native habitat to a new soil he has introduced a new geographical force to act upon it” in mind, I jumped at the chance to prepare a plate on “The Introduction of Species.” In his “Transfer” chapter, as in other sections of *Man and Nature*, Marsh proceeded through the accumulation of detail: approximately 700 new species of plants had been introduced to the “lonely island of St Helena” in the 350 years since its European discovery in 1501; “the Canada thistle, *Erigeron Canadense* [*Cirsium arvense*], is said to have sprung up in Europe two hundred years ago, from a seed which dropped out of the stuffed skin of a bird.” Exotics, “transplanted to foreign climates . . . often escape from the flower garden and naturalize themselves . . . among the pastures.”52

Reading such phrases led me to recognize one of the great gaps in the study of exotic species introductions to New Zealand. Contemporary botanists and natural historians had been much interested in the phenomenon, but their interest began with the timing of plant or animal arrivals in the islands and largely stopped at the assignment of plants to the list of indigenous or exotic species. As a geographer, Andrew Clark had sought to chart the spread of introduced people, plants, and animals in the South island, but the scale of his analysis remained relatively broad—he mapped sheep and cattle numbers and the acreages of the leading grain crops from the census but said little about the detailed mechanisms of plant diffusion. To address this gap, I looked again at one of the most remarkable works of environmental history published in New Zealand, W. H. Guthrie-Smith’s *Tutira*.53 I had acquired a copy of this classic, lovingly detailed and entirely idiosyncratic natural history from a tiny bookseller in a small town near the Hawkes Bay sheep station that gives the book its title while travelling through the North Island in 1974. Now I reread it, and with Marsh in mind was able to mark new, detailed contours onto the map of plant and animal diffusions into this part of New Zealand. Fleshed out in an essay published in the *Journal of Historical Geography*, this proved to be one of my most satisfying pieces of research, and *Tutira* became one of those areas of the world for which I hold an abiding affection.54

**Where We Have Been—and Where We Are Going**

When I arrived in Toronto, budding concern about the environment had only just begun to seize the public imagination, and had not yet ripened into the consumer-oriented groundswell of environmentalism, differentiated from the earlier, producer-driven progressive conservation movement, the roots of which many traced back to *Man and Nature*.55 When I bought my copy of *Tutira*, the book once familiar to most New Zealand schoolchildren had been largely forgotten. When I began my academic career, research on human transformations of the earth was regarded as part of a venerable but fading geographical tradition, and the euphonious term “environmental history” had hardly been used in its now-familiar sense. When the American historian Richard
White sought to inventory work in this new arena of scholarly endeavour in 1985, he adopted a
catholic view of the field and spent a summer reading a couple of hundred pieces of writing.56
When American scholar John McNeill was asked, early in the new millennium, to map environ-
mental history on a global scale, he quipped that he would need a century of summers to repeat
White’s approach.57 Since 1997, the story of Guthrie-Smith and Tutira station has been the subject
of an effective display in the Hawkes’s Bay Museum in Napier, and it has also been celebrated in a
program prepared for NZTV’s Country Calendar. Tutira, the book, has been reprinted as a Weyer-
haeuser Environmental Classic by the University of Washington Press, along with a revised and
expanded version of Lowenthal’s Versatile Vermonter, now titled George Perkins Marsh, Prophet
of Conservation. What a long way we have come. Environmental concerns that found small but
contested voice at Pollution Probe meetings in the basement of Sidney Smith Hall of the University
of Toronto have become global, urbane, and high profile (think of the Kyoto Accord and Al
Gore’s An Inconvenient Truth), and interest in environmental history has expanded beyond the
wildest imaginings of many of those who were around at its inception. But this is no cause for
complacency.

In his Foreword to George Perkins Marsh, William Cronon ranks Man and Nature, Silent Spring,
and A Sand County Almanac as the three books by American authors “that have had the greatest
impact on environmental politics and on the struggle to build more responsible human relations
with the natural world.”58 It is hard to argue with this. But it is well, I think, to remember that
books are read differently at different times and in different places, and that their reputations and
influences are far from constant. Indeed, Cronon ranks Marsh’s book ahead of works by Henry
Thoreau and John Muir on the strength of its 19th-century impact and despite the fact that it “is
today little read even by those who still remember it.” These are murky waters. Much of the con-
tent of Man and Nature is, inevitably, dated; subsequent research has shown that several of its
arguments are misguided and that many of its claims about human modifications of the earth
need to be reconsidered. For all the stimulus, inspiration, and insight found in Marsh’s ideas over
the years, Man and Nature is now generally read (or at least discussed) with doubt in mind—
especially doubt about the significance of the book’s contribution and the accuracy of the claims
made for it.

Was Marsh really “the fountainhead of the conservation movement” as Lewis Mumford sug-
gested? Does he warrant the status of “prophet” accorded him by David Lowenthal? Just as I
discovered that my English education had left me ignorant of George Perkins Marsh, others have
argued that Marsh’s importance has been inflated and that his reputation in these spheres rests
upon a peculiarly limited American view of attitudes toward nature in the past. Oxford-, London-, and
Cambridge-educated Richard Grove stands at the forefront among those advancing this line
of argument. By his account, most readily accessible in Green Imperialism: Colonial Expansion,
Tropical Island Edens and the Origins of Environmentalism, 1600–1860, “western environmental
concern and concomitant attempts at conservationist intervention” long predated the publication
of Man and Nature.59 Far from being unleashed upon the world with the force of revelation in
1864, “reasoned awareness of the wholesale vulnerability of the earth to man” as well as the idea of
state-directed environmental (or resource) conservation emerged gradually from the experience
of colonial encounters with tropical regions and island ecosystems well before the 19th century.
Grove's argument is complex, his research is impressive, and his conclusions are arresting. The ramifications of his work point far beyond the need to re-evaluate Marsh's contribution in a global context, to emphasize the importance, for all who would pursue environmental historical studies, of respecting local differences and avoiding easy assertions about the universal destructiveness of colonialism or the monolithic character of ecological imperialism.

Others have wondered whether Marsh was the prescient “great man” possessed of unanticipated and unparalleled insight (as Lowenthal and others have tended to see him), or a man of his time who simply gave vivid expression to ideas already in circulation. Richard Judd of the University of Maine has done most to advance this reconsideration, particularly in his book Common Lands, Common People, which argues that ordinary people living in the countryside and working the land of early New England developed grassroots strategies of resource conservation as integral elements of their local cultures well before the middle of the 19th century.60 Elsewhere, Judd has extended his argument to insist that ecological principles were “common currency in early American natural history,” and that many of Marsh’s most cogent claims were foreshadowed in the writings of this amorphous group of people.61 I have contributed my own mite to this process of re-evaluation, focusing upon the contribution (published in London, England, in 1835) of one Titus Smith of Halifax, Nova Scotia, who detailed human impacts upon the vegetation of that colony and foreshadowed the rhetorical gambit from which Man and Nature drew some of its potency by offering a telling comparison between his newly settled surroundings and some of the longest-settled, once-fertile but then desiccated and unproductive fringes of the Mediterranean.62

Lowenthal has responded to some of these efforts to “reposition” Marsh, particularly those that give credit for the origins of conservation to “unsung hoi polloi on the mainstream’s margins.” Dismissing them as “put-downs,” he clings to the conviction first expressed in his introduction to Man and Nature that “anyone wielding a hoe or an ax knows what he is doing, but before Marsh no one had assessed the cumulative effect of all axes and hoes” and denies the credibility of arguments attributing the origins of conservation to “oceanic islands and Oriental mysticism,” or the wisdom of “voiceless underlings.”63 These are lively and interesting debates, but insofar as they seek to identify the sources of particular insights or to assert primacy in the origin of ideas (or are read as doing so) they are ultimately futile and largely irrelevant. As the historical geographer and forest historian Michael Williams has rightly observed, all such efforts are as frustrating as they are fascinating. Clarence Glacken’s compendious tome Traces on the Rhodian Shore notes that some inhabitants of the Ancient World understood humans to be geographical agents and that this idea gained adherents through the medieval period. Hints and allusions are everywhere, and depending upon the weight and significance one affords them it is possible to conclude that there is “nothing new under the sun.”64

Rather than end there, it is important to ask why, how, and where ideas have gained currency and to excavate the different meanings attached to them in different circumstances. In this light, the recent debate about Marsh’s contribution has much more to do with, and is more revealing of, current sensibilities than it is about his originality and influence. Few deny that Man and Nature was important in shaping attitudes toward the environment in the 19th century. But many radical environmentalists of the late 20th century have looked askance at Marsh’s reputation as a well-spring of the conservation movement. Conservation is equated with management and many of
those active in the modern environmental movement are deeply distrustful of managerialism. Science and expert knowledge are regarded by many radical environmentalists as part of the problem rather than the solution to environmental problems, and earlier celebrations of Marsh’s role in promoting awareness of the need for stewardship of the earth have made him “more an impediment than a role model” for the causes espoused by today’s reformers. The growing influence of “critical theory” has made work in the humanities much more reflexive and attentive to “difference.” Sweeping claims, of authority or impact, are treated with suspicion and there is growing recognition that science and other forms of inquiry need to be “put in their place.” Grove would not deny the influence of Vermont and the Mediterranean littoral in shaping Marsh’s thinking, but argues that other places, other environments, other geographies led other observers to their own, and earlier, conclusions about human modifications of the earth. He also insists (and my experience suggests) that American commentators placed the American Marsh on a pedestal of their own making, and that his 20th-century reputation, much as it waxed and waned with changing American environmental sensibilities, was substantially an American one. Scholars have also grown uneasy with the traditional view that history is the biography of great men. Times have changed: social, women’s, labour, postcolonial, and other hyphenated histories have let subalterns speak, and stressed the importance of listening to “voiceless underlings.” In doing so they have opened new windows on the past—while rendering it a whole lot more complicated and creating space for new stories that serve, as do all historical accounts, to (re)present the past and facilitate new visions of the future.

All of this bears upon the journey into environmental history that I have sketched in these pages. It is, of course a personal, even somewhat eccentric, story. But it does serve to illustrate a number of points that may be useful to those embarking on their own expeditions into new academic fields and their literatures. First, all of these subjects or disciplines are artificial and malleable; they are human inventions or “social constructions” and the preoccupations and procedures of their practitioners are ever-evolving. Some disciplines have claimed to study “naively given sections of reality”—history, time; geography, space—but the boundaries between such territories, and especially between history and geography, are blurred and indistinct, and increasingly disregarded. Historical geography and environmental history explicitly seek to straddle this false frontier and are thus closely allied, even cognate endeavours. For all that (and second), disciplinary concerns, shifting though they may be, are not inconsequential. Insofar as historical geographers working in the human–environment tradition stand with historians in the interdisciplinary space of environmental history, their inquiries tend to fall more squarely within the realm of what John McNeill calls materialist environmental history (emphasizing changes in biophysical environments and their influence upon human societies) than the cultural/intellectual (considering “representations and images of nature”) and the political (concerned with law and state policy) aspects of the field.

Third, it is as well to recognize that although “environmental history” emerged as a distinct, named, subfield of inquiry in the United States in the 1970s and many attribute its development to the rise of environmentalism, the field developed later in Canada, and (like Man and Nature) had precursors and antecedents in both countries. The Kansas historian James C. Malin (1893–1979)—“perhaps the first historian to write as an ecologist”—and Manitoba-born William
L. Morton (1908–1980) certainly warrant inclusion in any longer pedigree of the field. So too do a handful of geographers on both sides of the border, including Carl O. Sauer and J.G. Nelson, although for reasons discussed above, historical geographers largely abandoned work on the environment in the 1960s, just as public interest in environmental issues increased and historians found exciting new furrows to plough in human–nature relations.

Fourth, the world unfolds in unpredictable ways: time and chance open unforeseen opportunities and challenges. Past and present, those who act in the world—whether wielding hoe or axe, shaping or resisting societal trends, seeking an education, campaigning for a cause, or interpreting circumstances—act in contexts shaped by particular events as well as by their times, places, pasts, and personalities. This was as true for Marsh and for me as it is for you the reader. Neither certainty nor autonomy is complete. As the 17th-century metaphysical poet John Donne had it: “No man is an island, entire of itself; every man is a piece of the continent, a part of the main.” Although Marsh has been at my side for many a year, and his presence has shaped my journey, he never determined its direction or outcome. Other, often unforeseen, influences worked their effects in ways not entirely evident even to this moment. Never at any point along this trajectory could I have guessed with any degree of specificity what I would be engaged with five years into the future. Despite that (and fifth), historical scholarship is cumulative and collaborative. Although “every generation writes its own history” in reflection of the specific concerns of people (scholars and students, writers and readers) in a particular time and place, ideas and influences flow, from books, articles, and lectures, from generation to generation. Established ideas must be subject to critical scrutiny. They might be challenged, discarded, built upon, or refined. But they should not—indeed, cannot—be ignored. Even the most radical reinterpretation is by definition an engagement (in an ongoing conversation) with what has gone before, and what lies ahead will emerge from the past.

So let us then turn, finally, to bring Marsh into dialogue about the future. Decades ago, he argued that people were destroying their dwelling place and that the earth was “fast becoming an unfit home for its noblest inhabitant.” Recent years have seen a dramatic resurgence of similarly apocalyptic rhetoric about the prospects for the future of humankind. Jared Diamond’s Collapse is perhaps the best known of these contributions to public debate, but others, including Ronald Wright in his 2004 Massey Lectures offering A Short History of Progress, have argued similarly that “our civilization” is on a ruinous path and that, like the inhabitants of Rapa Nui (Easter Island), Norse Iceland, and ancient Sumeria before us, we are bound for destitution (or “impoverished productiveness” and “climatic excess” as Marsh had it). In this view, the past is littered with train wrecks offering eerie reminders that “humankind is . . . on a collision course with the natural world.”

Certainly, increasing numbers of technologically ever-more-powerful people have had an enormous impact on the biosphere. But should the future simply be envisaged (with little attention to questions of scale and intellectual and technological context) as a giant-screen replay of a past in which societies fail through naïveté or hubris? For all the sinister parallels Marsh drew between old world and new, he understood that not all the “physical revolutions . . . wrought by man” were “destructive to human interests” and he appreciated the need to act: “desolation . . . awaits . . . unless prompt measures are taken to check the action of destructive causes already in operation,”
he wrote in 1864. Although the message of *Man and Nature* has been interpreted in apocalyptic terms, a considerable part of this great book is devoted, as Marsh signalled in its first sentence, to suggesting “the possibility and the importance of the restoration of disturbed harmonies and the material improvement of waste and exhausted regions.” For Marsh, “Man” the disturber was also “Man” the restorer. Convinced that “sight is a faculty; seeing an art,” Marsh crafted his accounts of desiccation and decline in the Mediterranean basin as part of a larger story that would enable his contemporaries to see how dramatically the earth is modified by human action; how societies and environments interact; and how valuable an understanding of the past can be in defining a better future.72 These remain among the most important goals of those interested in the history of human–environment interactions to this day.

**DISCUSSION QUESTIONS**

1. Why does each generation rewrite history?
2. Why has environmental history emerged as a distinctive field of study?
3. Environmental historians sometimes claim that their field is distinguished by the fact that it “recognizes the agency of nature in human affairs.” What does “agency” mean? Do you think that nonhuman entities or forces can be agents? Why or why not?
4. Can you provide additional examples (beyond those offered by environmental history and geography) of the ways in which academic disciplines are “malleable” and “social constructions”?
5. What is “environmental determinism” and how does Marsh’s *Man and Nature* stand in relation to this conception of human–environment relations?
6. What is at stake in the debate over whether George Perkins Marsh was the “fountainhead of the conservation movement”?
7. Reflecting upon the narrowness of focus and extreme specialization evident in much research, some commentators have said that recent scholarship seeks to learn more and more about less and less. Is the broad sweep of *Man and Nature* simply a reflection of an earlier (less-specialized) era, or does environmental history encourage researchers and readers to “see the world whole” again?
8. Why is it important to remember that Marsh saw humans as capable of restoring as well as of disturbing nature?

**NOTES**

3. Lowenthal, *Versatile Vermonter*, p. 246. Most of the detail in this and the following paragraphs can be found in this biography.


20. The contributions, interest, and approaches of these individuals can best be traced in the several histories of geography. Among these Ronald J. Johnston, *Geography and Geographers: Anglo-American Human Geography since 1945* (London: Edward Arnold, 1986, and subsequent editions through 2004) is perhaps the most useful; see also Ronald J. Johnston, *Philosophy and Human Geography: An Introduction to Contemporary Approaches* (London: Edward Arnold, 1986. David Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise* (Oxford, UK; Cambridge, MA: Blackwell Publishers, 1993) is also highly regarded. One of the volumes with which I was familiar as an undergraduate was T. Griffith Taylor, ed., *Geography in the Twentieth Century: A Study of Growth, Fields, Techniques, Aims and Trends* [with chapters by Kenneth Hare, Donald F. Putnam, and George Tatham, all of whom
were significant contributors to the development of geography in Canada] (New York: Philosophical Library, 1957).


33. The results of this work were summarized in Graeme Wynn, “Late Eighteenth-Century Agriculture on the Bay of Fundy Marshlands,” *Acadiensis* 8 no. 2 (1979): pp. 80–89.

34. So, for example, Preston James asserted in the “Introduction” of James and Jones, eds., *American Geography*, that efforts to apportion knowledge among the natural sciences, the social sciences and the humanities “is intolerable for geographers, for that must deal with man as well as that which is not man (now commonly defined as nature), and the two are intimately intermixed wherever man has been on the earth . . . Actually there is just one kind of geography,” p. 15—but then continues to say that practicing this unitary geography is impossible: “each individual scholar must define a subdivision or subdivisions of the whole for his own purposes. It is necessary to specialize both areally and topically,” p. 16.


36. For a critique of this aspect of Hartshorne see Joseph A. May, *Kant’s Concept of Geography and Its Relation to Recent Geographical Thought* (Toronto: Published for the University of Toronto Department of Geography, University of Toronto Press, 1970).

37. These developments are reviewed in Conzen, “The Historical Impulse,” and Wynn, “The Writing.” The phrasing is an allusion to Graeme Wynn, ed., *People Places Patterns Processes: Geographical Perspectives on the Canadian Past* (Toronto: Copp Clark Pitman, 1990) to which the “Introduction” (pp. 1–37) also provides an annotated guide to relevant literature.


40. Intrigued by Nash and intellectual history (a field I had not previously encountered), I mooted the idea of taking a graduate course in the field, but this was looked upon somewhat askance; as it happened, Carl Berger, whose tutelage I would have sought, was on leave that year. The work in the forestry and botany libraries was not in vain. The chair of my dissertation defence was from the Faculty of Forestry. When he asked me some pointed questions about the reproduction of pine trees and other such things, my geography committee members thought I was sunk, but I was able to muster responses sufficient unto the day (or my interrogator had a kindly disposition!).


50. Some of what I had in mind was later undertaken for his University of Canterbury Ph.D by Michael Roche, who was an undergraduate student in geography during my time at that institution. See his *Forest Policy in New Zealand: An Historical Geography, 1840–1919* (Palmerston North: The Dunmore Press, 1987).


70. An attempt to order the Canadian literature in the field is made in Matthew Evenden and Graeme Wynn, “54,40 or Fight: Writing within and across Borders in North American Environmental History,” in Paul S. Warde and Sverker Sorlin (ed.s) *Nature’s End: History and the Environment* (Palgrave, forthcoming 2008).


**Further Reading**


Ice, Worms, and Dirt: The Power of Nature in North American History

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The 2004 tsunami that killed over 250,000 people living along the shores of the Indian Ocean sent a shock wave through western culture. And now Hurricane Katrina has, on a much smaller scale, done the same for people in the United States. In both cases we learned how vulnerable our vaunted technological civilization is to the power of the natural world. Historians are scurrying to find examples from the past when other natural calamities similarly destroyed lives, upset the political order, and challenged religious beliefs in divine providence. They point to the volcanic explosion of Krakatoa in 1883 or the Lisbon earthquake of 1755 or dozens of El Niño effects that, besides causing immense human suffering, may also have brought significant change to the social or intellectual order. A new field of “disaster history” has sprung up, with the usual mix of serious scholars and publicity-seeking charlatans vying to say just how powerful nature has been as a force in history.

But nature not only inflicts us with sudden tragic events that kill or disrupt or impoverish. Far more of nature’s power comes to us with the slow, relentless, gradual force of a glacier in motion or a continent in drift and over scales of time that far transcend our written records or memories, scales that often could have been revealed only by modern scientific methods. That power is not simply destructive, although it is always simply indifferent. We would not number over six
billion people if, on the whole, nature had been against us, or if most planetary forces had been hostile to life.

Quite the contrary, Earth is wonderfully fit for life. All civilizations have thrived on that fitness, although seldom acknowledging just how much their success depended on natural resources, on soil fertility, on a generally stable atmospheric and climate system, on many organic allies, and on the services that nature daily provides.

That hidden power of nature affects far more than primitive hunters and gatherers or vulnerable peasant farmers. It has even shaped the growth and development of modern nations like Canada and the United States. Politicians, economists, business people, and academic humanists could all profit by taking a deeper look at the continent of North America, this huge bowl in which we live, stretching from Arctic tundra down to green tropical mountains.

What is this place and what has it allowed people to do here? What terms did an ancient and dynamic nature set for human settlement, economic development, and cultural evolution? How is that nature still influencing the way we live today?

An Icy Beginning

Among other things, this continent has been shaped and influenced over its entire extent by the Ice Age, and much of what we have been allowed to do here reflects that geological epoch. Yet the Ice Age, or the Pleistocene, has almost never figured into the histories that academic historians have written about North America. Historians in the United States talk about the colonial period, the Civil War era, and the New Deal; historians in Canada talk about Confederation or the era of Mackenzie King—but virtually never about the Ice Age and its implications for these nations’ stories.

Yet no less than four separate times over the past million years heavy snow has fallen, accumulated, and compacted into immense sheets of ice, and those sheets have crept southward, crunching everything in their path. They have buried rich, luxuriant forests that once grew within the Arctic Circle. They have scraped dark soil down to bedrock and pushed and piled it somewhere else. Repeatedly, they have driven any creature that could walk or fly to warmer climes. Naturalist Peter Farb has described a glacier as a “monumental plow upon the land, scooping out depressions in the earth and grinding boulders down to pebbles.”¹ Our historians do talk now and then about plows, but those Ice Age plows exceeded anything we have ever invented. They were capable of moving entire hills and rivers, laying bare hundreds of thousands of square miles, remaking the face of a continent.

When the rate of melt exceeded the rate of advance, the ice began to retreat, dropping its burden of earth and rock like a dirty blanket. The blanket was very thin in New England, but in what we now call the Midwest it was several hundred feet thick. Mountains emerged from the ice scarred and scraped clean. Eskers, hogbacks, and drumlins testified to the direction of glacial retreat. The largest depressions left behind became lakes, and the largest of them became the Great Lakes, containing more fresh water than anyplace else on earth. Rivers flowed out of those lakes, seeking the ocean, and after each retreat the continent showed a new set of watery veins and arteries.

¹ Naturalist Peter Farb has described a glacier as a “monumental plow upon the land, scooping out depressions in the earth and grinding boulders down to pebbles.”
Scattered around North America today, in the high mountains of Colorado, California, Alaska, and Canada, are a few remnants of the last ice sheet. But it is to Greenland we must go to feel the full massiveness of the ice when it was at its peak. Greenland is really “Whiteland,” buried under a sheet of ice two miles thick. So also much of the North American continent once was buried—Montreal, New York, Toronto, Chicago, Winnipeg all occupying sites that once were deeply buried under the ice.

Surely that immensity of cold, hard whiteness, returning again and again, left a mark not only on the land itself but also on subsequent human history, influencing patterns of Canadian or American settlement and enterprise. But what was it, and how to make that legacy of the Pleistocene more visible and convincing? How should it influence our thinking about the history of Quebec, the St. Lawrence valley, or the whole continent? Where do we start and how do we start with this monumental epoch of our common environmental history?

A Counterfactual Account

One way to bring home the significance of the deep past might be to play a counterfactual game. My dictionary does not define “counterfactual,” but everyone probably knows what I mean. A counterfactual is an alternative past that never actually happened but that can help us, by comparison and contrast, understand better what did happen. It shows us that history might have gone in different directions, that nothing was foreordained to turn out exactly the way it has; at the same time, everything was caused and might have been turned out differently if the causes had been even slightly different. Environmental historians might use this counterfactual strategy by imagining an alternative geological history for the continent and then asking what that difference might have made in the human history we have lived and written about.

Begin by imagining a map showing the continent’s landforms and vegetation patterns. Its key features are, of course, the eastward-flowing Great Lakes and the St. Lawrence River, the north–south trending Rockies and Appalachians, with deserts, basins, and coasts filling in the rest of the picture. Usually, such a map just sits there inert and passive in our minds, a terrain fixed in time, completely nonhistorical. The rivers never stop running, the mountains never wear away, the eternal coasts front an unchanging sea. Actually, we realize when we think about it that the physical map of the continent has always been in flux. North America has always been undergoing profound change, though often the changes in the land take far longer to observe than the social or political changes that most historians choose to study.

Put a date of 1534 on our mental map, the year the Breton sea captain Jacques Cartier made his first voyage to the New World. Cartier, the first white man to penetrate the continental interior north of Mexico, provides our earliest written descriptions of the place, and they are filled with ambivalence, not surprisingly since his mission was to find a way to China. Cartier arrived at the rocky shore of Labrador in June, complaining that “there is nothing but moss and stunted shrubs.” Disappointed, he was “inclined to regard this land as the one God gave to Cain,” fit only for outcasts and murderers. Fortunately, he came back on a second voyage, which took him up the “great river of Hochelaga and chemyn de Canada” (later called the Saint Lawrence), where he glimpsed a more promising continent of extraordinary richness and fertility. Somewhere to the west, he learned from the so-called Indians, lay a kingdom as rich in minerals as Peru, a land that would make France as wealthy as Spain.
Unfortunately Cartier never saw that fabulous (and mythical) kingdom. He died in 1557 in his hometown of Saint Malo, probably after much fruitless dreaming about that faraway place. His countrymen subsequently fell into religious wars that for a long time distracted them from thinking about the nature of the New World.

But now run that 1534 C.E. map backward in time, say, to about 12,000 years before the present. In geological terms that was not so very long ago. What we now see on our mind’s computer screen is the last great sheet of ice covering the northern latitudes of the continent, which scientists call the Late Wisconsinan glaciation. Although at first glance it looks like one solid sheet, actually it is made up several discrete ice masses, the largest of which is the Laurentide Ice Sheet occupying the interior of Canada from Newfoundland to the Rockies and, if we go back 20,000 years before the present, reaching as far south as present-day New York City and across to Illinois and Wisconsin. A separate Cordilleran Ice Sheet covers the mountainous areas of far-western Canada. Most of Alaska is free of ice and supports a population of mammoths, horses, bison, musk oxen, and caribou on scanty vegetation.

Now imagine that our huge sheet of ice does not melt away so quickly, that nature keeps it there until the time when Monsieur Cartier is scheduled to arrive. Bring him along the Labrador coast in our counterfactual story, and what does he see? Ice and more ice. The land that God gave to Cain becomes more forbidding than ever—indeed, no land at all is in sight, only a wall of frozen water, with icebergs calving into the sea. Cartier might just as well have come to Antarctica. No Indian parties paddle out in canoes to meet him, offering to trade the beaver robes on their backs. In fact there are no Indians or beavers in what we call eastern Canada. There is no St. Lawrence River draining the interior. In a sense there is no interior.

Offshore, the natural environment is changed too. The Grand Banks, that famous shallow sea of upwelling currents that drew fishermen from England, France, and Portugal, has become dry land on our map. No codfish can swim there or attract fishermen. One such voyage would probably be enough for Cartier. He would sail straight home, never to return, and his fellow Europeans would remain indifferent to the New World not merely for a few decades but for centuries, perhaps even for millennia, to come.

All of this remapping is not completely imaginary. Such a glaciated place once really existed. Had that icy reality continued to exist just a little longer than it did, the effects of the New World on European civilization would have been profoundly different (presuming, of course, that any kind of civilization would have emerged in a Europe likewise buried under an ice cap stretching as far south as Italy or Spain).

The New World discoveries, with all their ramifications for European science, literature, economics, political institutions, food, and demography, came at a time when nature wonderfully cooperated, opening up a continent for Europeans to explore, seize, and fight about. Put another way, the natural environment allowed European expansion. It also allowed the spread of European plants and animals, which environmental historian Alfred Crosby has called “the portmanteau biota,” those introduced species, from smallpox and dandelions to pigs and cattle, that ran wild across North America and helped the Europeans take control.

But if we ventured farther into the purely hypothetical, to imagine a continent that never existed, we might appreciate even more how the power of nature might easily have made quite a
different impact on human history than it did. Bring, for example, that Laurentide Ice Sheet farther south on our mental map, beyond its true line of extent—bring it as far south as the state of Georgia. We now have created a place where teeth-numbing meltwater flows down both sides of the Appalachian Mountains. Now bring Europeans onto that imaginary scene and ask, what would they find and what would they do? What could they do in that colder, wetter environment?

They would find the eastern shoreline of North America extending far out into the Atlantic basin, as the amount of water in the ocean would be greatly diminished—taken up into the ice—and the continental shelf exposed. Coming ashore on that new raw edge of the continent, they would find tundra all around them, rather than a temperate land. The broad tidewater rivers would not look anything like the James or the Susquehanna, as earlier colonists knew them, whose banks were covered with hardwood forests festooned with wild grape vines and teeming with wild game. On the contrary, the scene would be bleak and cold; the growing season would be that of today’s Hudson Bay littoral.

What would that Virginia or North Carolina of a more extensive Pleistocene allow them to do? Clearly, they could not expect to recreate in such a place dominated by lichens and rock any kind of agriculture based on the major crops that have supported human civilization—wheat, oats, rice, maize, legumes, and millets. Importing the New World plantation system (first developed in Brazil to grow large-scale monocultures of sugar cane, tobacco, or cotton) would also have been inconceivable. The most daring entrepreneur would not dream of trying to grow in such a place plants requiring a long growing season, abundant rainfall, and temperate or subtropical weather. The plantation was invented to raise non-European crops in very warm latitudes for European consumption. The real South’s subtropical climate and soils provided the necessary conditions for such agriculture to flourish, but those conditions would not exist in our hypothetical Virginia of ice, tundra, and hairy mammoths.

If no plantation system were possible, then there would be no need for armies of field hands to cut and dry tobacco leaves or grind sugar cane into molasses. There would be no need of or excuse for indenturing poor Englishmen or for enslaving Africans and transporting them in chains. The natural environment of North America would not encourage such practices. We have no record of slave-based agriculture developing in a tundra landscape.

Slavery, to be sure, was a labour institution created by racist attitudes and an entrepreneurial economic culture, not by nature. Nevertheless, the natural environment of North America as it was fateful found in the late 16th and the early 17th centuries did play a significant role in the invention and evolution of a plantation economy based on slave labour. The natural environment allowed the spread of plantation agriculture from the Atlantic Tidewater westward to Texas. How can we understand that economy fully without taking into account the role of the environment? The plantation was at once an economic, social, and cultural relationship among different peoples and a response of people with capital to the possibilities set by nature.

When we begin to approach all of North American history in this more complicated way, we will begin to see how important ramifications followed the fact that the actual Virginia of history was free of ice and tundra. We will have to grant that even the history of race relationships in North America was not only formed by culture, ideology, and economy, but also had powerful environmental determinants.
Back to Reality

Canada, in contrast to the American South, did not offer suitable natural conditions for the plantation system. True, it had a few good possibilities for agriculture, once the glaciers had receded. Shortly after the last ice sheet melted away, the first indisputable evidence of humans begins to show up across Canada. Whether those archaic hunting peoples were newcomers to the continent or whether they were old-timers who had been here for thousands of years is not important to settle now. We do know for certain that as the ice melted they drifted eastward, skirting a 700-mile long inland sea, Lake Agassiz, which at one time dominated the centre of the continent. And we know that within a few thousand years after their arrival they had learned to cultivate maize in the Ontario lowlands, where there was a lot of good soil.

Over much of Ontario, however, the retreating ice sheet left a land scoured and bereft of fertility. A Precambrian basement rock, the Canadian Shield, now lay exposed in a vast semicircle bordering Hudson Bay, like a medieval breastplate, stretching from the mountains of northern Labrador south to the Great Lakes and then across Manitoba all the way to the Arctic Archipelago. It covered almost half the present-day nation. A hard, knobby plate, it featured low hills a few hundred feet high and hollows filled with muskeg swamp, peat bog, and mosquito-rich lakes and ponds, with a myriad of streams running helter-skelter across the surface. About all that would grow on the Shield were conifers and scattered hardwoods with shallow, spreading roots.

Confronted by such an inhospitable environment, agriculture could not get much of a foothold. Even overland travel was difficult. Long after the Europeans had arrived, the Shield continued to defy land transportation and was open only to canoes and snowshoes. Although one day a railroad would eventually be dynamited through the rock and an industrial economy would grow up around mines, pulp mills, and hydro projects, agriculture would never be widely possible there.

The long-lasting effects of the Ice Age explain better than any cultural or political factor the contrasting fates of Canada and the United States. Here are twin-sister nations with very similar cultural roots, two nations that are virtually identical in physical size (each covering nearly 10 million square kilometres)—yet they are radically dissimilar in population size (the United States has 10 times the population of Canada), in national wealth (again, the U.S. annual gross domestic product is more than 10 times that of Canada). And, following those material dissimilarities, they have become radically dissimilar in global power and in their role in global politics. I doubt that the difference between their current status in the superpower stakes is due to a deep moral repugnance toward imperialism north of the border and a deep lust for imperialism south of the border.

South of the Great Lakes the glaciers left behind that thick blanket of till noted earlier, one that over several thousand years developed into a fertile topsoil, the best and most extensive in the world. When the Europeans first encountered that soil, it was covered with tall prairie grasses and oak-hickory forests. Think what a difference such an abundance of fertility has made to the fate of the United States. Settlers with plows, wagons, and dreams of acquiring private property tended to go south of the international border, avoiding the rock-hard centre of Canada, seeking homesteads on the deep prairie soils of the American Midwest. A tinkerer named Cyrus McCormick followed their trails and invented mechanical reapers for harvesting their abundant crops of wheat. Eventually New World maize flourished even better than wheat in this place and proved a
more profitable crop to raise, leading to the fabulously productive corn belt. Pigs fattened on the maize and trotted to market, where they were sold as ham and bacon to the cities. Thus urban conglomerations grew out of the same soil as maize and livestock—Cleveland, Chicago, Minneapolis, Milwaukee, Des Moines, Omaha, Saint Louis, and Kansas City. So also did industries for milling grain, packing meat, or assembling automobiles. Millions of immigrants came to this region to work in those industries as well as cultivate the earth. Whatever their line of work, they came here mainly because it had rich, abundant soil.

Creating the American Midwest took prodigious human labour and great amounts of capital, but neither the labour nor the capital created the topsoil that made the Midwest possible. That soil was the work not only of the glaciers but also of billions of organisms working in the glacial till: earthworms, mites, nematodes, fungi, bacteria, and badgers, all of them toiling tirelessly over thousands of years. Their significance to history is beyond easy reckoning. It is not too much to claim that the earthworm has been at least as important to the making of the U.S. Midwest as Cyrus McCormick, John Deere, Jane Adams, Frank Lloyd Wright, or even Abraham Lincoln. Somewhere on the streets of Omaha or Chicago there ought to be a monument to the lowly earthworm whose labours in the earth went on long before any humans arrived in the place. How many worm workdays did it take to prepare the ground for civilization? How long can a civilization persist if it forgets its debt to this “labouring class” that has no arms, legs, or voices?

Bringing the Environment In

The fate of nations, I have been suggesting, depends on something more than political ideology or economic systems or human energy or ingenuity. It also depends on nature, starting with the awesome power of climate. Climate is not a fixed entity that we can take for granted; it wobbles and changes as the earth wobbles on its axis. Climate is volatile and chaotic, and as it changes so too do the terms of existence for human societies. So also change the images and mythologies that people use to explain who they are—the people of the long winters, the people of the desiccated plains, the people of Hurricane Alley. Even now, with all the assistance of modern technology at our disposal, we cannot evade that shaping power of climate or of other planetary forces. The future of our vaunted civilization may lie at the mercy of advancing or receding ice sheets, a rising waterline, a prolonged spell of drought, or a volcanic eruption.

But as the example of the Midwest-creating earthworm suggests, many nonhuman living organisms, micro and macro, also have a vital role in making history. They have done so by working together in intricate ways, over evolutionary scales of time, creating complex ecosystems into which humans step and adjust or stumble and fail.

Take away all of those big and little organisms, which together far exceed our own human numbers on the continent, reduce North America to a flat, inorganic, sterile piece of rock or a sandy plain devoid of all living things, and then ask yourself what the United States or Canada would be like today. Neither nation would be here. Nor would all their predecessor nations, the Inuit, the Navajo, the Micmacs, or the Choctaws.

Popular culture now and then recognizes the importance of those other than human organisms by celebrating them in stories, images, and icons. We have turned the beaver, the white pine, the
bison, and the cod into symbols as much as we have turned them into wealth. They have even become markers of national identity, proudly displayed on our money, flags, and corporate logos. Why should their significance not also be acknowledged more often in the books written by academic historians?

But including such organisms in history should not mean merely reducing them to cultural inscriptions in the history of ideas or popular iconography. They have been potent material agents in shaping our destiny. Modern science has revealed the extent and importance of the intricate biological interdependencies that have evolved in every habitat—the food and energy webs that link predator and prey, parasite and host, dominants and subordinates to form an ecological community. No organism, humans included, can survive without those complex communities of other living things. It is time that we reconceived of human history from this perspective, using the insights of ecology, geology, and other natural sciences to ask new questions about the past. We can no longer ignore the overwhelming scientific evidence of that principle of evolutionary interdependence.

The significance of the environment does not, of course, stop with the power that nature, organic and inorganic, holds over human life. As humans try to change their surroundings, those changes in the landscape themselves become powerful material forces. To paraphrase Winston Churchill, we reshape the landscape, and then it reshapes us. Among the most critical changes we make in nature are the depletions we cause in vital natural resources, as our habits of consumption increase. Substituting coal for wood or Herefords for bison or deer may help us overcome such depletions, but then the substitutions themselves begin to forge their own chain of consequences. They force changes in technology, in the organization of labour, in gender relations, in the investment of capital, even in the discourse of philosophy—in short they ramify through history.

Today, we are forging powerful new chains of environmental consequence by our often-unwitting behaviour. The rock oil that was discovered in 19th-century Pennsylvania, for example, and then was developed into a global oil industry, is now required to fuel over 100 million automobiles in North America and millions more overseas. Those automobiles are altering the global atmosphere, creating, according to the overwhelming majority of atmospheric scientists, a greenhouse effect that may make much of future North America hotter and drier than it has been for thousands of years. If that desiccation happens, if Saskatchewan becomes the new corn belt, or if Florida disappears through a melting of the polar icecaps and a rising ocean level, then environmental change will once again profoundly affect the history of civilization. This time it may be humans, not nature acting alone, that turn Manitoba into Nebraska, and Nebraska into west Texas.

Historians have too often found such matters uninteresting, marginal, irrelevant, or even repugnant to their work. They have not been adequately trained to see the power or complexity of the biophysical world. But if we ignore the power of nature and physical places in writing history, we will write history with only one eye open. We may see much with that one eye, but we will not see the past in its full breadth and depth. For depth of vision you need two eyes, one trained to see culture and one trained to see nature, and you need to keep them both wide open.
Conclusion

Whatever their social status or level of wealth, humans from presidents and priests to homesteaders and housekeepers have all had to derive their living, directly or indirectly, from the land. They have, most basically, had to eat. Historians who look at the past with both eyes open will see that every generation of humans, our own included, has had to rely on soil, forests, and animals to get the food they consume. They will see that when people fought they were often fighting over who could exploit the land beneath their feet. The full-vision historian will see that we cannot truly write the history of North America if the St. Lawrence River is left invisible, or if the adaptation of a farming society to the grasslands becomes marginalized, or if the hard physical labour of climbing mountains to reach California is forgotten.

If historians ignore or deny the power of nature, if they ignore the Pleistocene, the force of climate, the interdependent web of life, the limits of natural resources, they will write bad history—history that is analytically incomplete and ungrounded. They will also add to our society’s irresponsible and thoughtless behaviour. History ought to make us better equipped to deal with the world around us and to act as responsible citizens. But how can we do that if we are blind to the nature that feeds us, the nature that conditions us, the nature that thwarts us from time to time, and the nature that every day imprints itself on our very existence?

DISCUSSION QUESTIONS

1. Counterfactual arguments are based on things that didn’t happen. This might suggest that there could be no evidence to support them. Is this the case? Why or why not?
2. Does the author’s counterfactual history suggest the importance of environment in history? What is gained, for example, in considering the earthworm’s role in history?
3. Why and how might a reader argue that Worster is wrong, that history should not consider geological time?

NOTE


FURTHER READING


SECT ION

II

Reading Landscapes

Peter E. Pope

“Historical Archaeology and the Maritime Cultural Landscape of the Atlantic Fishery”

Carolyn Podruchny

“Writing, Ritual, and Folklore: Imagining the Cultural Geography of Voyageurs”
When you fly into St. Anthony in northern Newfoundland, you get the feeling that the last ice age has just ended. The rocky terrain is covered with ponds and bogs, like puddles on that first warm spring day, when the snow melts. The Great Northern Peninsula is still rising up out of the sea—rebonding from the heavy burden of ice it carried only 10,000 years ago. This isostatic rebound has created beach terraces in southern Labrador and northern Newfoundland, which mark the passing millennia. Many people have passed this way: Maritime Archaic Amerindians; Groswater and Dorset Paleoeskimos, more recently Beothuk, Innu, Inuit; and, eventually, Europeans. Each culture has wrested a livelihood from the rich marine life of the region; each has exploited the shoreline of its time; and each can be found on its own beach terraces. To walk inland from the present shoreline is to step upward and therefore backward through time.

One aspect of these beach terraces is puzzling. It is not surprising that the land rebounds upward when the glacial ice cap melts. But why doesn’t it do so smoothly, even if its rise slows over time? Why is the landscape stepped, with severe marine erosion alternating with more gradual slopes? A few years ago, I heard a good answer to this question, from geographer Trevor Bell. The ancient beach terraces that we notice on the landscape are offset by steeper zones of rapid erosion that mark unusually destructive wave activity: perhaps the worst storm in 1,000 years, a tsunami, or even an extended period of extremely violent seas. This is a wonderful illustration of the way in which the uniform processes of geological change are intertwined with intermittent catastrophe. This dialectic has a parallel in my own field of archaeology. Archaeology suits the study of what
the French historian Fernand Braudel called the *longue durée*—the long term. But paradoxically, archaeologists learn about long-term patterns of daily life by finding evidence of particular events. We can never do more than sample the past and our sample can never be more than what happened to be spilled, thrown out, or abandoned, at a particular time. (For further discussion of uniformitarianism and of the *longue durée*, see Stephen Bocking and Lyle Dick, respectively, in this volume.)

Braudel was careful to point out that the slow rhythms of the *longue durée* are punctuated intermittently by turning points (*conjunctures*): shifts in political or economic or industrial organization that change the very structure of everyday life. ¹ One of the most significant of these surely happened about 1500, when European mariners became aware of the Americas. When Zuan Cabotto (John Cabot) brought back news of the New Found Isle in the North Atlantic, his crewmen seem to have been more interested in the rich fishing grounds near the coasts they had visited. The marine resources of Atlantic Canada made a new industry possible. Or rather, they provided a new place for an old industry, since the northern European commercial salt-cod fishery was already at least 300 years old. Fish remains from Quoygrew in the Orkneys, north of Scotland, become much more uniform in size after AD 1150. This suggests to zooarchaeologists that the commercial production of salt cod was underway at this time, because markets prefer product of a standardized size to a degree that subsistence economies do not. The trade in salt cod from Norway’s Lofoten Islands is documented from about AD 1250. In the 15th century crews from Hull and Bristol in England fished for cod along the coast of Iceland, while fishermen from Devon and from the Basque country in France and Spain exploited the coast of Ireland.² Both the technique of wind drying salted cod and the practice of making long-distance seasonal voyages to catch fish were well established by 1500, when European fishermen began to visit what was, for them, a New World.

This chapter describes this forgotten industry and sketches its history, including its impact on both the land and the sea. The idea that generations of transient fishermen created a cultural landscape as they returned to their seasonal fishing stations is the central point. Historical archaeology is one way of researching such landscapes—but what is historical archaeology and how does it relate to documentary history? Perhaps we can clarify how these disciplines relate by considering the relevant documentary and archaeological resources for this particular research topic and also by introducing a technique used by both disciplines for organizing data: the geographical information system (GIS).

### The Transatlantic Fishery

The transatlantic migratory salt-cod fishery is a dinosaur of economic history: once huge, but now extinct. Between about 1500 and 1800, this fishery played an important role in the European world economy. It provided a storable nutritious protein, as well as “train oil” extracted from cod livers—a valuable byproduct that literally greased the wheels of emerging industries. Because southern Europe was the best market for dry salt cod, the trade in fish became an efficient complement to trade from that region, particularly in wine. En route to North America, on the other
hand, fishing ships typically had plenty of cargo space. They came from Europe “in ballast” (that is, essentially without cargo) because supplies for the fishery took up much less space than the fish these ships would have to carry home. This effectively subsidized communications from Europe to North America, by keeping freight rates to Atlantic Canada low. Finally, France and Britain came to see their migratory fisheries as nurseries of seamen—that is, as crucial training grounds for the navies, which they used to protect their commercial interests. Historians have paid serious attention to the economic and political implications of this fishery; they are only beginning to ask about its social and environmental significance.

For centuries, migratory crews seasonally exploited Atlantic Canada, notably Cape Breton, Gaspé, the lower north shore of the St. Lawrence, southern Labrador, and several parts of Newfoundland. This was how Europe first made use of North America. Crews prosecuted the inshore fishery from boats rather than from the ships that brought them across the ocean. The dry salt cure used in the stationary shore fishery worked well in the temperate climate of Atlantic Canada and produced a stable product, well suited to the warm climates of the Mediterranean and the Iberian Peninsula. Whether they came from Portugal, Brittany, Normandy, the Basque Country of France and Spain, or the West Country of England, fishermen were familiar with the land-based dry cure and used it when fishing inshore. (The rule of thumb in your Canadian history survey text—that the English produced dry salt cod while the French supposedly concentrated exclusively on wet-salted fish—is a historians’ folk tale, passed along by scholars too busy to consult the documents or to identify an assemblage of artefacts.)

Migratory fishers were conservative: in any particular period each European region preferred to exploit its own particular part of the North American coasts. For example, in the 17th century, fishing crews from the north of Devon, in England’s West Country, regularly exploited the Newfoundland harbours of Renews and Fermeuse, a few hours sail south of the major East Coast port of St. John’s. A century earlier, this had been the preserve of Portuguese fishers. But by 1600, the Portuguese were gone, and Barnstaple and Bideford crews dominated this part of Newfoundland’s Avalon Peninsula. The Bretons of northern France, from St. Malo and St. Brieuc, fished on the south coast of Newfoundland and, in the north, on the Petit Nord, the Atlantic coast of Newfoundland’s Great Northern Peninsula (Figure 3.1). Breton crews were fishing, for example, at Cap Rouge when explorer Jacques Cartier stopped in 1541 to ask for supplies, on his third voyage up the St. Lawrence. Bretons dominated the productive fishery on the Petit Nord through the 17th and 18th centuries. Meanwhile, the Basques fished in Newfoundland’s Placentia Bay, around Cape Breton, and in the Gulf of St. Lawrence. In 1713, the Treaty of Utrecht confined French fishers in Newfoundland to the northeast coast, though French Basques in fact continued to exploit the west coast. An adjustment of the treaty in 1783 changed the boundaries of the French Shore to legalize this anomaly—but the adjusted French Shore still included the Petit Nord. In the 19th century, migratory Breton crews co-existed uneasily with a growing Anglo-Irish settler fishery in this part of Newfoundland. (By this time, France had surrendered the right to fish elsewhere in North America, except at St. Pierre and Miquelon.) Breton activity dwindled until 1904, when France relinquished its rights to seasonal shore stations in northern and western Newfoundland, as one part of a complicated deal with Britain, celebrated in diplomatic history as the Entente Cordiale.3
The summer stations used by Breton and Norman fishing crews between the early 16th century and 1904 were scattered over hundreds of kilometres of rocky coastline.

Source: Edward Eastaugh, for Archaeology of the Petit Nord.
Cod and Environmental History

The tragic history of cod in the 20th century is, pardon the expression, another kettle of fish. Even people who know little about the fishing industry have heard about the historic collapse of cod stocks that led the federal government to impose a moratorium on this fishery in most of Atlantic Canada in 1992. Using records of cod landings, fisheries biologists have been able to graph recorded catches over time, for the last century or so. When they looked at these graphs, they pinpointed a “killer spike”—an episode of intensive fish harvesting in the 1980s, when modern electronic fish-finding equipment became widely available. There is not much doubt that harvesting of cod beyond sustainable catches reduced cod populations to a few percent of their historic levels. The scale of this ecological disaster was unprecedented, at least for this species in this region, but the phenomenon was not completely new. Some interpretable historical statistics for cod catches at Newfoundland go back to the last quarter of the 17th century. These early estimates reveal previous swings in abundance, though none as serious as the crash in populations of the late 20th century. Some of these early crises—for example, a steep decline in cod catches around 1681—were understood by contemporaries as the result of overfishing. For Atlantic Canada, at least, climate change (such as the Little Ice Age of the late 17th century) may have been as important a factor in stock fluctuation as short-term overfishing. The technology of the salt-cod fishery changed little between the 16th and the mid-19th centuries, and this technological conservatism helped keep populations of cod in balance with human needs.

Fisheries historians and biologists are still working on the complicated question of the long-term impact of fishers on fish stocks. A two-fold consensus is emerging. First, the history of human impact on natural species cannot be traced species by species: human predation must be understood as affecting ecological systems. For example, human depletion of whale stocks around Spitzbergen, in the European Arctic, seems to have actually favoured population growth of some seabirds. Second, just because we have straightforward statistical data for 1950 or sometimes 1900 does not make either point in time an appropriate baseline for measuring ecological impacts. The virtual extinction of the right whale in the northwest Atlantic by the Basques in the late 16th century, the elimination of southern walrus populations about the same time, and predation on seabird colonies by fishing crews gathering industrial quantities of bait all must have affected the marine ecosystems of the Atlantic coast, as much as the actual take in cod, massive as it was.

A Maritime Cultural Landscape

What of the impact of the fishery on the Atlantic littoral itself? For example, from about 1510 until France surrendered its rights, migratory fishing crews from Brittany created seasonal shore stations to salt and dry cod on Newfoundland’s Petit Nord. Where were these early modern establishments? Or, taking a wider view, what remains of the oldest persistent European landscape in Canada? I am involved in a research program entitled “An Archaeology of the Petit Nord: The maritime cultural landscape of the French, seasonal, shore-based, salt-cod fishery in northern Newfoundland, 1510–1904.” We are seeking to put the vestiges of these shore stations into the context of the documentary, cartographic, and photographic evidence, enabling us to ask about how such places
were selected and constructed for resource extraction; about their relationships one with another; and about their evolution through time. In brief, we are trying to record an important *maritime cultural landscape*—a concept introduced by the Swedish marine archaeologist Christer Westerdahl to emphasize the interpenetration and interdependence of land and sea in coastal zones.7

Participant-observers in the early modern transatlantic fishery, like 17th-century Acadian entrepreneur Nicholas Denys, suggest that the fundamental spatial unit in this industry was the *fishing room*. These were the shore stations needed for splitting, salting, and drying cod caught in daily voyages by boat crews working for a particular fishing master. In the regional context of a harbour or even of whole fishing zones like the Petit Nord, each fishing room was an important landmark, in the sense that fishing crews returned to the same place summer after summer. At the same time, fishing rooms had their own complex internal structure. They were, in their own way, little landscapes. Each fishing room was an arrangement of features—stages for landing fish, cobble beaches and wooden flakes for drying, cookrooms, bread ovens, crosses or calvaries, and so on—and each of these features was a landmark within the miniature landscape of the fishing room (Figure 3.2). How can we study the surviving remnants of these early modern landscapes? And what can we hope to learn?

**Figure 3.2  An Eighteenth-Century Fishing Room in Newfoundland**

![Figure 3.2](image-url)

This 18th-century engraving from Duhamel du Monceau’s *Encyclopedia of the Fishery* shows a boat (A) landing fish at a stage (D), where the fish was gutted and split (C), before being dried on a wooden flake (G). Also shown is the cookroom where the crew was fed (E), and forest cutting in the background.

*Source: Courtesy of Centre for Newfoundland Studies, Memorial University.*
Historical Archaeology

Research on the landscape of the fishery grows from an interest in understanding how European mariners interacted with a particular transatlantic environment, rather than growing out of the reading of a particular corpus of documents or excavation of a single site. Such research is, inevitably, multidisciplinary and synthesizes texts and the material record. This is typical of historical archaeology—itself an interdisciplinary field with a strong eclectic bent. “Historical archaeology” is the North American term for archaeological study of the period after Europeans arrived in North America. When exactly Europeans can be said to have arrived on Newfoundland’s Great Northern Peninsula is a thought-provoking question. L’Anse aux Meadows, the only Norse (or “Viking”) archaeological site identified in North America, lies at the northern extremity of the peninsula, on the Strait of Belle Isle. Birgitta Wallace, who excavated the site for Parks Canada, identifies it as Leif’s Booths, the base camp used by the clan of Eric the Red in a series of exploratory forays from Greenland, around the year AD 1000. So Breton crews, fishing the rich cod resource 500 years later, were not the first Europeans to visit these waters. They were, however, the first Europeans to use the area year after year after year. Their activities in the 16th, 17th and even 18th centuries are not much better documented than those of the medieval Greenlanders. So if we want to learn about them, we have to look for archaeological traces, as well as documentary and oral evidence, where it exists.

If historical archaeology tends to be multidisciplinary, the archaeology of landscape is almost necessarily multiscalar. (For further discussion of issues of scale, see Ruth Sandwell’s chapter in this volume.) Our Archaeology of the Petit Nord project has a research strategy to look at the Petit Nord at several different scales, ranging from the features that together constitute each specific fishing room, to the array of fishing rooms around major harbours, to the choice of harbours by fishers along the coast of the Petit Nord. At the narrowest scale, our research emphasizes archaeological investigation of a particular fishing room, in Crouse Harbour, at Dos de Cheval (or EfAx-09, to use the Borden number with which Canadian archaeologists identify their sites). With historic plans or photos as guides to excavation and interpretation, our archaeological research is clarifying what a fishing room was, by recording typical features, including the vestiges of landing stages, galets (or cobble drying areas) for drying fish, paths, ramps, cookrooms, bread ovens, and ritual places. Historic maps and early fishing censuses play a greater role in interpretation of the distribution of fishing crews around major harbours, such as Fichot, Croque, Crouse, Conche, and Englee. But even on well-documented sites, the collection of exposed artefacts by surface survey of beaches and the digging of strategically located shovel test pits can refine our assumptions about dates of use and cultural affiliation. The broad canvas of the whole Petit Nord, between La Scie and Fleur de Lys in the southeast, to Griquet and Degrat in the Strait of Belle Isle, is based largely on historical cartography, early fishing censuses, and narrative accounts, supplemented by field photography, to capture a landscape record.

Documentary Sources

Contemporary documentation of the transatlantic migratory fishery in the 16th and early 17th centuries is rare. Few documents mention specific North American destinations. Fortunately, Cartier visited fishing stations in Newfoundland and in the Gulf of St. Lawrence, prompting officials in the
French Basque town of Fuenterrabia to put some questions to local fishing masters about his voyage—testimonies that also record their own activities on the Petit Nord, in the early 1540s. Because these documents shed light on a celebrated explorer who became a national hero for French Canadians in the 19th century, they were transcribed and published long ago. Otherwise, only a few documents about the fishery in this period are in print. The others rest in national or regional archives in France, Britain, Spain, or Portugal. At best, the interested researcher can hope that relevant documents have been copied and included in one of the microfilm series held in Library and Archives Canada in Ottawa—for example, from France, Archives des Colonies, or Great Britain, Colonial Office papers.

Fortunately, the fishing industry is much better documented from about 1660 onward. The late 17th-century colonial bureaucrats of Great Britain and France compiled censuses of the residents and migratory crews who fished for cod along the shores of Newfoundland. The information was politically useful because the settlement of the English Shore, on the east coast of the Avalon Peninsula, and of France’s colony of Plaisance in Placentia Bay to the west, were contested at the time. Perhaps more to the point, the Newfoundland fishery was an enormous industry with significant impact on European trade. A little notebook kept by British Secretary of State Sir Joseph Williamson between 1674 and 1677 provides an index of the attention Europeans paid to the fishery. In messy handwriting he described the paperwork he had to digest concerning British interests in the Americas. He devoted a few pages each to Surinam, Nevis, Barbados, the Leeward Islands, and New England, but Newfoundland takes up most of his notebook. In the larger scheme of things, colonial bureaucrats like Secretary Williamson were conscious of Newfoundland’s strategic importance. Their curiosity was simply pragmatic.

British naval commodores at Newfoundland filed an intermittent series of “Replies to Heads of Inquiry” from the mid-1670s into the 18th century, which survive in Britain’s National Archives. The most detailed cluster was between 1675 and 1684, providing censuses of both the fishery and inhabitants. Similar considerations led France’s colonial bureaucracy to take repeated censuses of the recently established French settlements on Newfoundland’s south coast between 1671 and 1711. Unfortunately, the French did not survey the cod fishery as an industry in the detail pursued by some Royal Navy officers posted to Newfoundland between 1675 and 1698.

We must turn to other kinds of evidence to obtain some sense of the size and distribution of France’s migratory fishing effort. Laurier Turgeon has used French inventories of ships in 1664 and 1686 to calculate vessel and tonnage figures for the Newfoundland fleet. These statistics suggest that about 50 percent of France’s effort was directed toward the Grand Banks, predominantly by crews from Normandy. Taking into account the fact that banks fish were salted in a wet brine rather than dry-salted and assuming that the French fishery was as efficient as the British fishery in transport, the 1686 tonnage figures imply a total French live catch in Newfoundland waters, including the Grand Banks, of about 140,000 tonnes. That in turn would mean that the live catch taken and dry-salted by French fishers inshore, predominantly Bretons and Basques, must have been well in excess of 70,000 tonnes—twice Britain’s live catch at Newfoundland, which was taken inshore and mostly dry-salted.

How was this enormous French effort distributed or, to put it more simply, where did the French fish and how many men and boats were involved? The best early data we have for answering these questions are not exactly censuses, comparable to the British “Replies to
Inquiries” but, instead, surveys of harbours regularly used by French fishermen, with recommendations about appropriate use. In 1680, Saint Malo’s fishing masters listed individual fishing rooms for over 4,800 men on the Petit Nord and about 960 inshore fishing boats. This means that the French migratory dry fishery in this region alone was comparable in scale to the whole British fishery at Newfoundland, migratory and resident. The 1680 survey does not include the fishing stations on the west coast of Newfoundland, notably Ferrolle, Port au Choix, and Port au Port, which were dominated by the Basques. It also ignores the northeast coast “no-man’s land” in Notre Dame Bay, the refuge of Newfoundland’s native Beothuk people, which was consequently underutilized by both French and British crews.

Data for the northeast and west coasts of Newfoundland survive in reports for 1764 and 1765. These resemble British fishing censuses, in giving the name, home port, tonnage, and crewing of ships actually fishing, by harbour, with the number of boats used, and an estimate of how many boats might potentially use each fishing post. Geographical coverage is excellent, from Bonavista, along the northeast coast, around the Petit Nord, and down the west coast as far as Port au Port, together with St. Pierre and Miquelon, which had just been restored to the French by the Treaty of Paris in 1763. These postwar surveys also contain extracts from captains’ reports, summarizing activity in each of the occupied harbours, including English and Irish settlers in some and British migratory fishers in others. A briefer summary also survives for 1784. When we have specific evidence of catches, these data support several contemporary rules of thumb. The fishery employed about five men for every boat (three to catch and two to clean and salt the fish) and together these five men could produce about 10 tonnes of dry fish every summer, or perhaps a bit more on the south coast, with its longer season. A more detailed survey of the French fishery in 1832 offers valuable comparative data, almost invariably identifying the same fishing rooms as the 1680 survey, although often offering significantly higher estimates of the numbers who could use these rooms.9

In the 16th and early 17th centuries, dozens of European ports sent fishing ships to the New World, but as transatlantic trades developed, ports specialized and those best situated for it came to dominate the fish business. The north Breton port of St. Malo, with the aid of merchant financing from the smaller neighbouring Norman port of Granville, came to dominate France’s transatlantic fishery. It is a rare port that is financially self-sufficient, so trade links are almost always more complicated than they seem at first.

Recovering commercial records is not always easy, although France and Spain have great riches in their communal (or municipal) archives and in their notarial records (the documents created by notaries public, employed by European merchants and fishing masters to legitimize their contracts). St. Malo was one of the northern French ports heavily bombed by the Allies during the Second World War, when the communal archives were destroyed. Certain records do survive, however, in the regional Archives departmentales d’Ille et Vilaine at Rennes, the capital of Brittany. By luck, among the surviving documents are the Rapports des capitaines (captains’ reports). These were summaries of voyages that masters working out of St. Malo were expected to file to the communal “Admiralty” (harbour authority), starting about 1678. The short ones are predictable. A typical entry about the cod fishery might say something like: 1686, Joseph Parete, captain of the Bénédiction of St. Malo, 150 tons, 26 men, from Newfoundland via Majorca, with (olive) oil.
The interesting documents are the long ones, when the captain was worried enough about how the voyage turned out, to make sure that his version of events got into the public record. Several of these captains’ reports tells us about life on the Petit Nord. One in particular, filed in February 1685 by Nicolas Arson, tells us something significant about fishing rooms. Arson was captain of the 200-ton *Jean Baptiste* of St. Malo, whose crew had fished at Cap Rouge (today Crouse) the previous summer. The traditional international custom of the fishery, known as the admiral system, gave choice of fishing rooms on a first-come, first-served basis. Both France and Britain had published regulations that modified this rule, by requiring fishing masters to choose rooms of a scale appropriate to the size of their crews. Arson complains bitterly that Robert Potier, captain of *La Royalle*, had taken a large fishing room, *L'admirauté du degrast de Carrouge*, generally accepted as being suitable for a crew of 90 men—beyond the needs of *La Royalle* and its smaller crew, but just right for the crew of a large ship, like Arson’s own *Jean Baptiste*. Because Captain Potier would not budge, Captain Arson and his crew had to take another fishing room, *Le havre des grand biches*, which we have identified archaeologically well up present-day Biche Arm. As Arson bitterly complained, this was at least a league (about 6 km) from the best fishing, causing him and his crew a great loss. In other words, not all fishing rooms were equal. Some were bigger, some smaller; some were close to the fish resource, some inefficiently far from it. Arson’s complaints underscore another important consideration: the number of usable fishing rooms was limited. The Newfoundland coast may be thousands of kilometres long, but if you need a place where you can count on being able to land a small boat full of fish and then have space to dry it, your choices are surprisingly limited.

The value of knowing exactly where the best fishing rooms were promoted the production of ever more detailed maritime charts of Newfoundland waters. These charts reached a modern form with James Cook’s survey of the west and northeast coasts of Newfoundland in the 1760s. But fishers certainly used earlier charts, published by John Thornton in *The English Pilot* (1689) or by the Bellin family in Paris, to find their fishing rooms. The same charts are invaluable today, to make sense of the fishing surveys of the period. Eighteenth- and 19th-century naval officers were expected to have some skills in drawing and cartography. A few plans of individual fishing rooms survive from the 17th century, but by the early 19th century virtually every fishing room on the Petit Nord is sketched, several times over, by succeeding visitors. Even when cartographically questionable, these plans are often rich in cultural detail, giving a distinct impression of how the terrain was put to use (e.g., Figure 3.3). They are invaluable for the interpretation of surviving industrial features and very useful too for finding archaeological sites.

Northern Newfoundland also happens to be the part of what is now Canada that was first extensively recorded photographically. Between 1857 and 1862, French naval officer Paul-Émile Miot took a series of superb glass-plate images (Figure 3.4). Miot had a particular interest in the material culture of the cod fishery, in Native people, and in “liviers,” the Newfoundlanders whom the French were starting to employ as winter caretakers or gardiens. This makes his work valuable for historical archaeology, in several ways. He recorded the technology of his time and the contemporary arrangement of the infrastructure of the fishery. Of course, the layout of a fishing room in 1858 did not necessarily reproduce its layout in 1758, 1658, or 1558. On the other hand, knowing the layout of 1858 is a start toward understanding the spatial evolution of a fishing room, especially given that by 1958 most had been abandoned for half a century and today are only partly
Figure 3.3  Map of Croque Harbour, 1767

Based on a 1767 map by Coquelin Latiolais, this chart of Croque Harbour shows the five protected inner coves used for shore stations. Some, such as Petit Maistre in the southwest, had more than one fishing room. Latiolais shows each stage and cabin, as well as cobbled areas for drying fish.

visible, short of excavation. One of the most instructive ways to use Miot’s photos is to compare them with recent images taken at the same locations. Such comparisons suggest that certain cultural landmarks persist in the landscape. A good place to land a boat is a good place to land a boat, and landing stages (fishers’ wharves) have therefore been rebuilt in the same locations for centuries. The change most visible in photos over the last century and a half is the resurgence of the forest. Clearly, fishermen of Miot’s day consumed wood close to the coast much faster than the inhabitants of the Great Northern Peninsula do today. (Newfoundlanders today cut plenty of wood but they also drive pickup trucks, and so can exploit inland stands.)

Historic maps and photographs are valuable guides for archaeological survey—particularly if we have documents that we can use to interpret the visual evidence and to locate the sites we are looking for. The Petit Nord surveys of 1680 and 1832 are such documents. They are extremely valuable as historical geographies because of the attention given specific fishing rooms. The 1680 report uses specialized fisheries terms such as galet and chauffaud (fishing stage). There are also many references to crosses, calvaries, and magdalaines, which were certainly shrines but that also seem to have been used as aids to navigation and sometimes as markers to delineate boundaries between accepted fishing rooms. They raise important questions for archaeologists. Where were they and how were they laid out? Do remains survive today? Is it possible that a church, in a present-day harbour, might occupy the site of a historic calvary? Are the crosses that still stand at certain sites in traditional locations or are they relatively recent innovations?

The 1680 report lists specific establishments in each harbour, the names of which evoke the human geography of the fishery. Let us consider, for instance, the description of La Crémaillière in 1680:

- Crémaillière and Savage Point for 15 men
- Anchor Point for 20 men
- The crucifix atop Anchor Point 6 men
- The bank between the stages up to the second (?) 20 men
- The middle calvary 10 men
- The beach between the lower stages 10 men
- The lower calvary 10 men
- The northeast as far as the streams 35 men

**Figure 3.4** PAUL-ÉMILE MIOT, A FISHING ROOM AT CROUSE, 1858

This Crouse fishing room was known as “The Admiralty” because it was the first choice of crews. One of its great advantages would have been the huge cobble beach visible in the background.

*Source: Paul-Émile Miot/Library and Archives Canada, PA-202291.*
From the stream as far as the bank of the flies 10 men
The bank of the flies and nearby 12 men
La Rochelle 20 men
The west shore Grand Cove 30 men
The head of the bay 10 men

These names present a challenge for the researcher, who needs the traditional knowledge of local residents to give them meaning. (At a recent conference in St. Anthony, residents were quite happy to correct academic confusions.) Many such names are reminders of a particular time and place. Besides the various calvaries and magdalaines, there are “Boat Banks,” “Anchor Points,” and “Bear Coves.” “Savage Point” probably refers to the Inuit who frequented the Crémaillère region in the 17th and 18th centuries. “Bank of Flies” (Banc aux mouches) in several harbours is a reminder of one of the difficulties of life along this coast. At Fichot, there is a fishing room called “Shoe Cutter” (Coupe Soulier), doubtless a rocky place, and another, certainly not very productive, called the “Bank of Great Poverty.” On the other hand, Conche had a New Castle (Chateau neuff)—a promising lead for an archaeologist interested in substantial architectural features. There is a lot of information in these French surveys, especially if they are compared, to highlight the use of a particular fishing room over time. Usually the number of boats and men grew slowly over time; when the fishery expanded rapidly it tended to do so by developing new fishing stations. One way of handling data like this, with a spatial component, is to use a geographical information system.

**Geographical Information Systems (GIS)**

A GIS is a database in which each fact is associated with a geographical place—a point in two or even three-dimensional space (see Stéphane Castonguay and Diane Saint-Laurent’s chapter in this volume.) This way of assembling information is familiar to archaeologists, because it is what even the simplest catalogue of excavated artefacts does. So a stack of handwritten catalogue forms is a simple GIS, if it enables us to look up what we found in a certain place: all the ceramic shards from EfAx-09, or all the wrought-iron nails in the lowest stratum of square W33S125. Computerizing them makes such catalogues of information much more accessible. Our project uses software called ArcMap, a fairly sophisticated GIS system, although we don’t actually use it to track artefacts. What we need in a study of the historical landscape of the migratory fishery is a way of integrating archaeological evidence about fishing rooms and their features with the information we have found in the documentary record of naval inspections, charts, plans, sketches, photographs and even oral history, collected from people who live in the region today.

Getting a complex GIS off the ground is a big project, usually needing input from more than one person. We wasted a bit of time and money to start with, trying to work up our own digital base maps of the Petit Nord. Then, in an honours essay, one of my undergraduate students used an existing, widely available base map of northern Newfoundland to make a convincing comparison, and it became pretty obvious that we had been reinventing the wheel. We got to work again, now on two fronts. One student is building extra layers of information that can be superimposed on the standard base map. We have a layer, for example, that represents the exact location of fishing rooms. Some of these can be tied to known archaeological sites, which of course have their
own exact locations. Meanwhile, a graduate student is preparing a database that records the information given in the 17th- and 18th-century surveys of the Petit Nord. I like to call this the “textbase,” because it ties the fact that in 1680 the fishing room *Champs Paya* could employ 50 men with the document that reports this and, at the same time, ties that estimate with estimates for 1764, 1832, and any other mention of that place we care to add. Once we have given each fishing room its appropriate latitude and longitude, we will have a set of data that we can import into the GIS to create more layers of information about historic toponymy (use of place names) and about the distribution of men and boats on the landscape, in specific periods.

Like any software, a GIS is only a tool, but it has some distinct conceptual advantages for the analysis of landscape. To be more precise, it suits a landscape study that emphasizes the interpretation of place. Our study of the early-modern Breton shore-base salt-cod fishery in northern Newfoundland aims to unravel how particular persistent landmarks, the fishing rooms, were interconnected, over many centuries, by seasonal use and reuse, to create a specific maritime cultural landscape. Our GIS won’t do this for us, any more than our photocopies of documents, our trays of artefacts, or even our measured drawings of site features will write their own interpretations. Our GIS is, though, a way of bringing an eclectic array of resources together, which makes it a useful tool for the historical archaeology of the fishery.

**Excavation**

When a team of archaeologists arrives at a traditional fishing room, what do we hope to find? What will excavation tell us that we haven’t already learned from the historic surveys, charts, plans, and photographs that document the landscape of the Petit Nord? The historical record tells us that our site at Long Point in Cape Rouge Harbour, registered with the Provincial Archaeology Office as Dos de Cheval, EfAx-09, was once a fishing room known as Champs Paya. Our local partners, the French Shore Historical Society, have found us a motor boat, in which we depart from the wooden-built hamlet of Crouse. We land carefully at Long Point, along the one rocky ledge where it is safe to bring a boat to shore. Not surprisingly, the nearby cobble beach terrace is where we uncover the landward end of the stages, used for centuries to bring fish ashore, as well as whole strata consisting of little but cod vertebrae and cranial bones, removed during splitting and cleaning. We have landed exactly where our Breton fishers once landed to bring their catches ashore. We know we are on a fishing room not only by the presence of such features, but also because we excavate wrought-iron fish hooks and lead weights for lines and nets, some humorously decorated to resemble grinning fish. (Metal objects rarely survive as surface finds.) Excavation of what appears to be the second beach terrace indicates that the whole deposit is anthropogenic (of human origin). The original beach, extending inland from today’s active shoreline, is now buried by almost a metre of deposits: the organic debris of fish processing; working floors where crews discarded their broken bottles, cook pots, and clay tobacco pipes; some relatively clean beach cobbles and some rough stone pavements. Since there are wrought-iron nails on the cobble surface of the original beach, and since pre-contact Native peoples of the region did not use iron, we can be pretty sure that the whole deposit above the beach is, in one way or another, the work of the fishing crews who used this site between 1540 and 1904. Over all this lies a 10 cm thick blanket of fine dark soil, virtually free of artefacts. That top
stratum is what has washed downhill from the deforested upper beach terrace, since the Bretons abandoned their migratory fishery. It marks the century in which the site has slept undisturbed.\textsuperscript{12}

The discovery of an archaeological site sometimes validates specific long-standing hypotheses. For example, Helge Ingstad's identification of L'Anse aux Meadows settled a debate about whether there was a factual basis to the Icelandic sagas, which told of lands to the west of Greenland. But no one questions the age of the migratory shore-based salt-cod fishery, though we might lack details about how it was pursued through time. Archaeologists often make a contribution to historical studies in a different way, by attending to what James Deetz called “small things forgotten.”\textsuperscript{13} Artefacts or architectural features recovered raise significant and sometimes difficult historical questions. Archaeology is useful when we find what we are looking for, but, in a way, it is even more useful when we find what we don’t expect. The deep anthropogenic beach terrace in part of our site was an aspect that we did not foresee. Many substantial features, including ramps, stone foundations, collapsed stone bread ovens, and a large oak cross are visible on the site, without excavation. We assumed that these would be 19th century, since beginning about 1820, French fishing crews had control of a fishing room for five years at a time—long enough to justify a serious investment in labour-intensive infrastructure. And, in fact, these very visible structures do seem to date relatively late. In earlier centuries, however, masters and crews took seasonal possession of fishing rooms anew every year. We expected this would have limited improvements to fishing rooms to those likely to pay off within a single summer. We did not foresee the extent to which moderate improvements year after year, century after century, could substantially alter the landscape of the fishing room. The ongoing modifications we uncovered raise questions about the extent to which fishers were able to use custom or informal negotiation to get access to the same rooms, season after season.

We did, of course, hope to find cod bones among our faunal remains. These can be sampled to make inferences about the average size of fish taken, as James Barrett of Cambridge University has done in the Orkneys. He is also working on the subspecies typing of fish remains, in an effort to use genetic markers to identify fish from regional populations in production zones, like the Petit Nord, with fish from consumer sites in Europe.\textsuperscript{14} What surprised us were the other species in our faunal collection, which reflects consumption of beef, pork, rabbit, mutton, chicken and a variety of seabirds. Our crews were apparently well provisioned by the fish merchants of Brittany but supplemented their diet with local ducks and other seabirds. Another unexpected find was the number of musket balls and gun flints recovered from 17th- and 18th-century deposits. These items occur noticeably more often than they do at contemporary fishing rooms on Newfoundland’s English Shore. Were French fishers better armed—or simply hungrier? Or were they, perhaps, more afraid of conflict with an aggressive indigenous population, in the person of the Inuit?

One class of finds that we could predict pretty accurately were the ceramic cook pots, bottles, jars, pans, mugs, and bowls that are typical of migratory fishing sites. We knew we would find Normandy stoneware bottles and storage jars. By the 19th century these were well distributed in Brittany and they turned up in significant numbers in our preliminary survey of Petit Nord fishing stations. We had also come to expect brown faience dishes and pans. We had been a bit surprised when these moderately costly kitchen items first turned up at the nearby fishing room at Crouse Beach East (EFax-10), but they were not so unexpected at a second site, an 18th-century one for which they have become a good marker. We also knew we were likely to recover more examples of
various Breton-style earthenware pots and jars. We have been working for several years with French archaeologists to identify these poorly understood wares by their geological chemistry, through inductively coupled plasma mass spectrometry (ICP-MS) analysis of their geological chemistry. This process identifies the exact proportions of various trace elements in the fabric of excavated pots, which can then be compared with the patterns of trace elements in pots from known production centres to confirm preliminary identifications based on form and colour. What we did not expect was the apparent prominence at this site of one particular coarse earthenware from pottery kilns at Pabu-Guingamp, near the early modern French fishing port of St. Brieuc. This material link between a specific fishing room in Newfoundland and a specific provisioning and crewing port in Brittany raises, again, the question of whether and how crews could return annually to the same site, in the centuries before the rules of the fishery evolved to encourage this practice. How crews enclosed (took control of) rooms is a key question in the history of the fishery. It intersects with issues about enclosure raised by Matthew Johnson in his “archaeology of capitalism.” Johnson sees historical archaeology as an important approach to understanding the economic culture of capitalism. For Johnson, the archaeology of fields and farms provides a kind of record as well as a context for study of the centuries-long process of enclosure of public common land, by landowners who took an increasingly capitalist attitude to the farmlands they controlled. In a parallel way, we might see the fishing rooms of the Petit Nord as both record and context for understanding how fishing masters competed for shore space within an early capitalist industry. Again, historical archaeology has not answered all our questions, but it has posed them in a fresh context.

Perhaps our greatest surprise was when we uncovered the skeletal remains of one of our Breton fishermen. This was a robust, adult male, about 175 cm tall, perhaps middle-aged, judging by his worn teeth. There are indications of violence, particularly a 5 cm diameter circular hole in his forehead. He was interred in a shallow grave cut into the original beach, on his back, his hands clasped in front of him, facing (in Christian fashion) almost exactly magnetic east. A large spike lay across his face and several animal long bones lay under and about his cranium. There was no sign of clothing to help date him, but artefacts in associated strata suggest that the burial dates before 1700. We assume this was a fisherman—but how did he end up in the beach cobble where the stages came ashore? Why wasn’t he buried inland, near the prominent cross that overlooks the site? Or does this interment on the beach terrace suggest that such a ritual place did not yet exist in his day? Was he the victim of violence? Was this more likely a dispute among fishing crews about access to rooms or a dispute with an Inuit band about access to the Petit Nord in general?

If you get the feeling that historical archaeologists end up chasing a lot of loose ends, then you have the general picture. To one degree or another, tracking disparate data is a constant challenge for most research in the social or historical sciences. A GIS helps, if data have a spatial component. But, in whatever way we manage to collate our information, an essential dilemma remains for archaeology, as for any historical discipline. When do we draw the line? When do we have enough evidence to begin to tell our contemporaries how people lived in the past? To be able to explain why the landscape we inhabit now came to have the form it does? To presume to treat one particular feature as a telling vestige of the past, another as a trivial accident? Some questions might be pleasant to research forever, should time and funding permit. But the Social Sciences and Humanities Research Council of Canada, which generously supports our project, quite reasonably likes to see conclusions drawn.
In its own way, so does the Provincial Archaeology Office, which issues our permit to disturb Newfoundland’s subsurface historic resources. Our local sponsors in northern Newfoundland, the French Shore Historical Society, have turned the old nursing station in Conche into a charming interpretation centre. They would like to fill it even fuller with artefacts, and they want those artefacts explained. Tourists drive a long and winding road to visit Crouse, and hike for 20 minutes to see our site. We can hardly greet them with a shrug, so we have already had to formulate interpretations of its history. Our academic colleagues press us to contribute to various dialogues about site formation or enclosure or migration or colonization or, indeed, the environmental history of Canada. And so, almost without noticing, we process traces of the past into abstractions. We ask our contemporaries to accept our present perception as an adequate representation of what was, even if we can be pretty sure that this will be, someday, for someone, yesterday’s oversimplification.

DISCUSSION QUESTIONS

1. Why did Breton and Norman crews who fished on Newfoundland’s Petit Nord every summer never settle there? How might this have affected their interactions with aboriginal peoples?
2. What is a cultural landscape? What is a maritime cultural landscape? Can you give an example of a landscape that isn’t cultural?
3. How can historic photographs, maps, and plans contribute to an understanding of the evolution of a cultural landscape?
4. What is a GIS (Geographical Information System)? Is a GIS a tool, method, or theoretical approach? How can it be used in historical research?
5. What is historical archaeology? Can it do more than remind us of “small things forgotten”? How?
6. What are the special challenges of identifying, recording, and understanding seasonally occupied archaeological sites?
7. What time scales might be appropriate for analysis of an industry like the shore-based migratory salt-cod fishery? For the evolution of a cultural landscape? For environmental change?
8. Are political and diplomatic events (for example, the 1696–1713 or 1789–1815 wars between England and France) basically irrelevant to the environmental history of industries like the northwest Atlantic cod fishery? Why or why not?

NOTES


6. We are sponsored by the Social Sciences and Humanities Research Council of Canada, Memorial University of Newfoundland’s Smallwood Foundation and Institute for Social and Economic Research, and the Provincial Archaeology Office of Newfoundland and Labrador.


11. Archives Départementales d’Ille-et-Vilaine, Rennes, Amirauté de Saint-Malo, 09 B art. 447, ff. 7v–9r[0].


**Further Reading**


Memorial University of Newfoundland. *Newfoundland and Labrador Heritage*. http://www.heritage.nf.ca


Writing, Ritual, and Folklore: Imagining the Cultural Geography of Voyageurs

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When I was a child in a small town on the prairies, I walked to school every day. By the time I reached Grade 6, I felt as if I could walk to my elementary school blindfolded. I knew every house along the streets, every shortcut through backyards, every crack on the sidewalks. When I started junior high school, my sense of the town was altered. I had to walk in a different direction, learn a new route, new cracks in the sidewalks. My sense of the town changed even more when I began high school, and walked in yet another direction. At 16 I learned to drive, and the world around me grew exponentially. I explored the surrounding countryside on my own, ventured to the city to hang out at the malls, and made day trips to the beach. I loved the wide-open skies, the miles and miles of straight roads framed by telephone wires, the sense that you could see the earth curving away in the distance. During summer vacations, my family took long car trips to British Columbia, the Maritimes, and California, and for the first time I saw oceans, mountains, and deserts. Yet the centre of my life remained my parents’ house, located roughly in the centre of the North American continent. When I moved east to Montreal to attend university, my world shifted, my ground tilted; I felt disoriented. Not only did I have to learn a new place, new routes to travel to school, and new landmarks, but also my centre of existence had shifted. The sky was different.

Now that I have lived in six different cities and dozens of different apartments and houses, I understand how important cultural geography is to defining both place and identity. My centre has shifted with each new move I make, but I still judge the size of a place in terms of my hometown and I compare vistas to the prairies. Most people’s sense of identity is rooted to the land, and
all societies envision space (an unoccupied and unknown expanse) and place (an occupied and knowable location) in distinct ways. In Chapter 14 of this volume, Matthew Evenden explains how distinct visions of Canada as a land of vast resources, industries, and physical features shaping its international geopolitical relations can be traced in military maps from the Cold War period. People and societies create individual and collective mental maps of their world to understand the land around them and their place in it. Their environmental history and cultural geography shapes their understandings of owning land, using land, and travelling through it.

In the late 1980s Donald Worster characterized environmental history as encompassing three branches of study: natural environments of the past, human modes of production using natural resources, and human ideas about nature. These branches have been growing and weaving together in the last two decades, but Worster’s distinction helps us understand how different environmental histories ask completely different kinds of questions. This chapter concerns Worster’s third branch, so it will not ask how ecology during the early North American fur trade differed from today, and it will not explore the effects of humans trapping some fur-bearing animals to the point of virtual extinction. Instead, this chapter asks how people working in the fur trade perceived their environment, based on the premise that perceptions of the environment influence people’s identities and cultures.

The Dictionary of Human Geography defines cultural geography as “a subfield of human geography that focuses on the impact of human culture, both material and non-material, upon the natural environment and the human organization of space.” Some American scholars, known as the “Berkeley School,” focus on human interventions transforming the earth’s surface. Their work is inspired by geographer Carl Sauer, who explained that “cultural landscape is fashioned from a natural landscape by a culture group. Culture is the agent, the natural area the medium, the cultural landscape the result.” Hence, the term “landscape” differs from “environment” by focusing specifically on human impacts on land. More recently, scholars have been shifting from examinations of material changes to land to an examination of how ideas shape landscape through literature, art, and politics. This “new cultural geography” looks at how values, meanings, and attitudes are distributed spatially, and hence how landscape is socially constructed. How can historians uncover people’s cultural geography, both physical and metaphysical, in past times? What kind of clues about their views of land did they leave behind? In the future, a historian can try to understand my sense of place by reading this article and my other writings, by uncovering where I lived, by examining how I travelled, and, if I am alive, by interviewing me. Much of my information is amply recorded in my journals, diaries, academic writing, and in the detritus of paper and digital documents generated by modern North American societies: tax returns, telephone books, ticket stubs, reimbursement forms, insurance records, e-mail, and the Internet. Studying the distant past is not so easy. How can we understand the cultural geography of people who were not literate and did not live in a society that generated large amounts of records? It is easier to uncover information about historical figures who were literate and deemed significant by their contemporaries (and themselves). For example, it would be fairly easy to attempt a reconstruction of the cultural geography of the explorer and fur trader Simon Fraser because he wrote a lot, and published and saved his records, which are now housed in archives. But how can we discover the views of the men who paddled his canoes and transported his equipment and trade goods?
This chapter will consider how French Canadian voyageurs from the St. Lawrence valley (in present-day Quebec) who worked in the fur trade in the 18th and 19th centuries viewed and shaped their geographic world. Because voyageurs were nonliterate and left very few records of their lives, finding sources to study their cultural geography is a problem. Two major types of sources offer some information. The first are documentary records, both in manuscript and published form, written by notaries, explorers, missionaries, and officers or masters in the fur trade. The second are oral stories, passed down through occupational groups and families, many of which were recorded in the late 19th and early 20th centuries by folklorists. Both of these types of sources can be used carefully to explore how voyageurs made sense of their physical surroundings and created their own sense of place while constantly travelling.

Working in the fur trade as paddlers and porters offered male French Canadian peasants an opportunity to supplement the livelihood they made from farming. Sons, husbands, and fathers signed up to work in the fur trade either as *mangeurs de lard* (porkeaters), to transport goods via canoes between Montreal and administrative posts in the Great Lakes region in the summers, or as *hommes du nord* (northmen), to work year-round, transporting trade goods from the Great Lakes to posts far into the interior, and to trade with aboriginal peoples. Voyageurs, the collective term for workers in the Montreal trade, were hired as indentured servants and signed contracts to work for their masters for between three and five years at a time. This group of labourers developed a distinct identity and occupational subculture that first emerged in the 1720s and lasted until the 1850s, when the Montreal-based fur trade diminished. Within this subculture, porkeaters were considered as “lesser” men than northmen because they did not travel as far into the continental interior, they did not spend their winters at posts or in camps, and they had access to domesticated meat, rather than being required to eat wild meat year-round. Porkeaters were paid less than northmen, and had to submit to teasing and inferior working conditions. A small portion of the men worked their whole lives in the fur trade, some quit the service and remained in the continental interior to join aboriginal communities or to live as freemen, but the majority returned to work on their farms in the St. Lawrence valley.

The main job of voyageurs was to transport trade goods and people thousands of kilometres in canoes. Fur-trade posts were spread out over the continent along rivers and lakes. Most posts were found in the boreal forests, near the habitat of beavers, whose pelts European traders valued above all other fur-bearing animals. The trade extended south along the Mississippi River to its mouth in the Gulf of Mexico, north along the Mackenzie River to its mouth in the Arctic Ocean, and west over the Rockies to the Pacific Ocean. The first part of the vast network of travel was concentrated between Montreal and the major administrative posts of the western end of Lake Superior. The journey could take between three and eight weeks depending on direction, weather, wind, and water levels. Voyageurs followed the Ottawa River to Lake Nipissing, continued along the French River to Lake Huron, and skirted the north shores of lakes Huron and Superior (Figure 4.1). At Lake Superior, porkeaters exchanged their cargo with northmen and started the journey back to Montreal, carrying the furs that would be sold in Europe. After bringing the furs out of the interior, northmen returned to their posts with European goods to trade with aboriginal peoples. Some headed south through Lake Michigan and other south-flowing rivers to connect with the
Voyageurs travelled through a complex system of rivers, streams, and lakes to transport goods and furs thousands of miles between Montreal and interior posts. Gaps in water routes were called portages, and here voyageurs had to carry their canoes and cargo over land. Shifts in continental drainage patterns, such as from the Great Lakes to Hudson Bay, were referred to as “heights of land.” The *pointe aux baptêmes* mark sites where novices were ritually baptized into the profession.
Mississippi and Missouri rivers. Others headed west through the boundary waters and Lake of the Woods, and the Winnipeg River, before connecting to the Saskatchewan, Red, Assiniboine, and Qu’Apelle rivers. A smaller group then pushed north to Lake Athabasca and beyond. These Athabasca men, as they were called, had the most difficult job: they not only had to travel the farthest of all voyageurs, they also had the shortest amount of time to travel between spring thawing and winter freezing.

With all this travelling over thousands of kilometres for months at a time, one would expect voyageurs to have highly developed and particular views of landscapes. Crews often hired local aboriginal guides to help them find their way through the countless lakes, rivers, and streams, but some voyageurs became experts on travel routes and assumed the role of guide within their canoe brigade for extra pay. The financial incentive and the effort to make their difficult jobs a little easier ensured that men paid close attention to the land they travelled through. So how can we find out how voyageurs viewed this land?

Written Sources

Literate people who travelled with voyageurs wrote about them. These included missionaries, explorers, and other travellers to the interior of the continent, but the majority were voyageurs’ masters in the fur trade, usually English-speaking Protestants, who differed significantly from the French-speaking Roman Catholic voyageurs. Most of the written descriptions about voyageurs are brief and formulaic. In daily journals and company correspondence, masters recorded details of work and problems that arose in the trade. In their personal letters, journals, and narratives, they cast voyageurs in the role of exotic entertainment, commenting on their singing, joviality, strength, and perseverance. A stereotype emerged of the voyageur as a merry workhorse, able to travel faster than a speeding arrow and leap over tall waterfalls in a single bound. Commentary on voyageurs by outsiders to their occupational subculture must be read carefully to extract meaningful data on voyageur history. In her book on the writings of British traders in the plateau region of the Pacific Northwest, Elizabeth Vibert describes the bias in traders’ writings as a “coordinating grid” or a web of ideas and assumptions that shaped the traders’ observations of aboriginal peoples. Her book identifies “the strands of inherited meaning that are woven into trader discourse.” Learning about the historical and social processes in which the strands were spun helps her read the meanings of each strand and how they interact when woven together. Historians usually think of discourse as both a specific act of communication (a sentence, a film, a piece of graffiti, a baptism) and as a more generalized way of thinking that provides vocabulary, expressions, and styles of communication. For example, a chicken may be described by a biologist as a source of pandemics, by a dietician as an excellent source of protein, and by a philosopher as what came before the egg. Traders’ writings about voyageurs must be read for their discourses with the same degree of caution.

Even though the fur-trade masters and other travellers saw voyageurs as stereotypes and viewed them through their own cultural lenses, their writings still contain useful information if we read beyond their words. One strategy for using these sources with caution is to figure out the context in which the masters were describing voyageurs. Masters sometimes varied their portraits of
voyageurs depending on their audience. For example, Alexander Mackenzie described voyageurs as loyal and obedient in his 1801 history of the fur trade because he was trying to convey the success of the trade. Yet, in a letter to his cousin Roderic McKenzie, who had just become a master himself, Alexander Mackenzie warns him to “keep every thing as secret as you can from your men, otherwise those old voyageurs will fish all they wish out of your green hands.” Many travellers commented on voyageurs’ actions because they saw them as part of the exotic landscape of their travels. Others were concerned with trade profits and viewed voyageurs as either obstacles or assets.

A second strategy is to read around the intentions of the recorder or to read against the grain. For example, a master might have casually mentioned that his crew canoed for 25 songs or five pipes. His intention was to record the distance the crew travelled, but he also disclosed that distances were measured by voyageurs’ work rituals, namely, singing while they paddled and taking regular breaks to smoke pipes. Written documents often contain multiple voices, some more faint than others. By closely reading a document we can try to amplify the faint voices to see different perspectives.

A third strategy is to read widely in these writings to discern patterns. If many people commented on voyageurs’ activities or behaviours then we have confidence that they represent voyageurs’ lives. However, we also have to wonder why certain incidents were reported. Sometimes events were recorded because they were deemed remarkable, much like the way news is reported today. If someone in the future were to be writing the history of early 21st-century Canadian urban society based solely upon daily television news, they may mistakenly surmise that most cars are involved in traffic accidents and that most people experience violent crime. Similarly, we must wonder whether the traders recorded only what they thought was remarkable and hence newsworthy. Did their reports characterize daily life or extraordinary events or both? Most of the mundane everyday activities were probably not recorded for the very reason that they were everyday events and not deemed remarkable enough to comment on in journals and letters. Some writers were particularly observant or particularly interested in voyageurs and hence wrote a lot; general patterns of behaviour can be inferred from these writers or from specific incidents that received a lot of attention.

Voyageurs shaped their landscape in both physical and metaphysical ways. The amount of traffic along waterways between Montreal and interior posts left ecological footprints. The frequent canoeing accidents scattered cargo and human remains in rapids and waterfalls. Few archaeologists have explored these sites (and when they do, as Peter Pope suggests in Chapter 3 of this volume, both expected and unexpected findings will raise new historical questions and lead to new interpretations). In addition to archaeological remains, other ecological footprints are evident. Campfires along rocky shores have left scorch marks on rocks. In the large context of overhunting, that led to the extinction of many fur-bearing animals, voyageurs hunting and fishing for food along fur-trade routes added a pattern of localized extinctions and changes to animal and fish habitats. Unlike the Inuit described by Lyle Dick in Chapter 5 of this volume, voyageurs did not have intimate knowledge of the lands they travelled through to fine-tune their hunting and fishing to each locale’s changing resources. The pemmican industry that arose to meet the needs of feeding large crews working in the trade contributed to the continental extinction of bison. Material traces of voyageurs can be uncovered by archaeological and scientific investigations. But what do written sources reveal about how voyageurs viewed and shaped land?
One of the first things that historians may notice is that voyageurs imprinted themselves on the land by naming elements of landscape. They named geomorphologic features, such as rivers and portages. Master Ross Cox commented that “The Canadians, who are very fertile in baptizing remarkable places, called an island near our encampment of the 6th Gibraltar, from the rocky steepness of its shore.” While travelling along the Winnipeg River, he complained that “it would be tiresome and useless to give the various names by which the Canadians distinguish[ed] those places” because there were so many of them. On a trip from Pays Plat (flat country) near Lake Superior to Portage de L’Isle in the Winnipeg River during the summer of July 1784, the crew of Edward Umfreville recorded the French names of many portages, which described their physical features, including Portage de Detour, Portage de Deux Rapids (two rapids), Portage des Grosse Roches (large rocks), Portage des Trembles (aspen), and Portage de Petite Rivière (little river). Other place names that reflected the physical surroundings included Portage du Thé, named after a species of mint that grew there and was used for tea; les Terres Jaunes, which referred to the yellow banks in the Rocky Mountains; La prairie de la Vache (bison country); and Le Rocher de Miette (small rocks). It is impossible to say whether voyageurs named these places themselves or translated them from aboriginal names. Other place names are obviously the French translations or renditions of aboriginal names, such as Lac Ouinipique (Lake Winnipeg).

The (re)naming of landscape features promoted a collective identity among voyageurs that reflected their history and identity. These names persisted for years and many have survived to today. Clerk George Nelson provides a detailed description of a trip between Fort William and Cumberland House in the summer of 1822, mentioning the prevailing names of many of the portages and the stories that went with them. Portage Écarté (remote or isolated) was so named because a man had been lost in it for nearly two days and because the path through the portage was obscured by large stones. Another named Racoursi (shortcut) was so difficult that, according to Nelson, only maniacs tried to run across it. He described Petit-Portage des Chiens (small portage of dogs) as slippery and smooth, commenting that the men frequently slid on their backsides or fell on their faces while racing with their heavy packs. Portage à Jourdain was named after a guide who had broken his canoe there. Another portage where a couple of men had died was called Portage des Morts. Voyageurs called the Rainy Lake Portage “le bout des Terres” (end of the land), which was an old name that Nelson thought might have originated in the early days of French exploration, when the French traders travelled only to that point in the interior and thought that the Great Lakes were simply branches of the western sea. Portage Des Rocher à Chaurette was named for a guide who broke his canoe and lost his cargo there. At Chute à Jacseau (Jack Falls) voyageurs customarily raced with their loads and frequently fell with them. Voyageurs raced across portages in order to appear strong and agile, bolstering their reputations, even if their actions proved dangerous. Some “fools” also raced across Portage Barrière, but were often killed. One portage on an island was named Beau-bien, after a voyageur was ordered by his bourgeois to run the rapid against his will. The canoe was swamped and sucked into an eddy; several people drowned and much property was lost. Nelson commented that voyageurs “perverted” many aboriginal place names, but most of the names he listed seemed to have arisen from voyageurs’ experiences. The names of the portages might have served as markers for difficult portages, as well as
reminders of those men lost in the service. For example, Portage des Noyés (the drowned) marked the location where five men had died. More of these names can be found in sources beyond the fur-trade documentary record. A survey of contemporary maps, as well as the recordings of folklorists, can provide a wealth of this kind of data.

**Rituals**

In addition to naming, voyageurs marked points of landscape by performing rituals. Voyageur rituals were performed with a fair degree of regularity and they are easier to find in fur-trade journals and letters than many other kinds of actions. Historian Edward Muir proposes viewing rituals as both mirrors, reflecting what people think, and models, helping people articulate, strive for, and teach how they would like to be. He outlines at least three related ways in which ritual is understood. Some scholars think of ritual primarily as an enactment that creates social solidarity or forms of social identities. Others focus on ritual as a form of communication that allows people to tell stories about themselves. And yet others see ritual as a collectively created performance that constructs, maintains, and modifies society. Muir argues that rituals present both unified visions of society and discordant voices to challenge these visions. Hence he sees rituals as “inherently ambiguous in their function and meaning. They speak with many voices.” Let’s consider rituals in all their broad and versatile forms. Rituals can create, express, teach, and remind participants of the meanings and values of their community and their identity. Rituals can form communities, bolster communal bonding, and at the same time provide a forum for the expressions of individual selfhood that challenge communal bonds. The instability and fluidity of the voyageur occupation not only made rituals of vital importance to the development of common values and working patterns among voyageurs, but also provided a site for contrary discourse. For example, races along lakes led to both fraternal bonding among men in one crew and feelings of competition and social divisiveness between different crews.

Many of these rituals were Roman Catholic. Master Daniel Harmon noted that “the Canadian Voyagers when they leave one stream to follow another have a custom of pulling off their Hats and making the sign of the Cross, and one in each Brigade if not in every Canoe repeats a short Prayer.” Voyageurs probably organized their appeals to the saints and their prayers according to aspects of the land, such as prayers for specific streams, rivers, lakes, islands, portages, rocks, hills, and cliffs. Every time they entered a new part of the journey, they would appeal to God and the saints for protection. The regular religious appeals meant that voyageurs both actively divided their journeys into sections marked by landscape features (which helped them keep to their course and estimate the time of their travels), and constantly invoked spiritual forces for protection.

One of the most distinct rituals performed by voyageurs was mock baptism. Baptism is one of the seven sacraments in the Roman Catholic Church and represents the entrance of a new soul into the Church. Mock baptisms performed by voyageurs symbolized the rebirth of a settler into a voyageur and the joining of a new fur-trade community. These ceremonies were a strange blend of blasphemy and reverence for a Catholic ritual combined with elements of aboriginal customs.
Voyageurs performed mock baptisms at physically distinctive points along fur-trade canoe routes, points that divided the long routes into distinct physical sections. At these points, voyageurs and masters who had not yet crossed that point in their working lives were dunked in the water by the crew. Usually the novice was pushed into the water and immediately rescued, but sometimes the ceremony was more elaborate and performed on the shore. In the summer of 1793, just west of Grand Portage on the shore of Lake Superior, newly hired clerk John Macdonell recorded in his journal:

Passed the Martes, les Perches and Slept at the height of Land, where I was instituted a North man by Batême performed by sprinkling water in my face with a small cedar Bow dipped in a ditch of water and accepting certain conditions such as not to let any new hand pass by that road without experiencing the same ceremony which stipulates particularly never to kiss a voyageur’s wife against her own free will the whole being accompanied by a dozen of Gun shots fired one after another in an Indian manner. The intention of this Bâtême being only to claim a glass. I complied with the custom and gave the men . . . a two gallon keg as my worthy Bourgeois Mr Cuthburt Grant directed me.

The mock baptism reflected voyageurs’ Roman Catholic beliefs and contact with Algonquian-speakers, in that it blended emphases from both. The ceremony stipulated rules about the treatment of aboriginal women and novices, gave the young men a sense of belonging, and helped unite the crews, which was crucially important to the effectiveness and safety of the job. Occasionally voyageurs added aboriginal elements, such as tobacco offerings and cedar boughs.

I have been able to find three locations of rituals in the documentary record, and there were undoubtedly more. The first site of mock baptism took place along the Ottawa River where the bedrock of the Laurentian or Canadian Shield is first visible from the trip out of Montreal. It is located about 320 kilometres northwest of the modern city of Ottawa, where Deep River or the Rivière Creuse enters the Ottawa River at the upper end of Lac des Allumettes. Here canoe brigades passed through a deep and swift part of the river, where cliffs of granite provided a significant visual marker for the entrance into a new land. After this passage, brigades stopped at a sandy point, known as “Pointe au Baptême,” where canoes could be easily grounded and the crew could pause for a rest. It was the oldest and most well-established site of ritual baptism along fur-trade routes. As early as 1686, Chevalier de Troyes mentioned the practice as an established custom: “Our French have the custom of baptizing at this place those who have not passed before.” The “Pointe aux Baptêmes” is still marked on maps today. This point separated voyageurs from habitants or peasants in the St. Lawrence valley, and it represented a point of no return to new voyageurs who may have been thinking about deserting the difficult job and returning to their farms.

The second site of baptism was about 80 kilometres west of Lake Superior, at the height of land separating the waters draining into the Great Lakes from those draining into Lake Winnipeg and Hudson Bay. Two routes from the western shore of Lake Superior to Lake Winnipeg crossed this
divide, one from Grand Portage and the other from Fort William farther north. Each route had a point of baptism at the “height of land.” Heights of land marked the boundaries of watersheds, and crossing them entailed a major portage to the new river system flowing in the opposite direction. The journey toward a height of land was always difficult because it was against the current, while the journey away from the point was easier because it was with the current. This height of land spanned several portages of over 300 metres, and served to separate porkeaters from northmen.31

The third site of ritual baptism was in the far northwest at Portage La Loche, also called Methy Portage, on the Clearwater River, which flows into the Athabasca River. The portage of 20 kilometres was located on the height of land separating the waters flowing into the Churchill River and Hudson Bay from waters draining into the Mackenzie River and Arctic Ocean.32 The site was long recognized as one of the most difficult and beautiful portages in the north.33 Most of it stretched over level ground, but the last 1.6 kilometres comprised a succession of eight hills, and the trail followed the edge of a steep precipice that fell about 300 metres to the plain below. Explorer John Franklin waxed poetic about the beauty and sublimity of the view. After he completed its traverse, he wrote, “I could not but feel astonished at the labourious task which the voyageurs have twice in the year to encounter at this place in conveying their stores backwards and forwards.”34 This site of baptism represented the entrance to a new state of “northness,” as the change in drainage system toward the Arctic Ocean took voyageurs more quickly and easily into new northern frontiers. This point separated northmen from Athabasca men, who were considered the most experienced, talented, and toughest of all voyageurs.

Each of these sites of ritual baptism marked a striking transition, the entrance to a socially recognized “new land” or region within fur-trade country, and the beginning of a new discernible segment of the vast canoe route of the Montreal fur trade. The fur-trade country was a psychological as much as a physical space, in which these sites of ritual baptism marked symbolic passages to different worlds that became increasingly challenging and exotic as one moved north and west. The sites also represented points of no return. Once reached, the brigades were too far along in their journeys for men to desert and easily return to the safety of Montreal, Grand Portage, or Ile à la Crosse. The oldest of the sites was the closest to Montreal, and the most recent of the sites was in the farthest reaches of the northwest. The sites followed the extension of the fur trade north and west, and came to represent the expanding boundaries of the fur-trade country.

Folklore

In addition to performing rituals, voyageurs imprinted their cultural geography on the landscape by telling stories and singing songs. One of the most remarkable of these points was a place along the Ottawa River on the shore of Grand Calumet Island, where a voyageur named Jean Cadieux was said to have perished. Each time a brigade passed the spot, voyageurs sang the song “Petit Rocher” (little rock) and told the story of Cadieux’s demise. Legend has it that Cadieux composed the song on his deathbed and wrote it on bark with charcoal or carved it into a tree before he fell
into a grave he had dug for himself. (When a group of Iroquois attacked his brigade carrying furs to Montreal, all escaped down seemingly impassable rapids except for Cadieux, who fell or jumped out of the canoe. He perished while hiding in the woods from the Iroquois.) The local memory of this story has survived to the present day. A monument to Cadieux and a substantial plaque stands along the major road on Grand Calumet Island, and a white wooden cross marking his grave stands in the bush near the shore, presumably close to the original site where voyageurs commemorated him. The song “Petit Rocher” is known today in French Canada, but his story has not survived as well in popular culture, nor was it widely circulated among the literate fur traders, explorers, and travellers of the 18th and 19th centuries.

To date, I have found nine references to the story in the historical record. Four of these are found in the documentary record of literate masters or travellers. Five references are found in the collections of folklorists in the early 20th century, who were interested in recording stories passed down orally through generations of French Canadian families. These accounts are shaped by the various tellers and listeners, and have passed through the lens of recorders questing for their notion of folk or ordinary people. Stories and songs should be treated in much the same way as written evidence, and interrogated for their context and layers of meaning. But they have the added problem of being transformed from an oral state to a written one. They are torn from the context of performance, where the relationship between the teller and audience shapes the story. The transcribing of oral stories excises gestures, intonations, emphases, and verbal rhythms, all of which contain meaning. The loss of evidence in transcribed stories does not render them useless to historians, but we must keep in mind that they are fragments of a much larger picture. The remembered and the written evidence are equally problematic, but they provide a good contrast to one another, and are striking in their similarities. The earliest and briefest hint of a similar tale was made by clerk John Macdonell in 1783. While travelling down the French River towards Lake Huron, below the Grand Recollet portage, Macdonell wrote,

After passing a narrow racy rapid named the Dalles we saw an island on which the story goes, the Iroquois in former days, say 40 or 50 years ago, tried to cut off a strong brigade of trading canoes. But upon finding themselves discovered by the French they abandoned their ambush with precipitation and the canoes pursued their route. It is said this was among the last attempts the Iroquois made in the long wars they had with the French in Canada.35

Although Macdonell makes no reference to Jean Cadieux, and the story is not along the French River, if this was an abbreviated form of the story, the origin can be traced to the 1730s or 1740s.

A direct record of the tale being told some time around the turn of the 19th century was passed down through the family of Hyacinthe Lemaine (1856–?), who lived on Grand Calumet Island. At the age of 70 in 1926, he recounted the tale taught to him by his father, who had learned the tale from his grandmother’s brother. Lemaine’s father made no mention of a song but taught Lemaine the story. Folklorist Louvigny de Montigny published this version in 1954: when a canoe of French traders stopped on the shore near the falls of Calumet, Cadieux got out of the...
canoe because his legs were cramped. When his crew saw Iroquois approaching, they sprang away without waiting for Cadieux. The canoe managed the incredible feat of shooting over the falls. Cadieux stayed near the spot where he disembarked and dug a hole, presumably a grave for himself. When his crew finally returned to pick him up, they found that Cadieux had died of joy at the sight of his rescuers.36

The first direct account of the tale in the documentary record can be found in the journals of George Nelson, who was a clerk in 1804. Like Lemaine, Nelson locates the event near Grand Calumet Island. Nelson wrote that in 1759

a Canoe of Voyageurs returning home from 'upper Countries', whether from Mackinac or the Grand Portage, were in the act of carrying their furs & baggage to the lower end, they met a large party of Iroquois going to war: they immediately set up their frightful War yell & pursued. The Canadians ran, leaped into their Canoe & paddled off for the opposite side, but getting into current were carried down those awful rapids, expecting every instant to be engulfed:—every one, most naturally put up his prayers, & vowed masses for their deliverance. They were carried over safely—they did not even ship any water. The next Portage being only a few hundred yards off, they escaped & drove to Montreal with the utmost expedition. The Iroquois ran too to the lower end, & saw them arriving at the Portage; ‘but observing a tall woman in white robes standing in the bow of the Canoes, immediately perceived they were under the protection of a divinity; of course pursuit would be as fruitless as impious:’ they each continued their respective routes. This was certainly a miraculous escape. It was indeed in the summer & the waters low, yet no bark Canoe even at very low water can withstand the furious commotions. The crew said, (& it is generally believed by the Romans) there they saw a woman, they believed to be the Virgin mary, conducting the canoe. One unfortunate creature being very lame a bruised heel (une foulure) could not reach the Canoe in time. He hid himself in the bushes. Ten days after, a party returned from Montreal to see after him. After much research they found him dead, ‘in a hole he had himself dug out with paddle’! He died from hunger disease & fright. Some say the body was not yet quite cold.37

Nelson’s version focuses on the miraculous escape of the crew aided by the Virgin Mary rather that on the tragic fate of the poor Cadieux.

The earliest reference to the song of Jean Cadieux dates to 1810. A French Canadian named Mercier learned the song in that year, and later taught it to his nephew Ovide Soucy, who passed it on to folklorist Marius Barbeau in 1918.38 Soucy’s uncle recalled that the song had been carved into an elm tree in very large and awkward letters, at the foot of a grave where an old voyageur named “Joseph Cagyeux” had perished. While being chased by Iroquois Cadieux abandoned his crew so that they could escape unharmed. He was now portrayed as a hero.
Dr. John Bigsby, travelling with a crew of voyageurs in 1821, also located the story along the shore of Grand Calumet Island and mentioned an inscription carved into a tree over a grave. When Louis-Guillaume Lévesque, French Canadian translator, author, and former participant in the 1837 rebellion, wrote about the tale in the late 1840s, he was intrigued by the site. His description is accompanied by a sketched map of the Grand Calumet rapids, showing precisely where Cadieux fell out of the boat and the tree where he carved his story. At some point along the way, Jean Cadieux had fully transformed from a minor and hapless victim to a hero and martyr among voyageurs. When Samuel Bowie moved to Île du Calumet in the early 1850s, everyone in the area knew the story and song of Jean Cadieux very well, and a monument to Cadieux had been erected near the falls where he perished.

By this time the story of Jean Cadieux had gotten to be so long and complex that German story-collector Georg Johann Kohl claimed that while travelling around Lake Superior, “I met with no one who knew it all by heart, though I took considerable trouble. But I heard many fragments at different places, and nearly every Voyageur knew a part of it, or was at least acquainted with its contents.” In a detailed description of the story, Kohl recounted that Jean Cayeux (as Kohl called him)

was a great Canadian Voyageur, a hunter and fur-trader, beloved by the Europeans and friendly Indians, and known through the entire country of the St. Lawrence... With the expenditure of his final strength dug himself a Christian grave. Over the grave he erected a cross, and he cut and carved on the wood his complainte, the entire history of his tragic fate. (So, at least, my Canadians asserted. They believed they sang the very song composed by Cayeux on his death-bed, but I imagine they could only have been some short allusions to his end.) The wooden cross soon rotted away, but the copy of his complainte is saved. And the cross has been repeatedly renewed up to the present time, and the Voyageurs still know the spot exactly.

This rendition is quite different than the earlier versions in its detail and its focus on the fate of a now heroic Cadieux and the fascination with his recording of the song. The most elaborate version can be found when the song was first recorded in 1863, by folklorist Jean Charles Taché, who wrote down the tale as he heard it from an old guide named Morache. Taché asserted that every time a crew passed by Grand Calumet portage, old voyageurs would tell novices the story and all enjoyed hearing it again and again. In this version (like the previous) Cadieux was an interpreter and voyageur, married to an Algonquin woman, with whom he had several children. Along with several other voyageur-aboriginal families, Cayeux lived year-round on the Ottawa River, hunting in the winter months and trading on behalf of fur merchants in the summer. They were attacked by an Iroquois war party at the moment when they were expecting a group of Odawa from Île des Courte-Oreille, west of Lake Michigan. The only means of escape for the families was to run the rapids, even though no one had ever done it before. As the most capable voyageur, Cadieux remained behind along with a young Algonquin man to distract the Iroquois. They armed themselves with guns, axes, and knives...
and engaged in a fierce battle with the Iroquois while the canoes escaped downriver. All prayed to Ste. Anne, mother of the Virgin Mary, helper of sailors and fishers, and patron saint of the voyageurs. They said Cadieux’s wife, a particularly pious woman, helped summon the Virgin Mary for guidance. The group made it safely to Lac de Deux Montagnes, just outside Montreal. Meanwhile, the battle at Sept Chutes (seven falls) continued fiercely, and Cadieux’s young aboriginal companion was overcome. For three days and three nights the Iroquois pursued Cadieux in the forest. Cadieux continued to hide long after the Iroquois gave up pursuit.

After 13 days Cadieux’s companions finally found him, close to Sept Chutes, near a small hut he had constructed, half fallen into the grave he had dug for himself, holding the bark on which he had inscribed his death song, his body still warm but his soul departed. Taché says that the voyageurs “liked to pretend” that Cadieux did not know how to read or write and that his death song appeared on the bark by a miracle, but Taché is convinced that Cadieux must have known how to write. (I find it strange that the skeptical Taché did not wonder at how a frightened, starving, and dying man found the energy to compose and carve a song, regardless of his level of literacy.) Taché reported that voyageurs cried whenever they sang Cadieux’s lament, and they continuously replaced the wooden cross at his grave along the Ottawa River. Even in the 1860s, voyageurs ensured that a copy of Cadieux’s song written on bark was hanging from a tree near his grave. By the time the famous 20th-century folklorist Marius Barbeau analyzed recorded versions of the song in 1954, the tale had been explicitly acknowledged as a true story of a real man who perished in 1709.

The example of Jean Cadieux’s story and song illuminates how voyageurs associated their canoe routes with their history. Voyageurs’ changing views of their history are apparent in how the story changed over time. As voyageurs became more important to the fur trade, we see the position of Jean Cadieux changing from a marginal figure to a hero: voyageurs increasingly recognized their worth as skilled workers in the trade. We also see Cadieux’s loyalties shifting from his crew to his aboriginal family, which reflects a trend in voyageur culture. As the fur trade moved farther into the continental interior, the labour force of northmen grew to staff new posts and transport goods the increasing distance from Montreal. More men working in the trade farther away from their French Canadian homes led to a higher rate of voyageur marriages to aboriginal women and an increase in dual-heritage children. The change in the Cadieux story reflects this shift in the preoccupations and family orientations of many voyageurs. The Cadieux example shows how it is useful to integrate different types of data, namely documentary and oral, to reconstruct the narrative of a how a story was told and to gain glimpses into the voyageurs’ consciousness of their history and identity. Voyageur history and identity was not static, but changed over time to reflect the status of their jobs, the formation of families with aboriginal peoples, and their association with the place. Yet the location of Cadieux’s grave and the use of the Ottawa River for transporting trade goods remained constant.

This paper has shown how documentary and orally transmitted records can reveal aspects of voyageur cultural geography. Voyageurs used canoe routes as the organizing framework for understanding the vast areas through which they travelled. They needed to learn these routes as
quickly as possible to perform their jobs, and they needed to know the dangers and advantages of all segments of the routes in order to stay safe. But the records reveal more than this. The voyageurs made the canoe routes their own by imprinting meaning on them. The most obvious way they did so was to name parts of the landscape. They also performed rituals along the journeys, and marked sites with stories and songs. These rituals, stories, and songs taught voyageurs about the routes, warned them of what was approaching, commemorated those who had perished, and enshrined aspects of their past. These meanings changed over time to reflect an evolving voyageur identity and history.

The cultural geography of voyageurs is still faintly visible today in material and cultural shadows on the landscape. The most obvious examples of the history of the fur trade are the numerous remains of stone fur-trade posts and reconstructed wooden posts that are now historic sites, such as Fort William in Thunder Bay, Ontario; Lower Fort Garry north of Winnipeg, Manitoba; and Historic Dunvegan in northwestern Alberta. Place names retain echoes of the fur-trade era, such as Portage la Prairie in Manitoba, and Ile à la Crosse in Saskatchewan. Some railway lines and highways follow the old canoe routes, and roadside plaques commemorate portages. Ecotourism companies offer guided tours of parts of fur-trade routes, such as Voyageur Adventure Tours in Samuel de Champlain Park along the Mattawa River just east of North Bay, Ontario. Although the land has been covered with asphalt and cement, houses and skyscrapers, and smog hangs in the sky, there are traces of the fur-trading past in the lakes, rivers, and streams.

When I return to the prairies, to my town, to my parents’ house, I think about all the people who have travelled over that land before—aboriginal peoples, voyageurs, Icelandic settlers, Ukrainian farmers—and although the buildings and people keep changing, I know that their travel routes are buried somewhere in the land, and that their cultural geography is buried somewhere in archives and memories.

**DISCUSSION QUESTIONS**

1. How do the physical and cultural worlds of voyageurs relate to one another?
2. What is cultural geography? What kind of evidence can be used to reconstruct the cultural geography of French Canadian voyageurs?
3. How will a historian in the future be able to research your cultural geography?
4. What does “reading beyond words” mean? Are there many ways to do this?
5. Describe your own “coordinating grid” or web of ideas and assumptions that shapes your observations of the world.
6. Compare the process of researching Simon Fraser’s cultural geography and Jean Cadieux’s.
7. What place, if any, is there for imagination in the researching and writing of environmental history?
NOTES


8. Other documentary evidence includes the contracts voyageurs signed, called *contracts*, and church records, such as baptism, marriage, and death records. Occasionally, evidence on voyageurs can be found in court records.


10. The phrase “reading beyond words” is taken from Jennifer S. H. Brown and Elizabeth Vibert, eds., *Reading Beyond Words: Contexts for Native History* (Peterborough: Broadview Press, 1996), which provides a multitude of examples of how to see beyond the bias of documents produced by non-aboriginals to write about aboriginal history.


15. For an introduction to using material traces in landscape as historical evidence, see William J. Turkel, “Every Place is an Archive: Environmental History and the Interpretation of Physical Evidence,” Rethinking History 10 no. 2 (June 2006): pp. 259–76.


19. George Nelson’s diary of events on a journey from Fort William to Cumberland House, July 21 to August 22, 1822; July 23, 24 and 27, 1822; August 6, 11 and 18–20, 1822; S13, Baldwin Room, Toronto Metropolitan Reference Library.


24. The other six anointing of the sick are communion, confession, confirmation, marriage, ordination, and funeral rites.


28. Chevalier de Troyes, *Journal de l’Expedition du Chevalier de Troyes a la Baie d’Hudson, en 1686*, L’Abbé Ivanhoe Caron, ed. (Beauceville: La Compagnie de ‘L’Éclaireur,’ 1918), 15 mai 1686 (my translation). The original French is “Nos François ont coutume de baptiser en cet endroit ceux qui n’y ont point encore passé.”


33. Mackenzie, Voyages from Montreal, pp. 89–90.


40. Centre de recherché en civilization canadienne-française, P76/1/3, fos. 18–19, Fonds Louis-Guillaume Lévesque, Université d’Ottawa.


**Further Reading**


Manipulating Scale

Lyle Dick

“People and Animals in the Arctic: Mediating between Indigenous and Western Knowledge”

Liza Piper

“Colloquial Meteorology”

R. W. Sandwell

“History as Experiment: Microhistory and Environmental History”
People and Animals in the Arctic: Mediating between Indigenous and Western Knowledge

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From the earliest documented arrival of aboriginal peoples in the High Arctic more than 4,000 years ago, humans and animals have interacted. “High Arctic” refers to the Polar desert areas of Canada’s most northerly lands and adjacent waters, generally corresponding to the Arctic archipelago (Figure 5.1). Throughout this region’s history, its resident hunting cultures have relied on animals for food, clothing, and tools. Animals were also an important part of these cultures’ belief systems and spirituality. The material and intellectual cultures of these peoples displayed innumerable adaptations to the ecosystems they inhabited, as successive cultures harvested marine and terrestrial mammals and occasionally fish and birds to enable occupation of this most challenging of Canada’s regions. All persisting groups necessarily acquired a thorough knowledge of the natural environment and developed strategies to adapt to its scarce opportunities and numerous privations. This story continues to unfold today, as Inuit of the High Arctic rely on country food (meaning, the food resources obtained from living on the land), which comprises an important part of their culture and identity. As in the past, Arctic animals are integral to the present and future of the Inuit.

This chapter will examine the history and ecology of human–animal interactions in this region over the millennia and especially in the last century, focusing on the relationships between humans, caribou, and muskoxen. For environmental history, as with other subfields of history, it is important to keep an eye on long-term trends, even when treating more specific, short-term developments. This discussion seeks to identify long-term continuities in human–animal interactions; medium-term changes arising from technological and social change, especially in the period 1875–1955; and short-term trends of the more recent past, governed by a new set of variables,
including shifting political contexts and knowledge frameworks. Both macro- and microhistorical analyses are relevant to the study of the major continuities and changes in environmental history, whether in Canada or other countries. While addressing trends in human–animal relationships over the sweep of High Arctic history, this chapter will focus on the recent history of hunting and associated political developments at Grise Fiord, a small Inuit hamlet on the southern coast of Ellesmere Island and Canada’s most northerly permanent community.

This history will necessarily involve dealing with two epistemologies, or ways of knowing the world: western science and Inuit indigenous knowledge. Data acquired under the western rubric includes historical sources such as explorers’ reports and hunting diaries, ecological sources, and archaeological data. Alongside this research, concepts of Inuit indigenous knowledge will be elaborated. Known specifically as Inuit Qaujimajatuqangit, it corresponds in some respects to what is referred to in recent conservation literature as Traditional Ecological Knowledge (TEK).

Figure 5.1  MAP OF THE HIGH ARCTIC

This map of the High Arctic depicts the Queen Elizabeth Islands, part of the Arctic archipelago of Canada’s Nunavut Territory. This region generally corresponds to the species range of the Peary caribou, which also inhabits Banks Island, parts of Victoria and King William islands, and the Boothia Peninsula. Muskoxen are found in all of these places as well as in a larger area of Canada’s Arctic mainland, Alaska, and Greenland.

Source: Map adapted from one by Jennifer Keeney, Parks Canada, Western and Northern Service Centre, Winnipeg.
form of knowledge is rooted both in empirical observations and pragmatic problem solving, and informs the ethical relationships of Inuit to the environment in which they live. There are good grounds—political, ethical, and scientific—for asserting the importance of both western science and Inuit indigenous knowledge to addressing critical issues pertaining to humans and animals in the Arctic. These two different but equally valid streams are of relevance, to not only science, but also the larger discipline of history. Writing history about the North today involves more than just telling stories; it means mediating between these different paradigms, and finding methodologies that facilitate ongoing inquiry and an open-endedness linking the past, present, and future.

Two High Arctic Ruminants—the Muskox and the Peary Caribou

The muskox is the largest ungulate in the Arctic and in several historical eras was among the most important game animals in the High Arctic. These ruminants are naturally found exclusively in North America's Arctic regions and in Greenland, although they have been introduced in Quebec, Norway, Sweden, and Russia. Present population estimates for Canada are in the order of 85,000 animals, and they have recolonized most of their range since significant depletion of populations both on the mainland and Arctic islands in the early 20th century. The important and documented declines of muskox on the mainland around 1900 played a key role in shaping policies and conservation efforts in the 20th century. In the early 1960s, surveys estimated the presence of 8,500 muskoxen on the Arctic islands, with perhaps 4,000, or nearly half of these, living on Ellesmere Island.

Typically, muskox herds consist of a bull and several cows and calves, but solitary bulls are also common, at least during the rutting season. They graze on grasses, sedges, lichen, and dwarf willow throughout the year. In winter, muskoxen are reportedly less mobile than in summer, as they stay in one place longer to more fully exploit less-abundant grazing opportunities and to conserve energy. The fact that they do not migrate in the winter and remain within limited grazing areas was probably of crucial importance to the Independence cultures, who largely relied on muskox meat for subsistence when they wintered in this region ca. 3,000 and 4,000 years ago. The tendency of muskoxen to retreat into a stationary defensive circle when confronted by attackers was historically a characteristic that made them easy prey for hunters in all historical periods.

The other principal grazing species of the High Arctic is the Peary caribou, the most northerly subspecies of caribou, a medium-size ungulate found only on the Arctic islands and the adjacent Boothia Peninsula of the mainland. At least four distinct populations have been identified based on phenotypic and genotypic differences. A current estimate places the Peary caribou's overall population on the Arctic islands at about 7,000, an apparently precipitous drop since a population estimate of 25,802 in 1961. However, precise figures are lacking, and the 1960 estimate may actually have underestimated the population by up to 50,000 animals. The animals are found in small groups, consisting of adult females and their calves, which are born in early June. In summer, they forage on sedges, willows, grasses, and forbs, especially purple saxifrage. In winter, caribou use more exposed sites with shallower snow cover and vegetated with dryas, purple saxifrage, Arctic willow, sedges, and lichens. Caribou do
not migrate between summer and winter ranges per se, but long-range movements and their ability to shift ranges between islands in times of environmental stress have been documented.  

While never as numerous as the muskox, the Peary caribou also played a role in the subsistence of the succession of cultures inhabiting the region.

Inhabiting Human Cultures and Patterns of Natural Resource Use in the Arctic

The archaeological and historical record reveals that, from earliest times, aboriginal occupants of the region have been hunters dependent on animals for subsistence. All groups needed to adapt to the region's natural ecology and to adjust to its frequent and unpredictable privations, including a relative scarcity and scattered distribution of game animals. Adaptation, defined as the process by which organisms establish beneficial relationships with their environments, has been the key to survival for all species, including humans, in this difficult natural region. An emerging consensus among students of human ecology is that diversity is the key to sustaining population levels. One of the ways that animal species develop greater diversity is by increasing the range of their habitat. Human populations can be made more viable by extending their range of natural resource use, the number of organisms they utilize, or the efficiency and effectiveness of resource exploitation through improvements in technology or its application.

Archaeological evidence has confirmed that, over 4,000 years, a succession of precontact cultures utilized both Peary caribou and muskoxen for subsistence, in addition to marine mammals, fish, and other resources such as birds. The earliest aboriginal residents of the High Arctic have been labelled the Independence I culture, one of a succession of cultures known collectively as the Arctic Small Tool Tradition. Employing a limited range of tools manufactured with chipped flint, these cultures nevertheless managed to eke out a precarious existence by procuring a wide range of resources, including terrestrial and marine mammals and birds, but they particularly emphasized the procurement of grazing animals such as the muskox and Peary caribou. Members of their small, nomadic bands lived in skin tents even in the dark winters. They probably relied on muskox droppings for fuel for their central hearths, perhaps supplemented by driftwood. In interior areas, temperatures in this region have been recorded as low as \(-70^\circ F (-56^\circ C)\).

Human occupation of this challenging region has not always been feasible and has been significantly governed by overriding climatic trends and related changes in Arctic ecosystems. For the human occupation of the Arctic Islands, the critical climatic shift apparently occurred about 11,000 Before Present (BP), when a warming trend precipitated the retreat of the ice caps and the development of both terrestrial species clusters in nonglaciated areas and favourable marine habitats in adjacent waterways. Ice-core analysis by climatologists situates the postglacial optimum in the High Arctic at 4,000 to 5,000 BP, followed by a general cooling trend. Carbon dating of driftwood found at various locations in the High Arctic reveals the periodic breakup of the pack ice in the region's channels during the last 4,000 years. Driftwood was a vital source of fuel and materials for weapons and tent supports for the Independence cultures and their Thule-Inuit successors. For example, archaeologist Eigil Knuth carbon-dated driftwood charcoal found...
at Independence Fiord off the north coast of Greenland to 3,600 to 4,700 BP, indicating its use by the Independence I culture. Knuth noted that occupation of this region at that time must have coincided with a warmer climatic interval, when reduced levels of pack ice in the Arctic Ocean enabled driftwood from Siberian rivers to reach the northern shores of Greenland. More recently, climatic warming trends at ca. 1,000 BP enabled reoccupation of the High Arctic by the Thule-Inuit culture, which applied a sophisticated array of projectile-point technologies, including spears and bow and arrow, in its procurement strategies (Figure 5.2). At this time, the waters between Ellesmere Island and Greenland were sufficiently free of ice to permit extensive summer hunting of marine mammals, including whales from kayaks or umiaks. Hunting at these remote latitudes took place during summer excursions from Thule-Inuit base settlements in the Smith Sound regions of both Ellesmere and Greenland.

A feature common to all aboriginal groups inhabiting the High Arctic in every era was their practice of nomadism: moving the entire community and its belongings over extended distances. For Arctic peoples, the sparse populations and perpetual movement of the region’s animals demanded a high level of mobility, strategies of resource use closely attuned to the seasonal cycle, and close observation of the feeding characteristics and migration patterns of the major game animals. Arctic peoples needed to be constantly on the move, adjusting their areas of resource use according to the movements of the game species. Their nomadism required the transport of all materials necessary to sustain life—clothing, skins for tents and bedding, hunting, cutting, and scraping tools, and sufficient provisions to sustain the group in intervals between the successful procurement of game. It was the only viable response to an ecosystem in which game species were both broadly dispersed and inclined to roam over vast expanses.

Other essential adaptations included the development of flexible forms of social organization built around hunting, high levels of mobility, and limiting groups to small bands capable of developing sustainable strategies of natural resource use. Given the sparse distribution of the animals, it was essential that hunters be able to predict the best hunting locations in each of the seasons, to maximize their efforts. Techniques such as the periodic alteration of hunting areas and modulation of the numbers and types of animals taken were characteristically practised. Since Arctic animal populations were observed to fluctuate dramatically over time, possibly due to climatic

Figure 5.2  INUGHUIT HUNTER

An Inughuit man displays the technique of hunting with a bow and arrow, Etah, Northern Greenland. In the High Arctic, the Inughuit and other Inuit societies relied on projectile technologies for hundreds of years before the bow and arrow was superseded by rifles in the Peary era, 1890–1909.

Source: Photograph courtesy of the American Museum of Natural History (New York City), Donald B. MacMillan Collection, Crocker Land Expedition, 1913–1917, Negative no. 230920.
fluctuations, Inuit needed to be nimble and flexible in adjusting their resource procurement regimes quickly as circumstances dictated. Due to the lack of predictability of food resources, they harvested as wide a range of game animals as the region afforded, an important adaptive strategy. As stocks of particular species diminished, aboriginal cultures needed to make rapid, pragmatic shifts to the utilization of alternative species. Such changes demanded an alertness to changing migration patterns of animals, expertise in adapting technology according to available materials, and an intimate environmental knowledge to enable successful exploitation of the region’s resources.

We cannot be certain that the subsistence practices of all aboriginal groups were sustainable in all eras. That humans may have played a role in the extinctions of the Pleistocene era has been hypothesized but remains unproved. Regarding the High Arctic, a plausible hypothesis, proffered by anthropologist Robert Paine, is that precontact populations exploited local animal resources until yields were reduced to the level of diminishing returns. Hunters responded by moving on to other hunting grounds to repeat this pattern. While it may be difficult to verify Paine’s hypothesis, the fact that aboriginal cultures utilized traditional projectile technologies suggests they were unlikely to have threatened the status of mammal populations of the region.

While techniques have changed, the pattern of aboriginal hunting has persisted into the present day. Beyond issues of subsistence, observers of today’s Inuit have also remarked on the importance of hunting and associated activities to its members’ identity and well-being. Country food is the focus of a range of social relations, values, and beliefs that define important aspects of Inuit identity. Beyond its social value, for the aboriginal peoples hunting has been of economic importance, enabling individuals and families to continue to live in small Inuit communities and maintain social networks without having to leave their homes or Nunavut. As the text of a recent Virtual Museum exhibit on Inuit culture states,

The food we obtain from hunting, or what we call country food, contributes to our health and it gives us a sense of wellness by providing us with a way to participate in our culture. It is while hunting and living on the land that our elders teach responsibility and the skills that give us confidence. . . . The time we spend on the land helps restore our inner harmony and balance. It also helps maintain our mental and physical well being. Much of the time we spend with our family and friends happens while we are out hunting, preparing the country foods, and taking part in meals. Eating land foods helps us to feel whole. It keeps us “in tune” with nature.

For these and other reasons, Inuit in the High Arctic, including those who are engaged in western-oriented occupations, continue to derive a substantial portion of their subsistence from country food and hunting. Their subsistence-oriented economic systems are characterized by several features, including a mixed economy with mutually supporting market and subsistence aspects; a stable seasonal round of procurement activities, and significant noncommercial networks of sharing and exchange of food and materials; “traditional” or long-standing systems of land use and occupancy; and complex belief systems, knowledge, and values connected to resource use, which are passed on from one generation to the next.
Technological Changes of the Pre- and Postcontact Eras

Technological change has been a major factor affecting the nature and scale of resource procurement in the region. Prior to European contact, the principal technological shift occurred following the arrival of Thule-Inuit people about 900 years BP. This culture’s advanced technological repertoire greatly exceeded its predecessor peoples of the Arctic Small Tool Tradition, enabling a more effective procurement of the range of wildlife. However, by emphasizing the hunting of marine mammals, the Thule-Inuit newcomers apparently placed no greater stress on the terrestrial animal populations than did their antecedents.

In the early contact era, the most significant technological change influencing the hunting of these animals entailed the introduction of firearms—specifically, rifles—by European parties during a series of wintering expeditions to or near Ellesmere Island. The Europeans initiated the hunting of terrestrial mammals and on a scale carrying the potential for major impacts on animal populations. Nevertheless, the earliest expeditions carried out only limited hunting of game animals, as these parties relied principally on imported provisions. All this changed with the North Polar expeditions of the American explorer Robert Peary, for whom hunting became the primary subsistence strategy, which he termed “living off the country.”31 Peary also greatly increased the effectiveness of his hunting activities by employing experienced Inughuit, the aboriginal peoples of northern Greenland, as hunters. They procured for him all manner of animals, but especially the grazing animals, to support his parties (Figures 5.3 and 5.4).

Between 1890 and 1909, Peary’s comprehensive introduction of rifles radically altered procurement strategies of the Inughuit.32 However proficient the Inughuit had been with bow and arrow and spear, these weapons were no match for the speed and sureness of a rifle. By the time of Peary’s final voyage in 1909–10, guns had completely superseded the bow and arrow in northern Greenland in everyday use.33 It was the combination of this new technology with aboriginal environmental knowledge that proved so devastating to the game animals in these hunts driven by the explorer’s goal of maximizing the kill to stockpile meat for his assorted attempts on the North Pole. In northern Greenland, Peary’s introduction of firearms and

Figure 5.3  Muskox at Bay

American big-game hunter Harry Whitney photographed a muskox being held at bay by Husky dogs during one of Whitney’s hunting excursions to central Ellesmere Island in 1909. The combination of firearms technology and Inughuit environmental knowledge proved highly effective in the securing of game animals in this period.

commissioning of large-scale caribou kills has been cited as one of the major factors depleting and possibly extirpating the species from Inglefield Land. Another potentially contributing factor may have been the presence of mild, wet winters, producing snow conditions limiting access to forage, and precipitating population crashes.34

In the mid-1960s, further change was occasioned by the introduction of snowmobiles at Grise Fiord and other High Arctic communities. In 1966, Samwilly Elaijasialuk, who had worked for the Department of Public Works to maintain the first powerhouse and also worked in the local school, purchased the community's first Bombardier Ski-Doo from Montreal.35 The same year, a RCMP special constable purchased a Bombardier Ski-Doo at Resolute Bay.36 By December 1968, there were 16 snowmobiles in Grise Fiord, some of them owned by individuals and others by hunters pooling their resources to purchase a machine.37 Reporting on the first year of general use, Constable Vitt of the Grise Fiord detachment noted that the snowmobiles enabled a caribou-hunting trip to Baumann Fiord in October, when 10 animals were killed. The hunters brought back half the carcasses on the first trip, and later returned by Ski-Doo to retrieve the remainder of the meat. According to Vitt, hunters also found the snowmobiles “ideal” for checking traplines during the dark winter months, as their headlamps made it much easier to follow the trail. Vitt noted, “What used to mean a week’s trip by dogs to the end of the trapline and back now takes one day for the return trip.”38 Snowmobiles also enabled hunters to undertake some forms of hunting that previously were not feasible. Where, before 1967, Inuit hunters usually could not overtake caribou with dog teams, the snowmobile made it possible for them to harvest more of these animals. Snowmobiles also facilitated overland travel to caribou hunting grounds, enabling a higher harvest rate.39 By 1968, use of snowmobiles enabled the hunters to increase the harvest of caribou in the Baumann Fiord area to 37 animals.40

**Figure 5.4 Hauling Muskox to Camp**

A party of Inughuit hunters haul a muskox back to their temporary camp on Ellesmere Island. Harry Whitney employed these Inughuit as guides on his 1909 hunting excursions to the island.


**Procurement Patterns of the Postcontact Era**

For Ellesmere Island and adjacent land masses in the postcontact era, the major sources documenting hunting of muskoxen and Peary caribou are contained in the unpublished and published writings of European explorers or Royal Canadian Mounted Police officers between 1875 and
1975. Research in these records has generated more than 550 references to the presence of these animals in various areas of the island, especially the northern interior and coastal regions, the southern and southwestern coasts, and the east-central coastal areas. These observations provide suitable baseline data for several key areas of island habitat.

Preliminary analysis of the data confirmed that both Peary caribou and muskoxen were observed or killed in areas corresponding to current prime foraging grounds for both species. For the muskox, the historical evidence suggests that intensive hunting in northern Ellesmere Island in the late 19th and early 20th centuries placed a severe stress on its resident ruminant populations. During Peary’s 1898–1902 expedition, his parties killed a minimum of 424 muskoxen on Ellesmere Island, and during his 1905–06 expedition they took 492 more, but in 1908–09, excepting the animals taken in northern Greenland, his parties were able to secure only 62 muskoxen on the island, mostly in the north. During his last expedition, Peary’s parties hunted in the same areas as on previous forays, so it is highly probable that these hunters had significantly depleted the muskox population.

The records tell a similar story of increasing harvests of Peary caribou through the Peary exploration era. In 1898–1902, Peary’s parties shot 30 caribou in the central region of Ellesmere Island. They increased the kill to 93 in 1905–06 in the northern part of the island, and—with the muskoxen population in decline—relied still more on caribou in Peary’s last expedition, killing 150. After the Peary era, the only reported sightings or kills of caribou in northern Ellesmere Island occurred in 1935, when a member of the Oxford University Ellesmere Land expedition killed three near the Gilman Glacier to the north of Lake Hazen. The comparative absence of sightings on this and other expeditions to this area suggests that the population of Peary caribou in the northern part of the Island may have been seriously compromised by Peary’s hunting activities of the early 20th century; it may still be recovering.41

Among Canada’s responses to the situation of unauthorized hunting was to establish its first detachment of the RCMP on Ellesmere Island, at Craig Harbour near the southeastern end of the island, in 1922. Among other roles, the Mounties were charged with enforcing Canada’s game laws, especially the muskox legislation. Evidence42 suggests that members of the Police themselves occasionally shot muskox, despite its protected status. Nevertheless, the RCMP’s presence on the island ensured that any large-scale decimation of herds would not recur. In 1923 and 1924, American explorer Donald MacMillan continued to ignore efforts by federal authorities to curtail his forays into Canadian territory, including unauthorized hunting of muskoxen, travel to Ellesmere Island without permission, and raising the stars and stripes at Camp Clay on Pim Island. His escapades precipitated the MacMillan-Byrd affair of 1925, an international diplomatic controversy leading to the establishment of a second RCMP station at Bache Peninsula on the central coast of Ellesmere Island. The RCMP hunted caribou intermittently during its occupations of the Ellesmere Island detachments at Craig Harbour (1922–25; 1933–40) and Bache Peninsula (1926–32). The numbers of animals taken was small but increased again in the 1950s following the reopening of the Craig Harbour detachment and the relocation of Inuit from Quebec and Baffin Island to Ellesmere Island. Overall, between 1875 and 1955, hunters of exploration parties killed a minimum of 420 caribou and 1,395 muskoxen on Ellesmere Island, mostly in the northern parts of the island (Figure 5.5, and Table 5.1).
Figure 5.5  Map of Muskoxen and Caribou Harvested on Ellesmere Island and Adjacent Land Masses, 1875–1973

This map reveals the wide extent of muskox and caribou hunting on Ellesmere Island in the exploration era. The circles represent kills of muskoxen and the triangles kills of Peary caribou in this period.

Source: Map adapted from one by Jennifer Keeney, Parks Canada, Western and Northern Service Centre, Winnipeg.
Canada’s Reoccupation of the High Arctic and Relocation of Inuit after 1951

Following the outbreak of the Second World War, the Ellesmere Island RCMP detachments were closed in 1940 and the island became officially uninhabited until the establishment of the High Arctic weather stations at Eureka and Alert between 1947 and 1950. Owing to heightened concerns arising from the extension of foreign influence in Canada’s northern territories during the war, discussed in Chapter 14 of this volume by Matthew Evenden, the federal government also soon decided to re-establish a Mounted Police presence on the island. In 1951, the detachment at Craig Harbour was reopened and, two years later, the Mounties established another detachment at Alexandra Fiord in the area of Smith Sound, on Ellesmere Island’s eastern coast. In 1953, the government relocated three Inuit families from Inukjuak, Quebec, and a family from Pond Inlet to Craig Harbour, and one family from each of the source communities to the new RCMP detachment at Alexandra Fiord. The concept was tied to notions of living off the land; indeed, the official rationale for the relocations was

**Table 5.1 Minimum Numbers of Peary Caribou and Muskoxen Harvested on Ellesmere Island and Adjacent Land Masses between 1875 and 1955**

<table>
<thead>
<tr>
<th>Expedition</th>
<th>Years</th>
<th>No. Peary Caribou Killed*</th>
<th>No. Muskoxen Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Northern Ellesmere</td>
<td>South/Central Ellesmere</td>
</tr>
<tr>
<td>Nares</td>
<td>1875–76</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Greely</td>
<td>1881–84</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Sverdrup</td>
<td>1898–1902</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Peary</td>
<td>1898–1902</td>
<td>30</td>
<td>93</td>
</tr>
<tr>
<td>Peary</td>
<td>1905–06</td>
<td>492</td>
<td></td>
</tr>
<tr>
<td>Peary</td>
<td>1908–09</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Cook</td>
<td>1907–08</td>
<td>6</td>
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</tr>
<tr>
<td>Whitney</td>
<td>1909</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>MacMillan</td>
<td>1913–17</td>
<td>51</td>
<td>62</td>
</tr>
<tr>
<td>MacMillan</td>
<td>1924</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCMP, Bache Pen.</td>
<td>1926–32</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Shackleton</td>
<td>1935</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>RCMP, Craig Hbr.</td>
<td>1933–40</td>
<td>22</td>
<td>1</td>
</tr>
<tr>
<td>RCMP, Craig Hbr.</td>
<td>1953</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inuit, Craig Hbr.</td>
<td>1953–55</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>248</td>
<td>172</td>
</tr>
</tbody>
</table>

*Note: These are minimum numbers. Explorers also reported other kills, but numbers and specific locations were not provided so these references were not included in the tallies.
to provide Inuit from Quebec with “new hunting grounds.” Samuel Arnakallak of Pond Inlet, head of one of the earliest families to be relocated, recalled that he and others had been told that game animals would be abundant at the new location. After their arrival, he found that it was true that marine mammals were more plentiful on Ellesmere Island than at Pond Inlet, but land mammals and other game were scarce. A source of unhappiness for the relocated Inuit was the lack of variety in the diet available to them on Ellesmere Island, as they were obliged to eat seal meat almost exclusively in the first year. Hunting in the initial period, especially during the long, dark winters, imposed heavy demands on hunters and their families. The Inuit discovered that animals were often few and far between or accessible only for brief periods. Owing to the scarcity of food, the men were obliged to hunt in all seasons. Travelling was made difficult by variable sea-ice conditions. Due to ocean currents, leads opened in the ice of Jones Sound even during the winter and hunters were often thwarted from travelling, hampering food procurement. The difficulties of hunting in the dark winters and the lack of hunting partners obliged men to take their spouses or children with them on hunting trips, a practice to which the Inuit from Quebec were unaccustomed.

Between 1953 and 1955, Inuit at Craig Harbour harvested 83 caribou. They hunted these animals at various locations in the southern or southwestern areas of Ellesmere Island or adjacent land masses. Areas of particular focus included the Bjorne Peninsula and Graham Island, both comparatively abundant sites of caribou habitat, as well as sites adjacent to various fiords along the south coast. Muskox hunting continued to be off-limits, owing to the continuation of the 1917 ban on hunting this species. Larry Audlaluk, who moved to Craig Harbour from Quebec with his family in 1953, recalled that at that time federal authorities would not allow any hunting of muskoxen “unless in extreme circumstances like starvation.” To Inuit who had been told that game was abundant on Ellesmere Island but were actually experiencing food shortages in the winter, these restrictions were difficult to accept.

Changing Political Contexts, 1960s to Present

From the 1960s, at Grise Fiord as in other areas of the Arctic, Inuit resource use has been influenced by changing political contexts. In 1950, the federal franchise in Canada was extended to Inuit and by the following decade local resource users were beginning to become involved in the political process, often through grassroots initiatives. Much of this activity revolved around issues relating to wildlife procurement and its regulation, with hunters asserting their right to be involved in decisions affecting their subsistence and livelihood. In the 1960s, Inuit hunters began to challenge hunting restrictions drafted by faraway people who were not dependent on the country’s resources. One such example of imposed restrictions occurred shortly after the arrival of Inuit on Ellesmere Island in the relocations of the early 1950s (Figure 5.6). While accompanying Inuit hunting excursions in search of caribou, a RCMP officer insisted that the hunters harvest only male animals, not females and their young. Accordingly, the Inuit took only 20 percent of the caribou, culling the adult males from each herd they encountered. Based on their own experience, Inuit believed that such an approach was unwise, as they believed members of caribou herds were interdependent and the death of the adult males would lead to the loss of the entire group. They wished to shoot all animals in a herd, rather than cull animals selectively. Ningiuk Killiktee, an Inuit special constable at Alexandra...
Fiord in this period, suggested that the partial hunting of only one or two members of a group would also make the others more wary, causing them to avoid feeding nearby. He stated, “The RCMP did not want us to finish off the caribou. They would tell us to leave some and I think they ran away.”

Anthropologist Milton Freeman later inferred that serious harm may have resulted from the selective culling of caribou groups. Noting the important social dynamics of caribou groups as interdependent units, Freeman suggested that the selective kill of bulls meant that the remaining animals were made more vulnerable to wolf predation and other risks. In consequence, caribou herds were severely curtailed in areas of southern Ellesmere Island and the northern coast of Devon Island after a period of only a few years.

Meanwhile, continued restrictions in muskox hunting coincided with winter food shortages in the community of Grise Fiord. In 1967, Samwilly Elaijasialuk reported that his brother and another hunter, Joalami, had been hunting for wolves in a blizzard and nearly starved because they could not shoot muskoxen. Samwilly related that, while a member of the settlement council, he spoke to a visiting federal representative: “You send us all the way here from our own settlement, Inukjuak, in the first place. Who do you think should live, Inuit or the animals? I want you to think about this.”

A further source of unhappiness was a series of proposed government experiments, such as the introduction of sport hunting into the region, developed without prior consultation with the aboriginal resource users. Previously, the restrictions had been inconsistently applied, as permits were occasionally issued to nonresidents to take muskoxen or other protected species. In May 1960, it was reported that a party from the Los Angeles Museum visited Eureka, on the west coast of Ellesmere Island, and shot four muskoxen on a permit. The issue came to a head in 1967, when a series of federal actions relating to muskox and polar bear hunting spurred political action by Grise Fiord hunters to protect their interests. The proposed nonresident muskox kill had several components. Federal officials proposed that only male muskoxen would be harvested, as trophy animals were desired. Only
old solitary males should be killed, as they were assumed to be superfluous to reproduction. The
muskoxen would need to be hunted in the vicinity of Grise Fiord, so that the community would
benefit economically from the sport hunting. Meat generated by the kill would be given to the
Inuit. A harvest of 12 animals per year was indicated, based on the assumption that this level
would not affect muskox population levels. It was further asserted that the selective culling of
muskoxen would enable the Peary caribou population to increase, as it was assumed that both ani-
imals fed on the same plant species.55

The Grise Fiord hunters argued that the government was mistaken in these assumptions. The
Inuit pointed out that food was never a problem in the summer months, when it was proposed
that the sport hunting would take place. Rather, they asserted their need to hunt muskoxen in the
winter, when food shortages were most acute. As well, the meat of muskoxen shot in June or July
was inedible.56 More significantly, the Inuit stated that the scientific rationale for regulations
requiring them to hunt only older bulls was faulty. They had observed empirically that older bulls,
through their ability to sense and avert danger, were essential to protecting the young of the herds.
Therefore, it would be better to hunt all the animals in a given herd, but to do so on a selective
basis. In support of this position, the community submitted impressive documentation of 51 sepa-
rate sightings of muskoxen as recorded by Grise Fiord hunters over the course of a year.57

Simonie, representing the community, closed with a clear, simple statement:

This is what I want to say concerning muskox. We want to be allowed to hunt
them right now with our reasons being: we do not get enough to eat during cold
winters because during these times seals are very hard to get; yet muskox are
plentiful. . . . The food that can be eaten by people is not always there; more often
than not it is hard to get. Our land does not grow food like a garden. We are
urging that we hunt muskox.58

In response to the protest, the Northwest Territories Council recommended to the federal
government that the proposal for nonresident muskox hunting be withdrawn. Federal authorities
acceded to this request. Subsequent biological research has apparently corroborated the Grise
Fiord Inuit’s interpretation of the implications of proposed sport hunting of muskox.59

Following the disputes of the 1960s, Inuit continued to hunt both species, as they incorporated
the meat of both caribou and muskoxen in their diet, and used caribou antlers or muskox horns as
materials for sculpture. Inuit women used caribou skins for various articles of clothing, and
muskox hides for blankets and occasionally for clothing. For half a century, Inuit at Grise Fiord and
other High Arctic communities have integrated caribou, and to a lesser extent muskoxen, into their
way of life. As Peary caribou and muskoxen hunting were being reintegrated into their lifeways,
however, new problems emerged to challenge their capacity to manage the ecosystem in which they
operated. In 1979, following a series of biological studies on Peary caribou populations on western
islands in the Arctic archipelago, the Committee on the Status of Endangered Wildlife in Canada
(COSEWIC) recommended that Peary caribou be assigned the status of a threatened species.
Applying various measures, COSEWIC defines a “threatened species” as “a wildlife species that is
likely to become endangered if nothing is done to reverse the factors leading to its extirpation or
extinction,” while an “endangered species” is “a wildlife species that is facing imminent extirpation or extinction.” The most recent COSEWIC report on Peary caribou, from 2005, gives all four distinct populations of them the status of “Endangered.”

A critical factor bearing on the management of this species includes the sociopolitical context, which has changed markedly since the 1960s. In addition to major shifts in social organization and material culture, demographic changes among Canada’s Inuit societies have been dramatic, with rapid increases in population far exceeding the Canadian average. Perhaps most pertinent for future environmental research are a series of constitutional changes obliging a completely different approach to wildlife management in the Arctic. The constitutional framework includes the land claims process involving the Tunngavik Federation of Nunavut and the federal government, leading to the Land Claim Settlement, the creation of the Territory of Nunavut, and the establishment of the Nunavut Wildlife Management Board (NWMB) and related institutions. Also connected to this process and part of the same negotiations was the establishment of the Quttinirpaaq National Park of Canada and a cooperative management regime for this and other national parks in Nunavut. A further legislative change bearing on Arctic wildlife management arrived with Parliament’s 2003 passage and the subsequent enactment of the Species at Risk Act, and its associated decision-making structures.

The Role of Inuit Indigenous Knowledge and Western Science

Inuit indigenous knowledge in research and management activities is increasingly important in wildlife management, and supported by legally binding documents and agreements. According to the 2003 Nunavut Wildlife Act, all stewards of wildlife, including local hunters and trappers organizations, must be guided by Inuit Qaujimajatuqangit, or “Inuit Knowledge of Old,” an aboriginal epistemology and worldview. In one recent definition, Inuit Qaujimajatuqangit “is really about ‘healthy, sustainable communities’ regaining their rights to a say in the governance of their lives using principles and values they regard as integral to who and what they are.” The Nunavut Wildlife Act also specifies that the local Hunters and Trappers Organizations (HTOs) “should play an important role in wildlife management.” Specifically, the HTOs are empowered by the act to manage and regulate harvesting activities among their members, allocate and enforce basic needs levels within their communities, and assign any portion of their basic needs levels to nonmembers. The act also obliges researchers to table their approaches with the HTOs, so that local resource users have an opportunity to comment on wildlife management strategies and techniques before they are implemented.

The new management structures give the Inuit greater control over the research questions that are being asked, the methods that are being used, and, most importantly, the interpretation of the results and the decisions that ensue. The Inuit are nevertheless still obliged to work in a cross-cultural environment and respond to ideas constructed according to different cultural paradigms, in a different geographical area and social–political context. A further layer of representation is the Nunavut Tunngavik Incorporated, the successor of the Tunngavik Federation of Nunavut, which is responsible for the management of all Inuit-owned lands in Nunavut.
approaches are still highly constrained by western scientific approaches, but the recent political changes lay the groundwork for resource management decision making in the future.

In the specific case of the Peary caribou, when former Minister of the Environment Stéphane Dion in 2005 indicated his acceptance of the COSEWIC recommendation to list them as endangered in the High Arctic, the HTOs of the region voiced their opposition. Resolute Bay hunters asserted that the recommended listing was based on data from a limited part of the species range, which was largely true. For their part, Grise Fiord hunters argued that greater public education regarding the implications of hunting caribou was a better option than listing the species. The High Arctic communities were supported by both the Government of Nunavut and the Nunavut Wildlife Board, which asked the federal government to postpone listing the species “until such time as the residents of Nunavut have been adequately informed on how this particular listing might impact their lives and hunting rights.” In response, the Minister postponed listing the species “in order to consult further with the Nunavut Wildlife Board,” although the Minister reserved the right to reconsider the matter after consultations on the Peary caribou have been completed. Inuit are not the only Arctic aboriginal group to assert their right to be consulted in processes under the Species at Risk Act. Through the land-claims process, Inuvialuit co-management boards have also gained decision-making powers in the listing process. Specifically, all species-listing reports must be reviewed by the relevant co-management board. How this process will work is not yet known, but it is assumed that the co-management boards will be the mechanism by which indigenous knowledge will be integrated into the decision-making process.

Data collected under western rubrics continue to be relevant to this process, as in a recent Parks Canada Species at Risk project on the status of the Peary caribou in northern Ellesmere Island in the vicinity of Quttinirpaaq National Park. Historical research in explorers’ records enables a reasonable inference that Peary’s harvests of the early 1900s may have exerted an enduring impact on Peary caribou in northern Ellesmere Island. Dramatic winter climatic events that have precipitated the large-scale winter mortality in western parts of the archipelago have not been recorded on the island, ruling out unusual sleet or snowfall levels as probable causes. A plausible explanation is that hunting by explorers reduced the resident populations to very low numbers, which may have been further exacerbated by wolf predation. Other possible explanations for the persisting low numbers in northern Ellesmere Island include changes in the productivity of the summer grazing ranges and a possible reduction in genetic diversity resulting from population losses, further impeding recovery. While these questions cannot be fully answered on the basis of current data, research on the genetic composition of caribou in northern Ellesmere Island is continuing, including DNA analysis of specimens brought back by Peary to the American Museum of Natural History in New York in the early 1900s, as well as recent samples of DNA extracted from caribou droppings in this area in 2004.

At a meeting dealing with the Peary caribou project in November 2003, members of the Hunters and Trappers Organizations of Grise Fiord and Resolute Bay indicated considerable interest in the historical data collected by Parks Canada, particularly the tabulations of numbers of caribou and muskoxen killed in the exploration era. However, the hunters also expressed the view that the species is not currently at risk in that region and that the numbers of caribou they have hunted have been within sustainable limits. Regarding specific research techniques then being considered by the Government of Nunavut, Inuit questioned the need for collaring of caribou to enable satellite
monitoring of their movements, citing evidence that stress induced by certain collaring techniques increases the risk of mortality for collared animals. Community members also expressed concern that the presence of researchers in their caribou hunting grounds might drive the animals away. They agreed with the potential value of continued research but requested that nonintrusive methods be followed. Further, the hunters expressed the view that Inuit knowledge should be integrated into the interpretation of scientific results obtained from studies relating to the northern part of the island.

At a second meeting with Parks Canada researchers, in March 2005, Inuit members of the Iviq Hunters and Trappers Organization at Grise Fiord elaborated on these perspectives. The hunters expressed the view that oscillations in the numbers of caribou were part of a natural cycle, and if in some years they were not numerous, the caribou would return in succeeding years. For example, Jarloo Kigugtak stated,

There are areas in which there are more caribou in some years, and other years in which there are less. If there is a temperature fluctuation in the fall, the ground freezes and it's hard for the animals to survive because the ground is frozen. I have read that lots of muskoxen starved and they would go to a different area after that happened but I think that they remembered what the grazing grounds were like and they would later return. People prematurely assumed that they had been depleted. Inuit would be blamed for that when in fact it was a natural occurrence.72

Larry Audlaluk, whose family was relocated to Craig Harbour in 1953, recalled hearing from elders that caribou came and went according to recurring natural cycles and suggested that this notion should be considered when structuring research studies in the High Arctic. Audlaluk asserted his belief that Peary caribou numbers were always limited in the region, so it was unclear whether the populations were in fact declining or were rather within the range of normal population sizes on Ellesmere Island.73 While the empirical observations of Inuit regarding caribou on Ellesmere Island have yet to be corroborated by western science, it is interesting to note that caribou specialist Morton Melgaard identified recurrent fluctuations since the 18th century in six caribou populations covering the entire coast of West Greenland based on historical, ethnohistorical, and game statistical sources.74

In Canada, the status of Peary caribou as a prospective listed species remains unresolved. As of October 2006, the Government of Nunavut and Nunavut Tunngavik Incorporated could not agree on an approach to hunting of the species. Based on its assumption that High Arctic herds numbered about 1,000 animals, the territorial government proposed limiting the harvest to 66 animals, while the NTI asserted that more consultation was needed before setting limits.75 To a significant degree, the issue of whether or to what degree hunting will change will ultimately turn on evidence. For either side to prevail in this debate will require presenting comprehensive data supporting their alternative interpretations of caribou numbers and the species’ sustainability, as Inuit at Grise Fiord did during the muskox controversy of the 1960s. At the same time, ways will need to be found of navigating between the different forms of knowledge so that alternative ways of knowing can learn from and enrich one another.76
How this issue will play out is uncertain, but clearly Inuit knowledge will play an important role, not only in research about caribou and other Arctic species, but also in their future management. This discussion cannot extensively address the issue of how Inuit knowledge—or western knowledge—will be both legitimized and applied in addressing the conservation of northern wildlife. There is considerable diversity in the circumstances in which Inuit knowledge will apply, and the issue has emerged so recently that we lack general models or criteria for its application. Such models will necessarily emerge through collaborative research and management in localities and contexts. What can be stated with certainty is that new political requirements for participatory co-management will define not only the kinds of data that will be brought to bear on these matters, but also the ways in which local perspectives will be brought to bear in the interpretation of the data, and on wildlife management generally. Conservation specialists have argued that in this period of mutual learning, co-management will need to be flexible and experimental so that both local and government-level authorities can learn how to navigate between aboriginal and western knowledge. How the western and aboriginal paradigms intersect in the future will have significant implications for both Inuit and the grazing animals of the High Arctic.

Conclusion

Throughout Arctic history, animals have been central to the lifeways of all inhabiting groups, including the Inuit of today. In some regions, such as western Hudson Bay and northern Yukon, terrestrial grazing animals remain central to the subsistence of aboriginal peoples. In the High Arctic, caribou, while not the principal staple, is still incorporated into Inuit local subsistence and its procurement continues to be an important component of their identity as traditional resource users. In the current context of dwindling numbers of caribou in other areas and the desire of conservation groups and governmental authorities to restrict further hunting, it is an open question to what degree these animals will continue to play a role in Inuit subsistence strategies. These questions will likely turn on issues of sustainability, how it is defined, and whether it can be effectively implemented.

This matter is made more complex by different knowledge paradigms and the need for researchers to find ways of navigating between them. Over the last two decades, the knowledge of aboriginal peoples has emerged as a major issue in the research and management of northern wildlife. The possibilities of negotiating the intersections between Inuit indigenous knowledge and western ecological science offer exciting possibilities, although the lack of consistent models presents significant challenges to researchers. In some contexts, researchers have even questioned whether governments are truly committed to a dialogue on these issues or are more concerned with incorporating aboriginal knowledge within a western paradigm, wherein nation-states, under the rubric of Traditional Ecological Knowledge (TEK), seek to further extend state control of natural resource use at the expense of the interests of local communities and resource users.

Whatever one’s position in this debate, more is at stake than the fate of Arctic animals. The issue also bears on the future of the Inuit, who are continuing a tradition of occupation of the High Arctic by aboriginal hunting peoples stretching back more than 4,000 years. How Inuit indigenous knowledge will intersect with western science in terms of documenting and managing animal populations is not yet fully known, but clearly the resolution of these questions cannot be
separated from such political issues as local governance and principles of self-determination for aboriginal peoples—both given short shrift in earlier eras but increasingly important concepts within contemporary political discourse. If ways of navigating between these different but equally valid forms of knowledge are to be found, the answers will emerge through dialogue and relationship building between aboriginal people and scientists. The protection of High Arctic wildlife will require cooperation, sharing knowledge, and mutual learning between scientists and practitioners of Inuit indigenous knowledge.79

History, including environmental history, is not a hermetically sealed entity but rather a dynamic process extending from the past to the present and into the future. How the history discussed here will unfold will depend on finding answers to various questions. Can the Peary caribou be protected in ways that can enable continued hunting by resource users? Will ways be found to integrate indigenous knowledge and western ecology so that northern species at risk can be managed in a sustainable way for future generations? Will Canada’s western societies respect the rights of aboriginal peoples to manage the resources on which they depend for subsistence and identity? The answers to these questions will clearly bear on the future status and lifeways of Inuit of the High Arctic and more generally aboriginal peoples across Canada’s northern regions, as well as the natural environments in which they live.

**DISCUSSION QUESTIONS**

1. What characteristics distinguish western science from Traditional Ecological Knowledge (or, in this case, Inuit indigenous knowledge)? In what ways are they similar? Why it is important to navigate between these different ways of knowing?

2. The author writes of “integrating,” “mediating,” and “navigating” the interfaces between western science and Traditional Ecological Knowledge. How are these terms different? How do they suggest different ways of dealing with cross-cultural matters?

3. Historically, what have been the goals of western science in undertaking endangered species research? What have been the goals of Inuit and other aboriginal communities in their observations of and interactions with these animals?

4. Can disputes be resolved when adherents of different ways of knowing see the environment in such different ways? How can the different ways of knowing be brought into a “both-and” rather than an “either-or” relation? What will adherents of these systems of knowledge each need to learn or do in order to move forward?

5. What obligations are implied or imposed by current political arrangements in the north?

6. What lessons of history, if any, can be learned from this historical case study?

**NOTES**

1. Research for this chapter emerged from a series of projects carried out to document the human history of Ellesmere Island, and historical research components of Parks Canada’s species-at-risk project on the Peary caribou, coordinated by Micheline Manseau. In addition to the valued collaboration and advice of
Dr. Manseau, I would like to thank the Ivitq Hunters and Trappers Organizations of Grise Fiord, especially Jaypetee Akeeagok, Jimmy Qappik, and Larry Audalaluk; the Hunters and Trappers Organization of Resolute Bay, especially Tabitha Mullin and Allie Salluviniq; Mayor Liza Ningiuq of Grise Fiord; and Mayor Susan Salluviniq of Resolute Bay. Much of this research was supported by the Western and Northern Service Centre of Parks Canada; the Nunavut Field Unit of Parks Canada; Quttinirpaaq National Park of Canada; the Polar Continental Shelf Project; and Parks Canada’s Species at Risk Action and Education fund, a program supported by the National Strategy for the Protection of Species at Risk. The maps are adapted from the design of Jennifer Keeney, Parks Canada, Western and Northern Service Centre, Winnipeg. Earlier presentations of this research benefited from the review of Pippa Shepherd, Judy Toews, John McCormick, Barry Olsen, and Joanne Tuckwell. The comments and guidance of the editors, as well as two anonymous readers, were much appreciated. Thanks, as always, are due to Ron Frohwerk for his continued sound advice on matters of form and content.


5. The political issues arise from emerging contexts of governance and stewardship of animals in Nunavut. As discussed in this chapter, various principles of Inuit Qaujimatuqangit have been written into the Nunavut Wildlife Act and have also been integrated into a new governance structure, called Inuit Qaujimajatuqangit Katimajijit, which is an external council providing advice to the government on the implementation of Inuit Qaujimajatuqangit. See http://www.gov.nu.ca/cley/english/news/2003/sept08_03.pdf. In terms of the scientific rationale, emerging studies are showing the value and
importance of Inuit Qaujimajatuqangit in documenting harvests, hunting intensity, consumption of country foods, and observed abnormalities in wildlife. See http://www.wwf.ca/Documents/Arctic/nwha_eng_sp.pdf. Useful background on the ethical rationale for safeguarding the rights of aboriginal peoples in the context of developing conservation issues and policies is contained in several key documents produced for the World Conservation Union, such as Grazia Borrini-Feyerabend, Ashish Kothari, and Gonzalo Oviedo, *Indigenous and Local Communities and Protected Areas: Towards Equity and Enhanced Conservation—Guidance on Policy and Practice for Co-managed Protected Areas and Community Conserved Areas* (Cambridge, UK: IUCN Publications Services Unit, 2000), and Janvier Beltran, ed., *Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines, and Case Studies* (Cambridge, UK: IUCN Publications Services Unit, 2000).

Western science, as the still-dominant paradigm, apparently does not currently require a justification in official scientific circles in the manner of indigenous knowledge, although a blind adherence to any one way of knowing can be a major impediment to dialogue with practitioners or adherents of alternative epistemologies. My operative assumption here is that an optimal approach would acknowledge both aboriginal and western approaches to knowledge as essential to the study and management of Arctic ecosystems.


15. On this issue, see Donald L. Hardesty, *Ecological Anthropology*, pp. 43–44.

16. See the discussions in Karl W. Butzer, *Archaeology as Human Ecology: Method and Theory for a Contextual Approach* (Cambridge, UK: Cambridge, 1982): p. 290; and Lyle Dick, *Muskox Land: Ellesmere Island in the Age of Contact* (Calgary: University of Calgary, 2001): pp. 47–48. At the same time, as anthropologist Robin Ridington has argued, it is important not to reduce technology to a set of artifacts and tools, but rather, to view it more broadly as a complex of strategies encompassing knowledge of the environment (including topography, mineral resources, and seasonal changes), world views, and belief systems. While material items such as weapons, sleds, and boats are important artifacts of hunting cultures, an even more fundamental requirement is “the technique of being able to carry the world around in your head.” Robin Ridington, “Technology, World View, and Adaptive Strategy in a Northern Hunting Society,” *Canadian Review of Sociology* 19 no. 4 (1982): p. 471.


32. Regarding Inughuit hunting technology, Peary’s Norwegian expedition colleague Eivind Astrup observed: “When we first arrived on these coasts in 1891, the chase [of caribou] was still carried on with the bow and arrow; at our departure in 1894 these were put away on the shelf; and the time is not far distant when they will be on view only in the glass cases of a few collectors.” Eivind Astrup, With Peary Near the Pole (London: C. Arthur Pearson, 1898): p. 135.


41. This inference bears further investigation. Hunting of both species on Ellesmere and adjacent islands continued during subsequent exploration forays by the explorers Frederick Cook (1907–08) and Donald MacMillan (1913–17; 1923; 1924).

42. See Lyle Dick, Muskox Land, Chapter 8, pp. 267–306.

43. Lyle Dick, Muskox Land, p. 435.


47. Interview with Martha Flaherty by Lyle Dick, Ottawa, 27 February 1989, Grise Fiord Oral History Project, PC, WNSC (Winnipeg), Side. 1.


49. For historical background on the process of settling of Inuit villages and associated social implications, see David Damas, Arctic Migrants/Arctic Villagers: The Transformation of Inuit Settlement in the Central Arctic (Montreal & Kingston: McGill-Queen’s University Press, 2004).


51. Ibid.


63. Ibid, Section 167, p. 69.


69. Parks Canada’s Species at Risk project on the Peary caribou is a multiyear, multidisciplinary project to document the historical and current status of the Peary caribou on Ellesmere Island from pre-contact eras to the present. In addition to providing historical, archaeological, and ecological documentation and analysis of this species, a significant component of the project has been to engage Inuit resource users in developing both research strategies and in interpreting the results.


73. Ibid.


77. See the discussion in Fikret Berkes, Nigel Bankes, Melissa Marschke, Derek Armitage, and Douglas Clark, “Cross-Scale Institutions and Building Resilience in the Canadian North,” *Breaking Ice*, p. 228.

78. See, for example, Paul Nadasdy, *Hunters and Bureaucrats: Power, Knowledge, and Aboriginal—State Relations in the Southwest Yukon* (Vancouver: UBC, 2003).

**FURTHER READING**


Colloquial Meteorology

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Prior to the creation of a nationwide network for systematic meteorological observation, farmers, fur traders, scientists, parish priests, travellers, whalers, and many others across Canada kept unofficial records of the weather. Comments on the temperature and wind, the appearance of the sky, and whether it rained or stormed were set down mostly in diaries and journals, but also in letters or reports to friends, family, and superiors. Some unofficial meteorologists had access to thermometers for instrumental temperature observations; just as often they relied upon their own experience of the air outside to note whether it was cool or warm or the hottest day that season. Some of these records cover only a few months or years at a time, others were more diligent and kept detailed notes that span decades.¹ These individuals acted as unofficial weather stations that preceded and continued alongside the state-established meteorological infrastructure, and they engaged in what we can think of as colloquial meteorology. They kept records that combined folk understandings of weather, its origins and effects upon community and economic life, with more systematic observations of temperature, wind speed, and direction. In the environmental history of Canada, knowing about past weather is important in and of itself and as a part of larger studies. Early 21st-century concern over global climate change makes it that much more important to be able to identify climatic variability in the past. For historians interested in questions that involve knowing the character of past environments, for example, if they are interested in the frequency of fires in national parks or in successful harvests as compared to periods of hardship, knowing about past weather conditions can provide essential pieces of the larger puzzles. The easiest way to reconstruct past climates is to use instrumental observations of temperature and other atmospheric conditions that can be readily compared, if necessary, across centuries. Unfortunately, for the lands that later became Canada there are few continuous instrumental or official record sets dating earlier than 1860. In their place, we have instead Canada’s colloquial meteorologists. Their observations are not unreliable substitutes for an official instrumental record, but rather constitute a different kind of source material. These sources do pose methodological challenges in interpreting varying degrees of subjective and objective observations of the state of the atmosphere, but more importantly they also offer a wealth of evidence into the intersections of past societies and economies with the natural world.
The Tambora Eruption, 1815

Several years back, an interest in the social, ecological, and economic effects of past environmental disasters led me to study the North American effects of the eruption of the Tambora volcano in 1815. Although less well known than the eruption of Krakatau (Krakatoa) in 1883, Tambora was a volcanic event of much greater magnitude, spewed far more material thousands of metres into the sky, killed over 90,000 people in the Indonesian archipelago, and led to epidemics, famine, a rise in sea level, and ash raining down from the sky.

Volcanic eruptions are known triggers of local and distant climate events. The White River volcanic eruption in Alaska circa 720 C.E. led to ash falls that have been linked to the eastward migration of Athapaskans into the Mackenzie valley. The 1783 Laki eruption in Iceland caused short summers in western Europe and catastrophic weather events leading to hay shortages that forced farmers to cull their cattle herds. In 1970, H. H. Lamb published a comprehensive article on the effects of volcanic dust on the atmosphere. Lamb described how the aerosols ejected in volcanic eruptions are propelled into the atmosphere and carried by global circulation to places far distant from the original eruption site. These aerosols include water vapour, sulphur compounds, and carbon dioxide, as well as broken surface rock of all variety of sizes, and ash formed by the solidification of erupting magma as it comes into contact with the much lower temperatures and pressures found at the earth’s surface. Each eruption produces its own unique combination and quantity of aerosols. These aerosols scatter and absorb solar radiation, leading to general cooling in the troposphere—the atmospheric zone closest to the earth. Lamb's volcanic dust veil index indicated that the dust veil from the Tambora eruption had three times the impact of Krakatoa. The known characteristics of the Tambora eruption—its magnitude and the amount of material ejected—made it likely to have had global climate effects.

Some historical work had already been done on the global effects of the Tambora eruption, most of which were felt a year later in 1816, the delay due to the length of time it took the volcanic aerosols to travel away from the eruption site. The most comprehensive research was from Europe, where there was a much longer historical tradition examining the relationship between climate, production, and history. This tradition was most clearly expressed in Emmanuel LeRoy Ladurie’s classic text *Times of Feast, Times of Famine* (1967, first English translation 1972) and more generally apparent in the work of the Annales school that considered long-term environmental variability as part of the fabric of historical continuity and change. J. D. Post’s *The Last Great Subsistence Crisis* (1977) argued that famines and bread riots in western Europe in 1816 were a direct consequence of the global climate repercussions of the Tambora eruption, which in turn had political, economic, and social effects that endured longer than the bad weather. On the other side of the Atlantic, the evidence for Tambora’s impact was strong but far from certain. Henry Stommel and Elizabeth Stommel drew upon instrumental records from New England colleges to suggest that the distant volcano had produced what Yankees called “the year without a summer” in 1816. Canadian researcher C. R. Harington edited a volume on 1816 around the globe, which included several articles from Canada. These articles focused on local and regional impacts of the Tambora dust veil, inquiring what effects the eruption had across the territory that later became Canada.
Questions about the socioeconomic consequences of a dramatic shift in the weather, a “year without a summer” within the young British North American colonies, had yet to be answered, or even clearly asked. There was room for further historical work on Tambora’s effects in North America. Although events from Western Europe and New England were instructive, the context of settlement in British North America was considerably different, even if strong cultural and economic ties bound the three regions together across the North Atlantic. Moreover, even before asking questions about harvest, subsistence, and social responses to inclement weather, I had to establish whether Tambora’s effects had indeed been felt in British North America: as the Harington collection made clear, the degree of local and regional variation meant that though it was quite likely, it was by no means certain that 1816 in Canada was a year without a summer.

Doing Climate History

How could I learn what the weather was in Canada in 1816? How would I know if this weather was exceptional or irregular? Before we go any further, a brief aside to address terminology and its implications. Weather refers to the state of the atmosphere at a given time and place, while climate is an average of the weather of a particular time and/or place. Across Canada, weather can change considerably from day to day, with the most distinctive variations occurring on a seasonal calendar. Canadian climates vary from north to south, and between moderate, humid coasts and dry, extreme interiors. Across time, climate, in contrast to weather, changes slowly. The most dramatic climate changes of recent centuries include the 1550–1850 Little Ice Age—a period of prolonged cold and unpredictable weather across the globe that broadly encouraged the growth of glaciers—and the persistent warming trend of recent decades linked to the industrial production of greenhouse gases. A volcanic eruption, even one on the scale of Tambora, is unlikely to lead to climate change—its effects dissipate as the volcanic aerosols are dispersed by atmospheric circulation. Yet the effects of a volcanic dust veil can be felt for extended periods of time: weeks, months, or even years. To understand the impacts of a volcanic eruption upon a distant environment requires that we know the historic climate of that place, the background conditions against which anomalous weather resulting from a volcanic event would be revealed.

So what was the climate of British North America in the early 19th century? This depends first on the part of British North America that we wish to investigate. For reasons that will become clear, I chose New Brunswick, and within New Brunswick, I examined the lower Saint John River valley, specifically the stretch known as Long Reach, a rich agricultural region in the early 19th century (see Figure 6.1). Maps from the late 18th century indicate that the regional topography has changed little in the two centuries since the Tambora eruption. Long Reach lies on the north side of the Kingston peninsula, just inland from the mouth of the Saint John River, which drains into the Bay of Fundy, and before the westward bend in the river toward Gagetown and Fredericton. The Reach is surrounded by high ground that slopes more sharply to the south, forming bluffs and cliffs. Water drains from the high ground into the finely textured valley soils, which allowed the cultivation of diverse crops. Lying near the North Atlantic coast, air temperature along the Reach reflected the mixing of continental air masses with the temperature-modering effect of the ocean. Topography and general geography strongly influence local microclimates, which in
The Lower Saint John River area of southern New Brunswick felt the effects of anomalous weather in 1816–17, as described in Benjamin Crawford's diary. Crawford's farm was in the community of Long Reach, not identified on the map but located just to the east of the stretch of river bearing the same name, in the map's lower centre.

Source: Library and Archives Canada, NMC-000254.
turn shape the weather that people experience on a daily basis. Knowing that these broad features had remained essentially unchanged since 1816 provided a foundation upon which to build a description of the regional climate setting.

Uncovering the rest of the climate picture—the temperature, precipitation, prevailing winds, and cloud cover—proved far more challenging. The same reasons that make British North America an interesting place to look for the effects of Tambora militate against the availability of good meteorological data in this period. The second decade of the 19th century was a period of considerable change for newcomer settlements in British North America. The American Revolution, followed soon after by the Napoleonic Wars in Europe, brought both new economic opportunities and Loyalist settlers to the Atlantic colonies and Upper Canada. Forest resources from Nova Scotia, Prince Edward Island, and the newly created New Brunswick had a competitive advantage in the early 19th century, complemented by exclusive trade opportunities with the British colonies in the West Indies. Commercial activity in the older settlements of the East Coast flourished in the early 19th century; Upper Canada developed more slowly, as it was still in the pioneer stage of agricultural development and had yet to produce reliable agricultural surpluses. To the west in Rupert’s Land, the North West and Hudson’s Bay companies competed within a flourishing fur trade, but larger newcomer settlements were scarce, with the notable exception of the Red River Colony in southern Manitoba, founded in 1812. In Lower Canada, the most substantial and established of the British North American colonies, the second decade of the 19th century marked the onset of a period of agricultural crisis.

Doing climate history in the midst of such considerable change holds exciting potential. In the early 19th century, many people moved to and across British North America and Rupert’s Land, and the climatic conditions they encountered played an important role in where they settled, their economic choices, and their expectations about a new place. As Julie Cruikshank has argued, the hazardous environmental conditions of the Little Ice Age shaped initial colonial encounters in the Canadian North and many of the still-dominant perceptions of the north in the Euro-Canadian imagination. Similarly, Alwynne Beaudoin, among others, demonstrates how early interpretation of the potential of prairie landscapes for agriculture by late-19th century settlers was a product both of newcomer expectations and the exceptionally wet conditions that they encountered. Early settlements were closely tied to local environmental conditions, as the majority of settlers engaged in productive activities that brought them into direct daily contact with the physical and biological world. Colonial environments were, moreover, syncretic cultural landscapes where different folk, spiritual, and scientific attitudes toward nature met. A late 18th-century map of southern New Brunswick illustrates the government lots distributed to the Loyalists along the Saint John and its tributaries, bounded by “Negro Settlements” on the north shore of Long Reach, and the “French Village” farther to the east. The indigenous Micmac and Maliseet residents were excluded from this representation of settlement altogether. Each of these groups held sometimes overlapping, sometimes divergent, cultural perceptions of the role of weather in influencing human affairs and different expectations about the potential of the southern New Brunswick environment. These same perceptions and expectations changed through longer experience on the land and with one another. Similarly, settlers imported and adapted technologies to the local environment. Studying the earliest years in which settler societies forged material and conceptual
relationships to the land can reveal to the environmental historian the long roots of certain attitudes toward nature in a particular place, as well as expose how people made choices in dealing with the challenges posed by an unfamiliar landscape. Amid the stresses of the early settlement period, climate played an especially important role. The questions arising out of the investigation of Tambora’s effects in a British North American settlement then become more complex: if we find anomalous weather in 1816, to what extent did it influence the early evolution of community, economy, and relationships to the natural world?

None of this gets us closer to knowing more about local climates in British North America in the early 19th century, however. Although there was rapid economic development and increased settlement in many places, neither factor was conducive to the accumulation of meteorological data necessary to accurately reconstruct regional climates in this period. Instrumental records of past weather are typically considered an ideal source for historical climatology.16 Certainly, for physical scientists seeking to use information about past climates to model present and future trends, instrumental temperature data can allow for comparisons to be made across centuries. The Celsius temperature scale, developed in the 18th century and based upon the boiling and freezing points of water, meant that 20 degrees Celsius in 1750 and 20 degrees Celsius in 1950 recorded the same temperature.17 The year 1816 lies well within the modern era of temperature measurement, and while thermometers were in use in British North America at this time, few if any continuous series of instrumental measurements extend back to the second decade of the 19th century. The oldest temperature records for places that lie within the borders of present-day Canada include the highly detailed snapshots provided by European explorers, such as John Richardson, the surgeon and naturalist with the Franklin expedition in the 1820s.18 Explorers took detailed meteorological measurements while they travelled across the Canadian landscape. Unfortunately, these series rarely offer more than a few years worth of observations. Longer, continuous instrumental records are available from whaling ships, fur trade, military, and mission posts scattered across the Canadian landscape.19 However, most of these date from the late 19th century, or are from places far away from New Brunswick, the chosen site of study. The first official, government-sponsored meteorological station was established in Toronto in 1839, as part of an imperial effort to accumulate terrestrial magnetism data and improve the data base for forecasting.20 Throughout the 19th century, official and private forecasting stations were established across Canada, offering an intermittent and widely dispersed historical instrumental record.21 These sources notwithstanding, instrumental data from Canadian territory is relatively rare.

Environmental historians must know how to use sources and apply methods other than those conventionally employed by historians. This is, arguably, how environmental history can contribute most to the historical discipline: by providing means to allow for the effective practice of interdisciplinarity (drawing upon two or more disciplines for methodological or conceptual insights) as demanded by transdisciplinary subjects (i.e., subjects, like the environment, that transcend traditional disciplinary boundaries). If we are to engage with the natural world as an active agent in Canadian history, then we must draw upon the tools developed by researchers outside archives to investigate the character and dynamics of past environments. In the case of historical climate research, evidence from tree rings, pollen, ice cores, and lake and marine sediments can
indicate climatic change much farther back in the past than the documentary record allows. Archaeological investigations that reveal evidence of extinction and desertion of settlements are useful for examining long-term climate variations. Tree rings are used to reconstruct both past climate and hydrology, and work from the Canadian prairies has supplied a long-term record of drought on the western plains. Unfortunately, unless physical data is available and has been gathered from the particular site of interest, then it cannot provide anything more than a broad-scale, general reconstruction of regional climates.

The combination of physical evidence and instrumental data (from outside British North America) indicates that highly variable weather conditions characterized the climate of New Brunswick in the early 19th century. This highly variable weather was associated with the close of the Little Ice Age, which has been broadly characterized as composed of three distinct periods: “a stormy ‘zonal’ onset, a calm ‘meridional’ maximum and a stormy ‘zonal’ end.” To investigate whether Tambora produced further anomalous weather in British North America, within this already varying climatic context, required primary materials that supplied evidence of not only what happened in 1816, but also the longer period in which the weather of that year occurred. In the absence of instrumental data, the ideal source was a record that offered both documentary and proxy evidence of the weather. Documentary evidence presents historical descriptions of weather and events dependent upon weather phenomena and is one of the richest forms of information on past climates. Oral histories can be used in a similar fashion, although they pose more complex challenges with regards to dating. Proxies are changes in the physical or biological world that indirectly describe weather conditions. Proxy information is derived from sources such as the seasonal or annual layers of tree rings, ice cores, and stratified lake sediments. A tree ring does not record the atmospheric temperature in which it was formed; its width, however, indicates the relative length of the growing season. Historical proxies include the dates of ice breakup and freeze-up, which have been studied in detail using the logbooks of Hudson’s Bay Company vessels. European environmental historian Christian Pfister has emphasized that pre-industrial people often demonstrated the anomalous character of a season by referring to observed signs in the physical or biological world. These signs reveal the broad ecological repercussions of anomalous weather. Proxy information further indicates strategies of socioeconomic adaptation and instances of susceptibility to extreme and variable weather. As a scientific tool, proxy information is seen as an important but imprecise source of information; for the historian, proxy information exists at the meeting point of climate, ecology, economy, and culture and thus is valuable in ways that abstracted instrumental data is not. Documentary and oral evidence in general intertwine perceptions of natural environments with details of environmental change and thus allow us to interpret the ideas and cultural practices that framed past encounters with weather.

For the predominantly agricultural settlements of British North America, farmers’ diaries offer the best potential source material for research. Men and women who lived in pre-industrial farming communities kept daybooks to record accounts, receipts, and expenditures; work begun or completed; and notable community or family events. They also, more often than not, kept a daily record of the weather—whether it snowed or rained, whether it was fine or overcast. Social historians have made extensive use of such diaries as means to access the worlds of
ordinary people whose historical experiences otherwise remain obscured. Farmers’ diaries have also been used extensively in conjunction with probate inventories and account books as invaluable sources for economic history. To a lesser extent, climate historians have used the meteorological information commonly found in farmers’ diaries to reconstruct past weather.27 Perhaps part of the reason that farmers’ diaries are not more widely used in historical research lies in the not uncommon complaint from historians or genealogists that an extensive diary of information, which they hoped would reveal details of rich community and social life, instead offered little aside from a daily record of the weather. This was precisely the kind of diary I was looking for.

Farmers’ diaries are a kind of source material that is commonly preserved, first by family members who appreciate the record of their ancestors and subsequently within archives. Not just any farmer’s diary would do, however. To clearly determine the local effects of Tambora in a British North American colony, I needed the diary of a farmer who had kept a daily record both prior to and following 1816. Although I had initially set out to research Upper Canada, the relative youth of many settlements in that colony meant that few diaries survived from the second decade of the 19th century. In the midst of pioneering farm work, settlers rarely had the occasion to keep a daily journal. The most famous narrative of early settler life in Upper Canada, Roughing It in the Bush, was published at mid-century and described Susanna Moodie’s experiences from the 1830s. History is done at the whim of what is preserved through oral tradition, documentary records, or material artefacts. Chance and circumstance are critical both to the preservation of material as well as their subsequent assessment by a historian. In this instance, I happened upon the diary of a farmer, kept daily from 1801 to 1859. This diary, located in the Provincial Archives of Ontario, chronicled Benjamin Benedict Crawford’s farm life in New Brunswick from 1801 until 1838, when he, like many others, migrated with his family from New Brunswick to Upper Canada and continued farming in Oxford township until his death in 1859. This diary provided more than 20 years of evidence of the local climate along Long Reach in southern New Brunswick, extending both before and after 1816.28

Benjamin Crawford’s Diary

Benjamin Benedict Crawford was born in Westchester County, New York, in 1777 to a Loyalist family, who left New York state in 1783 and headed north with thousands of other refugees to the province of Nova Scotia. James and Rachel Crawford settled along the Lower Saint John River, which the following year became part of Kings County in the new colony of New Brunswick. Benjamin, their third son, married Jane Catherine Lyon, daughter to prominent Loyalist Captain Joseph Lyon, in December 1805. Together Jane and Benjamin raised 13 children on their farm at Long Reach, and Benjamin also served the community for 20 years as a justice of the peace.

Benjamin Crawford first kept a diary on a trip in 1799 to Upper Canada, and his earliest entries are like most visitors’ journals: a description of routes travelled, places stopped, things seen. Crawford’s diary keeping came to reflect his social sensibility and aspirations as he continued his entries upon his return to New Brunswick in 1801. Jan Golinski has examined how
the appearance of weather diaries in Britain during the Enlightenment expressed a desire to move weather observation out of the realm of superstition and folklore and into a form of scientific study that could reveal “the rule of a benevolent providence over an orderly world.” As such, the systematic recording of weather acted as means of imposing order over the natural world and of elevating its observation into a disciplined, spiritual, and intellectual practice.

While Crawford, in contrast to Golinski’s 18th-century scientists, remained bound to the rhythms of agricultural life, he was also a religious man clearly positioned within the rural elite, as evidenced in his role as a justice of the peace, his relative prosperity, and his social networks. The people whose public and private affairs most commonly appeared in Crawford’s diary shared his financial and social status. The Whelpleys, Lyons, and Williams worked similar-sized farms, and Richard Whelpley was captain of the militia. This middling social group stood in contrast to the Acadians, “Blackmen,” and “Irishmen” who appeared in the diary either as farm-labourers or as a result of Crawford’s work as JP. In keeping his record of weather and farm activities, Crawford produced a systematic record indicating the skill and precision required for his labours, even as the same diary often articulated vernacular knowledge of nature and weather and acted as a repository of local gossip.

Benjamin Crawford did not begin to consistently record the weather until 1810, and his descriptions of weather and the local environment grew more detailed with time. This was in part because he became a better record keeper. In 1812 there are 144 days with no record (39.3 percent). In 1813 this drops to 59 days (16 percent) and continues to fall, such that in the period from 1815 to 1821 Crawford has no record for an average of only five days a year (1.4 percent) with his most regular entries before 1821 kept in 1816, 1817, and 1818. But Crawford’s greater attention to weather detail is also a fairly common feature of any diary that records the local environment, as the recorder becomes more confident with time and has access to a past record to remark upon exceptional events in detail or to describe normal conditions. Beginning in December 1814 Crawford began to devote one page to each week, ruling dashed lines along the pages to divide them into equal-sized sections, increasing the precision with which his record was kept. By creating a space to record each day’s events, rather than just writing on the days that he remembered or chose to, Crawford ensured that his weather record would become even more precise: on days when nothing of note occurred, he still remarked upon the weather in the designated space. A typical longer entry might include information about the weather, the farm, and local social life; for example, on May 10, 1819, Crawford wrote, “A dry spell of weather; sowed about 3 pecks of wheat and 2 bushels of oats at the upper lot; John Whelpley here to see his people.” The single most common entry found in isolation in Crawford’s diary was the simple statement “good weather.”

By standardizing entries and keeping tallies and summaries for each year, Crawford made it easier to review important dates with an eye to comparing production and activities in the present to those in the past. His diary functioned as a ledger that allowed him to keep track of accounts owed or paid. Crawford purchased oats and potatoes from his neighbours, particularly in years when his hay harvest was poor. In turn, he sold meat and livestock to his neighbours. These purchases were either paid in cash, or notes were given at the time of the transaction and several months later Crawford would record that he and the other party had settled.
few pages of each diary were devoted to summaries of production and sales, along with miscellaneous notes about cures for illnesses or injuries that his family or friends had suffered during the course of the year, and drafts of material related to his work as justice of the peace. Precision and consistency were important not just to the integrity of the record itself, but as part of the larger function that the diary served in Crawford’s life.

Economic and farming life, and by extension the natural environment that these were predicated upon, were the major focus of the diary. Much of the Crawford farm activities focused upon the family’s cattle, sheep, and pigs. Between 1806 and 1821 the Crawford farm included on average 12 milk and beef cows, 3 horses, 10 pigs, 2–3 geese that produced between 6 and 20 goslings each year, and at least 20 chickens. In this same time span, the number of sheep on the Crawford farm grew from 14 sheep and 9 lambs to 24 sheep and 19 lambs. The emphasis on livestock reflected the broader economy of southern New Brunswick, which produced pork and cattle for export to Great Britain and the West Indies. Crawford detailed trips to town to sell or purchase goods, as well as the prices paid and the specific amounts in each instance. To maintain the livestock, the Crawfords produced hay and oats, and to maintain themselves and for sale at market, the farm produced buckwheat and wheat. Crawford kept a record of when he sowed his grain, hoed his potatoes, slaughtered calves, and cut hay. Crawford also kept a close eye on the farming and economic activities of his neighbours, including forestry work, which featured increasingly prominently in the life of Long Reach over this period. Crawford’s social record of economic activity not only emphasized the communal aspects of pre-industrial labour through frolics or bees, but also represented how Crawford evaluated his own activities and success against the work of others. In August 1821 Crawford noted that “Richard Whelpley sowed his Rye the 7 of September last and it is very good which seems to be a good time to sow Rye.” From 1816 to 1818 Crawford tallied his own salmon catches against those of his neighbour (and Richard’s brother) Henry Whelpley. In addition to his own trips to market, Crawford also paid attention to when his family and friends went to Saint John; family and friends could carry goods for him and relay important information about prices.

Just as his diary acted as a record of his farm work, it also served as a place to record his family and social life. The births of his children were noted and tallied, he kept record of illnesses and deaths in his immediate family and among his larger circle of family and friends, and who cared for whom under such circumstances. Visiting featured prominently as one of the main aspects of social life, including day visits or longer stays. Moreover, through his work as justice of the peace, Crawford became closely involved in the intimate lives of much of the community at Long Reach. When an unmarried woman got pregnant and wanted to hold the father-to-be responsible, she would come to the Crawford farm to make her declaration. When a neighbour accused a labourer of stealing, Crawford was directly involved in the matter. Crawford kept note of disagreements, trials, and settlements. His social and economic records were one and the same, as when on August 9, 1820, he noted, “John Williams had a mowing frolick had 14 hands then they had a quarrel at night.” In Benjamin Crawford’s diary the life of the community is interwoven with observations of natural phenomena, and an account of colonial farming and forestry. The diary thus acts as an ideal source through which to examine the intersection of nature, society, and economy in early 19th century New Brunswick.
Reading Diaries for Weather

At first glance, however, the Crawford diary—like so many other diaries and journals found in archives across Canada—is little more than a dense and relatively uninteresting collection of details: “cold but good weather for hauling wood, fine going to town”; “NW wind cold, Drummer calved.” How important is it that we know that a particular cow in southern New Brunswick calved one early April morning almost 200 years ago? The juiciest of the local gossip appeared sparingly in the diaries, and could be made meaningful only with knowledge of the social networks that bound the community at Long Reach together. As Kathryn Carter has observed, “diaries of this type have often been overlooked by scholars because they seem inexpressive and opaque.” Here Carter refers to the superficial appearance of such diaries, which on a single page offer no distinctive voice or relevant insight into broader affairs. Yet account books and diaries of this sort can be fairly effective vehicles for past voices, provided that the author was an interesting person or at least an interested observer of her or his world, and that the reader has the patience and time to get to know the author. With the opportunity to spend some time getting to know the diary keeper, the potential of such sources can be enormous.

When doing this kind of research, your first question must be, Is this diary worth your time? In my case, I originally requested to look at all the early 19th-century diaries in the Provincial Archives of Ontario (there were not all that many) as I hoped to use multiple diaries for a more precise reconstruction of the weather from multiple observers across a particular region. To decide whether a diary was a worthwhile source, I turned first to 1816 to see whether any remarkable weather had occurred. This quickly showed which diaries were legible and which diarists were astute observers of the weather, as well as indicating any remarkable weather in that year. The Crawford diary quickly stood out as the best and indeed only worthwhile source for the years of interest. Not only was Benjamin Crawford attentive to weather and strange weather events, but also it was clear that something was amiss in the spring and summer of 1816, as he remarked upon the “Backward weather.” Such an initial selection process is not always successful. I have, in other research projects, been fooled by diarists who, over the period of immediate interest, kept a close record of weather but otherwise consistently omitted days or weeks at a stretch. Such inconsistent record keeping limits the value of a diary to the reconstruction of past weather. Travellers’ diaries are similarly compromised as travellers move through places, leaving only a brief record from a given site. Furthermore, because they are only visiting, travellers are poorly tuned to exceptional as distinct from regular environmental conditions. Travellers’ diaries thus often reveal more about the travellers than about the places they visit. Even a perfectly kept weather record has its limits as an historical source. Descriptions of the weather typically endure even when the diarist finds nothing else worthwhile to record. But this is useful only if weather reconstruction is the sole aim of your project. The real richness of the Crawford diary, which became clear to me only after I had worked with the source for several days, lay in the combined descriptions of weather, environment, society, and economy.

I opted to hand copy the important material from the original diaries. The entire series had been microfilmed but the quality of the microfilm was poor and because the microfilm existed, I did not have permission to photocopy the original text. Moreover, because the originals were
stored in a restricted part of the archives, I did not have permission to use a laptop. So instead, every day I walked across town in the hot and humid Toronto summer to the Archives and sat down with a pencil and notebook copying what I thought was important from Crawford’s daily record. I started with the years 1815 through 1817, to ensure that my initial sense of the diaries’ worth was correct. Once those three years were complete I then moved back to 1812 and copied the remainder through 1821. I benefited from the tallies and summaries that Crawford kept annually. I did not copy every single detail; even though I was often compelled by Crawford’s descriptions of his family life, I knew that such events had no discernible links to the weather. One of the real challenges in doing history, and I would suggest environmental history in particular, lies with knowing where to draw such lines.\textsuperscript{39} If you are too restrictive in the notes that you take you can limit your possible research outcomes. Had I recorded only weather observations and grain prices, then my environmental history would have focused exclusively upon markets and the economic effects of the distant Tambora eruption. Instead, I cast widely to try to capture the broader environmental repercussions of the volcano—I paid attention to Crawford’s observations of plant growth, cherries ripening, hay harvesting, and ice breakup, as well as his comments on his cattle and the cost of flour. I also paid some attention to social events, hoping that Crawford, particularly with privileged access to community life in his role as JP, would offer some insights into social repercussions of anomalous weather in the young colony of New Brunswick.

The alternative to copying the entries would have been to extract the relevant information directly into a digital database as I read the diary. A “digital database” refers to the form in which data drawn from an historical source is organized using a computer. Digital databases can be relatively straightforward: for instance, a table or spreadsheet with the information organized into columns and rows; or it can involve more complex relationships between multiple tables, text entries, and mapping functions. Directly inputting data is less time consuming, but it is also less flexible: any database constructed prior to reading a diary in detail will not be perfectly suited to the particular original source. In some respects this introduces an important measure of standardization onto the information that is sought. But it also can mean that rather than allowing for quick tallies, dates, or counts of important information, a poorly designed database will force much of the interesting information into an open “comments” field, from which it then has to be extracted in a second iteration of analysis. In this case, the database saves no time as compared to copying out the diary and, I would argue, creates more opportunities for introduced errors. As the form of the database deviates from the form of the original source, it is easier to miss errors in transcription, for example. Moreover, in moving straight to database entries, some of the benefits of “reading” the diary are lost. Copying the diary entries served a wider purpose, as it established rapid familiarity not only with Benjamin Crawford but also with the geography and community of Long Reach. Exceptional events appeared clearly as I grew accustomed to Crawford’s tone. It also helped that he was interested in anomalous weather. Descriptions of severe storms often included details about the longer weather context, such as a fierce storm on June 4, 1812, that led Crawford to remark, “this day there was a prophecy that the world would be at an end—the most severe storm that was ever none in June By the oldest inhabitant.”\textsuperscript{40} Benjamin Crawford was a reliable and knowledgeable guide to the early 19th-century environment and climate of Long Reach.
Sensing Weather in the Past

Conceptualizing the larger weather context required extracting relevant data from the diary entries and organizing it in a manner that made meteorological sense. Documentary records used for historical climatology typically include two kinds of weather-related information: meteorological variables and proxies. Atmospheric scientists measure precipitation, temperature, air pressure, humidity, cloudiness, and wind speed and direction to determine the state of the atmosphere, and where these variables are found in historical documents they can supply the most straightforward climate data. To translate the text within Crawford’s diary into atmospheric data, I created 10 tables, one for each year, in which each day was numbered 1 through 365 (or 366 in the leap years) and organized the information into fields for temperature; wind speed and direction; whether it snowed, rained, or stormed; and, if known, how much rain or snow fell, whether the sky was clear or cloudy, and whether the day was dry. I also kept an open field of comments in which to record descriptive detail. These tables provided a broad overview of what information was recorded regularly enough to permit analysis. Crawford most consistently recorded temperature, precipitation, and wind speed and direction.

Crawford described temperature using such adjectives as “cold,” “warm,” “very hot,” “cool,” or sometimes less precisely “good weather” or “fine.” Obviously, a cold day in June 1814 has no direct degree equivalent in the 21st century. But when temperature was considered as a relative value rather than an absolute, Crawford’s record was more forthcoming. To express relative value I needed to translate the descriptions into quantifiable terms. One possibility, if I was interested only in looking at the temperature in 1816 relative to that in 1813 or 1821, was to count the number of cold days as compared to the number of good days (to use just two examples). Distributing these counts across months would ensure that I could capture seasonal variations. However, by only quantifying Crawford’s record in reference to the diary itself, I was in danger of perpetuating any weather delusions that Crawford might have had. I needed some kind of external confirmation as to the reliability of the record. The colonial newspaper, the New Brunswick Royal Gazette provided one external reference. In 1816 the Gazette featured three separate articles that sought to identify causes for the unseasonably cold summer weather. The other opportunity for external validation came in a different approach to the temperature observations. I made a list of the principal terms used to describe the weather and then ordered them from coldest to warmest: dreadful cold, very cold, cold, moderate, cool, dull, fine/pleasant/good, warm, very warm, hot/dreadful warm, very hot. I then set each of these equal to a number, from −5 through +5 with 0 equal to “dull.” Using these assigned values, that bore no relation to actual temperatures but attempted to capture the variations in weather described by Crawford himself, I charted and analyzed the temperature descriptions on a monthly, seasonal, and annual basis. The accuracy of both the method and of Crawford’s temperature observations in general were tested by comparing a graph that averaged these temperature values for the entire period against a graph of temperature normals from the 20th century. The amplitude of the 1812–21 graph was smaller but otherwise mirrored the form of the 20th-century data, indicating that Crawford’s observations were broadly reliable. Comparing 1816 to 20th-century climate normals further revealed a sharp depression in temperature in 1816 that lasted into 1817, graphically illustrating the markedly colder weather in 1816.
The other kinds of data available in Crawford’s diary posed far fewer methodological problems. Present-day meteorology is more precise but otherwise relies on much the same information that Crawford recorded. Crawford occasionally remarked upon the amount of precipitation that fell, but without the requisite regularity; he did record the days when rain or snow fell, however. Crawford’s diary is consistent with, albeit less sensitive than, present instrumental records of precipitation that can register as little as a tenth of a millimetre of rain or snow. I counted the days when precipitation fell and distinguished the kind of precipitation. The same approach was used to assess thunder-, snow-, and rainstorms. Relying upon Crawford’s own consistency in what he termed a “storm” provided the foundation for this approach. From these variables I was able to construct an overview of the weather, as recorded in Crawford’s diary between 1812 and 1821. The stormiest years in this period were 1812, 1814, and 1817. The absence of summer thunderstorms in 1816 was an expected result of the cooler temperatures that year. Additional research suggested that the exceptionally stormy weather early in the period could also be tied to other wider climate events, either distant eruptions between 1809 and 1814 or to the effects of the North Atlantic Oscillation.

It still remained to understand the significance of this weather relative both to the 1815 volcanic eruption and to the life of the community at Long Reach in this period. The data I had thus far gathered showed patterns and trends—such as the large numbers of storms early in the period, persistent cooling in 1816–17, increased precipitation in 1818, and drought in 1820–21—but it was poorly linked to society and economy. Perhaps it was colder in 1816, but was it just a little cooler or did this weather have an effect on plant growth, animal behaviour, or social life? Proxies offered the potential to reveal the wider ecological and economic repercussions of anomalous weather. But then I had to ask, what were the appropriate proxies to use?

Crawford observed a lot of features of the wider environment and his community but these varied observations were valuable only if he made note of them every, or almost every, year. To organize this diverse information I created tables for descriptions of grains, prices, labour, transportation, social events, and animals. In each table, the date tied the observation to the weather tables, but otherwise the record reflected the different ways that Crawford described his world. Animals principally included farm animals, and entries mention when they reproduced, fell ill, or were slaughtered. Within the database constructed around Crawford’s diary, each table focused upon one aspect of the environment, economy, or society at Long Reach. From these tables, it was clear that I could use two proxies, quite common to historical weather records: observations of the freeze-up and breakup of ice (in this instance from along the Saint John River) and the length of the growing season.

The seasonal formation and destruction of ice is a particularly rigorous and important environmental proxy in historical records across Canada, speaking to the significance of this seasonal transformation in Canadian history. Waterways served as the highways of commerce across much of the continent well into the industrial period. The transformation of water from a solid to liquid state and back again signalled the seasonal transition, brought immediate disruption as the transitional period made travel much more dangerous, and involved distinct modes of transport and specific hazards. Yet the formation and breakup of ice in major waterways is a complex
environmental phenomenon that occurs over a period of time (from when the ice first becomes unsafe until the water is completely open) and is contingent upon the morphology of a river or lake in combination with weather conditions. Stormy weather could break up newly formed ice, keeping a waterway open for longer than ice that formed under colder and calmer conditions. Crawford again was a particularly helpful observer. His first and last comment on ice breaking and freezing respectively were taken to signal the dates when the river first opened and finally closed. But Crawford also consistently remarked the date when the spring freshet (the height of meltwaters in the river) reached its peak, when the ice passed Caton’s Island, and when the river was fully open. Crawford thus presented a sensitive annual reading of the complicated process of ice breakup and freeze-up.

The complexity of this process offered further insight into the enduring effects of cold weather in 1816. Although the ice broke briefly in January that year, it soon froze over again and remained closed into April, as usual. Twice in the spring of 1816, Crawford commented on the “backward” weather and noted snow on the mountains in June, where he had only ever otherwise noted snow in the fall months. The marked increase in storms in 1817 was concentrated in the winter months (from January to March) and saw more rain and snow than any other year in the decade. The severity of that winter led Crawford to remark that this was “the hardest season that we have ever had for many years.” The accumulated snowfall and cold temperatures kept the Saint John River frozen longer in 1817. Crawford described the ice that year “as good I suppose as it ever was known this thirty years past” and the spring freshet “was as high as was ever known” as the meltwaters filled the riverbed. Just as the more complicated record of ice breakup and freeze-up recorded the more enduring impacts of the unseasonable cold of 1816, so too a rather simpler record—that of frog callings—more straightforwardly indicated spring weather conditions along the Reach. Spring peepers need temperatures around 20 degrees Celsius before they will begin their search for a mate. Crawford recorded each year when the frogs began to peep, presenting a strong record of spring temperatures even in the absence of instruments. In 1816 the frogs did not start calling until May 20, almost two weeks later than in any other year except 1817.

The vulnerability of plant life to anomalous weather and the importance of plants to agriculture have ensured plant life a prominent place in global historical climatology. Ladurie’s *Times of Feast, Times of Famine* focused upon European tithes and vintage dates, when the grapes were ready to harvest. Agriculture was substantially less well established in early-19th-century New Brunswick, but proxies drawn from plants and crops nevertheless offer detailed insights into the consequences of anomalous weather. The length of the growing season signalled years with consistently colder summer weather and directly linked weather conditions to failed, modest, or flourishing agricultural production. Knowing and accommodating the length of the growing season was essential to skilled agriculture and was measured by the number of days from the last frost to first frost. Crawford kept a record of these dates in each year, revealing dramatic fluctuations in the length of the growing season between 1812 and 1821. The blossoming and ripening dates for strawberries, which grew wild but that Crawford recorded more diligently than his own cultivated produce, reinforced the consequences of the cold weather upon plants. In 1816 the growing season lasted only 86 days, where it usually lasted over 100 days; the strawberries ripened later than any other year, and by September Crawford remarked, “there has not been scarcely any
corn or beens got ripe this season.” Grain prices (oats, wheat, and corn) all peaked in 1817, reflecting scarcity in the previous year. Hay reached the highest price peak in April 1817; with livestock still dependent upon the fodder produced in 1816, there were not only increased transactions between Crawford and his neighbours over hay, but also prices reported as high as £12 per ton, where Crawford typically paid around £3 per ton in the same season, revealing that hay was a commodity greatly in demand.

From the proxy and anecdotal evidence available in Crawford’s diary in combination with other sources on early-19th-century New Brunswick history, I was able to draw some connections between wider social and economic changes and the anomalous weather. Crawford noted the presence and execution of a witch in the region in August 1816, articulating some of the insecurity and fear that attended the unseasonable weather and its negative effects upon agriculture. Outward migration from the region increased during and after 1816, and transient wage labour came to prevail over communal work in farming and forest harvesting, suggesting how the hard seasons contributed to the instability of the still-young farm economy of southern New Brunswick. Some of those who stayed in Long Reach shifted their efforts from vulnerable corn and hay (used to fodder cattle in the winter months) to hardier oats used to feed sheep. Likewise, work in the woods profited from the cold seasons that made it easier to access and haul lumber. Thus individuals, families, and communities already responding to the hardships of early settlement adapted their economic activities to the limits of the natural environment—limits imposed by inclement weather itself resulting from a far distant volcanic eruption.

Climate in Environmental History

The case of the Tambora volcano and its effects upon the community of Long Reach illustrate how climate and weather are critical and complicated subjects for environmental history. Oceans and landmasses define boundaries, whereas the atmosphere links distant places through global patterns of dispersal and circulation. The far-reaching climatic effects of a single volcanic eruption expose distant connections and help us to recognize how environmental history is the study of local places caught up in global processes. In studying past climate we must always be alert to distinguish between correlations and causation. The coincidence of anomalous weather with momentous historical events should not lead us to make assumptions about cause (exceptional weather) and effect (dramatic event). Instead, the role of weather must be recognized as part of a larger environmental, social, and economic context. Yet the complexity of weather phenomena and their wider socioecological repercussions can thwart ready analysis and interpretation. Climate is often described as a stochastic process, one where outcomes cannot be readily determined but rather appear random because of the degree of complexity involved. This creates not only opportunities to refute findings regarding 20th-century warming trends, but also challenges in attempting to reconstruct past climates and their socioecological consequences, using historical evidence. Although Benjamin Crawford was alert to the strange weather of 1816, it is only with the benefit of historical hindsight that we can see the manifold ways that it affected the environment and economy of Long Reach.
**DISCUSSION QUESTIONS**

1. How can we recognize past climate change or changes in the weather? What kinds of sources can we use to reconstruct past weather and climates?

2. How has climate changed over time? Offer a broad-stroke climate history of Canada. Is there such a thing as a “normal” Canadian climate?

3. How would pre-industrial peoples have perceived the weather differently than we do today? Were they closer to nature?

4. How would climate or weather, as compared to other aspects of the natural environment, influence early settlement?

5. What makes a community vulnerable to changes in the weather?

6. How can we test the reliability of proxy evidence of past climates?

7. Is colloquial meteorology more or less precise than official meteorology?

8. Other key events in Canadian history occurred in 1816. In what is now Manitoba, Métis and members of the Hudson’s Bay Company fought at Seven Oaks, a battle precipitated by food shortages. In Lower Canada, an agricultural crisis developed. How could one go about investigating the effects of weather—and, ultimately, the Tambora eruption—on these historical episodes?

**NOTES**

1. The Early Canada Environmental Data project, part of the NiCHE: Network in Canadian History and Environment initiative, seeks to compile and collect such materials in all its different forms.


21. This can be accessed at Environment Canada’s “Climate Data Online” at http://www.climate.com/weatheroffice.ec.gc.ca/climateData/canada_e.html.


30. His farm, inherited from the land grant given to his father, was a standard size, somewhere between 70 and 169 acres.

31. These peak years also reflect Benjamin Crawford’s attention to anomalous weather.


33. See for example, *Crawford Family Papers*, Benjamin Benedict Crawford Diary 1814–15, January 6, 1813, MS 796, F 709, Archives of Ontario (AO). Hereafter I will cite diary entries with the abbreviation BBC followed by the date(s) referenced in the text. Where I quote directly from the diary I retain the original spelling, although I insert periods and capitals to indicate what would have been separate notes in any daily entry.


35. BBC, August 7, 1821.

36. BBC, March 29, 1815; May 12, 1813; April 11, 1817.

38. BBC, April 15, 1816.

39. Environmental history in particular because of the wide range of natural as well as social, cultural, political, and economic occurrences that fall within its purview.

40. BBC, June 4, 1812; See also April 27, 1814; May 19, 1813; and June 24, 1814.


42. The normals can be found in federal government publications such as Environment Canada, *Canadian Climate Normals/Normales Climatiques au Canada 1951–1980, Temperature and Precipitation/Température et Précipitations: Atlantic Provinces/Provinces de L’Atlantique*, vol. 5 (Ottawa: Minister of Supply and Services Canada).

43. A snowstorm would be tallied twice, for example: once as a storm and once as a day with snow.


46. For discussion of methodology, see Catchpole, “River Ice and Sea Ice.”

47. BBC, April 1, 1817.

48. BBC, January 24, 1817; May 15, 1817.

49. Fleshy fruits are particularly good indicators of weather because it is not only when they ripen, but also their qualities when ready that can indicate the interaction of multiple weather phenomena. See Stommel and Stommel, *Volcano Weather*, p. 41.

50. William Baron argued that it was the crop failures, rather than just the cold temperatures that produced them, that were the source of 1816’s notoriety. Baron, p. 132.

51. BBC, September 11, 1816.

52. £12 appears on March 25, 1817.

FURTHER READINGS


Like all history, microhistory is a dialogue about the interpretation of meaningful evidence left over from the past. Microhistory differs from other kinds of history in that it reduces the scale of observation; it is a very close reading of evidence documenting how people ordinarily (day to day) related to each other, and to their environment, in one place. Microhistorians are drawn by their conviction that "[p]henomena previously considered to be sufficiently described and understood assume completely new meanings by altering the scale of observation." A study of a specific house, river, neighbourhood, family, or individual through history, or anything else that requires the reduction of scale and an intensive examination of evidence, could qualify as microhistory. But because the most commonly recognized kind of microhistory is the community-based study, and as its advantages to environmental history are both extensive and generally unacknowledged, this will be the focus of my discussion here.

Microhistorians are interested in the details of daily life in one place, and how they change over time. By focusing on the specific and the local, microhistorians’ detailed research has contributed to more nuanced general and even national histories. For example, microhistorical studies have provided evidence of the differences and variations within national or thematic patterns that historians have already documented, shedding light on such questions as, why is it that while most families in Canada were reducing their family size in the early 20th century, some did not? Did farms fail or did there seem to be more opportunities for a better life in the city? How exactly did dry land farming practices used by farmers in the early years of the 20th century contribute to the soil erosion that came to define the “dust bowl” of the Depression years? And microhistorians’ work can offer some particular insights into the ways in which general patterns or average behaviours were
experienced at the individual or local level. Bettina Bradbury’s study of two Montreal neighbour-
hoods, for example, provides an in-depth look at the aspirations, practices, and financial consid-
erations that engaged people coming to terms with industrialization.3 The reduced scale of
microhistory can be particularly useful not only in documenting variations within general trends,
and insights into the experience of the average, but also, as will be shown in more detail below, in
bringing to the historian’s view those activities, beliefs, and issues that are difficult to see, let alone
understand, when the scope of enquiry is wider, more generalized, or depersonalized.

Unlike most other historians, microhistorians are not seeking to demonstrate the significance
or meaning of their particular research in terms of, or in relation to, averages, patterns, or trends
already established by other historians. Indeed, when microhistory emerged in the 1970s, it did so
as part of a radical historiographical groundswell that challenged assumptions of homogeneity,
uniformity, and “progress” posited by earlier generations of historians and embedded in the very
notions of “general trends” or “average behaviours.” Society cannot, microhistorians argued, be
understood in terms of external forces that imposed massive change on everyone, or even on
coherent social groups, all at the same time and in the same way; change cannot be understood as
a “regular progression through a uniform and predictable series of stages” in which individuals
respond to social and economic structures in a way that seems “given, natural and inevitable.”4
By reducing the scale of observation, it becomes possible to document the ways that particular
people work out their lives within a shifting set of patterns—beliefs, practices, relationships—in
which they make sense of their own lives, adapting themselves to each other and to their environ-
ment, or by changing their environment to suit their society. It is in people’s day-to-day practices
that they make the “innumerable and infinitesimal transformations of and within the dominant
cultural economy in order to adapt it to their own interests and their own rules.”5 It is in these
practices that microhistorians hope to see and sometimes explain variation and change in history.
Microhistorians of the 1970s, in other words, were explicitly looking for ways of understanding
difference and change that did not reduce culture, economy, and society to normative trends and
generalized patterns; in the study of the local and the particular they found a new, and they
believed, a much more complex way of understanding society and the individuals who comprised
it through time.

But whether or not microhistorians actively espouse the radical purpose of their historiographic
forebears, and whatever their contribution to debates about general trends, issues, and
events, microhistorians’ purpose, and the starting point of their research, is the local and the par-
ticular. This has some interesting consequences for the kind of history they write. They cannot be
certain, at the beginning of their research, whether their findings will cast new light on old ques-
tions, support earlier generalizations, or generate new questions about issues or events whose
significance has not yet come to the attention of historians. And because of the range of their
topics, and their emphasis on diversity, difference, and the particulars of the person or place they are
exploring, microhistorians as a group have no consensus on the theories, concepts, or ideological
frameworks that will direct their interpretation of what they will find. Instead, they draw widely
from anthropology, sociology, and history as seems appropriate to their particular study. Perhaps
the only substantive generalization, therefore, that can be meaningfully made about microhistory,
aside from its alteration of scale, is that it is an essentially experimental genre of history. It is the kind of experiment that ventures something new and different; it is an experiment with no dependent variables.

I will be suggesting throughout this chapter that microhistorians’ vision of history as experiment can offer focus, methods, and purposes that have some particular advantages to those doing and understanding environmental history. As Donald Worster argues, environmental history looks beyond the thematic, temporal, and geographic boundaries that define most historical subjects and practices. Instead of being located within these boundaries, environmental history situates human actions within an ecological context, where three kinds of relationships can be observed: the relationships among nonhuman phenomena (like microbes, algae, fish, and river beds); the ongoing, multiple, endless responses of human beings to their environment (adapting farming practices to a particular soil, or burning “buffalo chips” to heat a sod house on the Prairies); and the impact of human beings on that environment (the toxic waste from a chemical plant dumped into a lake that kills fish, or the creation by farmers of a perfect environment for weeds by cultivating the soil). A “fundamental premise” of environmental history, as William Cronon puts it, “is that human acts occur within a network of relationships, processes and systems that are as ecological as they are cultural. . . . [T]he natural world, its objective effects on people, and the concrete ways people affect it in turn are . . . the very heart of our intellectual project.”

Microhistory can assist environmental history by providing a focus through which to see the complex daily series of relationships involving humans and nature. It might be said that microhistory offers an “ecosystem approach” to understanding people in their environments.

A Case Study of Microhistorical Practice

Microhistory provides a close-up view of people and place over time. It also offers environmental history a methodology (a way of doing history) and epistemology (a way of knowing the subjects of history) for exploring the kinds of rigorous, detailed, empirical studies that are needed to explore the complex relations between people and their environment. As well as being defined by its attention to the relations within a particular place, microhistory is also rooted in a close examination of a wide variety and large volume of documentary evidence about that place. This section will discuss how the research of a microhistorian might unfold, and suggests, in the process, how this kind of history is particularly well suited to the study of environmental history.

Let’s turn to the research process that I am the most familiar with: my own microhistorical study. In beginning work on what eventually became my book *Contesting Rural Space*, I chose Salt-spring Island, British Columbia, because it met the requirements set out above for a microhistorical study. It was a well-defined place, and there was a lot of historical evidence available that allowed me to answer questions that I wanted to ask about day-to-day life—most particularly, what was the relationship of these people to the rural land on which they lived? Before beginning my research, I understood from secondary readings that it had been one of the first areas identified as an agricultural hinterland for Victoria and the mining communities of Ladysmith and Nanaimo on Vancouver Island, providing them with fresh agricultural produce.
My first task as a researcher involved finding out as much as I could about the particular people who lived on the island, and about the particular pieces of land that they took up. I sought all of the documents that provided information about any person who lived on the island—from the time that the first non-native settlers arrived on the island in 1859, through the first generation of resettlement, to the date when the first detailed agricultural statistics were available for individuals on the island in 1891—and to find out about each piece of land inhabited in that time period. The population of the island was about 270 in 1881 and 450 in 1891, but most of my records documented the people of most interest to the colonial and early provincial bureaucrats and policy makers: landowners. Women were allowed to own land under some circumstances, but they were not generally allowed to obtain land under the pre-emption (or homesteading) system. As the vast majority of land on the island was obtained under that system, most of my records were about men. In the end, I had about 4,400 discrete pieces of information relating to this population in the years under examination, and about 80 percent of these described landholding men.

I spent many months finding and entering into a computerized database information gleaned from what historians term “routinely generated sources.” For the island, these included voters’ lists (listing the name of all eligible voters on the island); business directories (listing all property owners on the island); censuses for 1881, 1891, and 1901 (offering information about the age, sex, religion, place of origin, ethnicity, and relationship to the household head of everyone on the island on census day); and tax assessment rolls (providing information on land ownership, the value of land, the number of livestock, as well as information about the value of their taxable property in this age before income tax). I also looked for information about individuals in a variety of other sources: court records, inquests, school records, Public Accounts for the province of British Columbia (which listed the name of everyone who worked for the provincial government, for what wage, and for how many days), newspaper stories, diaries, and letters. Gravestones and parish records provided the best source of information about women and children outside the decennial census, though the latter, with its listing of the names, ages, and parentage of all residents, provided the best—though certainly still not always accurate—single source about all members of each household.

Land records provided my largest single source. The surveyor general’s office houses an important collection for the study of pioneer settlement. When land was (and is) originally purchased from the crown (i.e., from the province of British Columbia), the purchaser pays the government, and obtains a crown grant that gives him or her legal title to the land. This process generates a formal record, the registration of the land in the surveyor general’s office in Victoria. In the first years of resettlement, these records were handwritten in the land register, a huge book where every piece of land was listed by region (Saltspring Island had its own book, while Victoria and Nanaimo each had several volumes, for example) and then by individual section and range number, and included the name of the first person to purchase that particular piece of land and the date.

After a particular piece of land is “alienated from the crown,” documentation relating to any further sales of that land is dealt with in a different office, the land records office. It is an efficient system for following the purchase and sale of land from one individual to another, but it creates difficulties for anyone wanting to study the history of a community. First, the system used by the land records office does not allow the researcher to see the history of any particular piece of land
through time, because (unlike the surveyor general’s records, which lists the history of each piece of property on a page or two), the land records office in British Columbia keeps track of only a number that links one sale in the province back to the last previous owner. As a result, it can take several hours to research a single piece of property through several purchases and sales. Second, the search is very expensive. The land records office will not allow researchers to do their own searching, and so are obliged to charge the researcher several dollars per land transaction. This makes tracing the history of land ownership in an entire community like Saltspring Island practically impossible—a factor that helps to explain why there are so few studies of land ownership in western Canada and the United States.9

Fortunately, given my research goals, most people on Saltspring Island in the years that I was looking at did not purchase their land outright; indeed, no one did before 1881. Instead, most people obtained their land by taking advantage of the pre-emption system. This was a homesteading system, developed in the 1860s across North America, that allowed people without a lot of money to register a claim on a piece of land for just a few dollars, and then to live on it for some years without paying for it. Once settlers had “improved” their land by clearing, fencing, and erecting a permanent building on it, they were entitled to purchase the property very cheaply from the government—$1 per acre across much of the west in the 19th century. This was an excellent system for encouraging settlers to turn “wilderness” areas into farming communities. This system also generated the kinds of records historians need to follow the process of land settlement. The government recorded who was pre-empting and improving land in the same land register that listed the eventual alienation of each piece of land from the Crown when it was finally purchased. The land register, therefore, became central to my study of land use on the island, and I spent several months entering its contents into my computerized database. The only snag was that British Columbia started collecting its data in such an organized form only in 1871, when it became a province, while my study began in 1859. It took me several months of searching throughout the British Columbia Archives to find just over 100 pre-emptions from the earlier, colonial era.

Once I had all of this information about people and where and how they lived, I needed to organize and analyze it. What were the questions I wanted to ask? Did my data allow me to answer them? Foundational to my approach was a conviction that rural households were central to an understanding of rural economies and societies, and so I made the households on the island the centre of my study. The kinds of questions that I wanted to answer came, in their most general form, from the wider historical literature about rural societies and how they changed over time. From this literature, I identified a number of specific questions that I hoped would address bigger questions about rural society. What was the household composition? (Were families nuclear, or extended? How many children did people have? Was there intermarriage among the many different ethnic groups on the island?) How did people make a living on the island? (Did they grow crops or raise livestock? Did they sell or consume these products? Did they hunt and fish, and, if so, did they do so for money or for home consumption? Did men, women, and children do the same things, or different?) What kind of community was there on the island? (Was there a municipal government? Did people send their children to school regularly? Did they all go to the same church? How were conflicts settled?)
To answer these questions, I cross-linked the information gathered about land usage and ownership and every other piece of information I had about individuals to the census descriptions of households in the 1881 and 1891 censuses. The census, in other words, became a snapshot of each household that I related to all other information I had gathered about individuals over time. For all heads of household appearing on the census, for example, I was able to provide a first and last date that they appeared on any documentation indicating their presence on the island, a description of the amount of land they owned, and the number of children they had in the census year. These cross-linkages for 1881 and 1891 allowed me to answer questions such as, How old were people when they arrived on the island? Did they arrive by themselves, in couples, or with their families? How much land did people take up? How long did they live on each piece of land, and on the island? What percentage of those arriving on the island stayed for more than a year, or more than 20 years? Did people who arrived the earliest stay the longest?

Out of this information, gathered and analyzed over a period of four years, I gradually built up a description and analysis of the population of the island as it grew and changed between 1859 and 1891. My challenge was then to make inferences about people’s motives, aspirations, and ideas about rural life from the fragmentary evidence documenting their behaviours. I concluded that the people of SaltSpring Island worked out a particular compromise between their cultural expectations and the place in which they lived, a compromise that suited that rural population, but did not meet with the approval of bureaucrats or neighbouring “respectable” urban centres. As we will see in more detail below, it did not take Islanders long to figure out that they had more options open to them than selling either farm produce or their labour in order to make a living.

While my study noted the importance of the Gulf Islands’ climate, geology, flora, and fauna to the people of the island, it did little to explore the particular impact of the population on that environment in any detail. In what ways can microhistorians add an examination of this crucial dynamic to the study of place? Louis-Raphael Pelletier’s “Revolutionizing Landscapes: Hydroelectricity and the Heavy Industrialization of Society and Environment in the comté de Beauharnois, 1927–1948” is one of only a handful of detailed studies emphasizing the specific environmental impact that a community effected over time. Using the archival records of the Beauharnois Light, Heat and Power Company—records that included a wealth of photographs documenting the remarkable changes made to the environment by the installation of the dam the company needed to produce the electrical power it wanted to sell—and the “routinely generated sources” from the comté (county) de Beauharnois, in south-eastern Quebec, Pelletier documents the profound social, economic, and environmental changes that accompanied the development of heavy modern industry into an area previously characterized by small-scale farms. The majority of farmers were forced to sell their properties to BLH&P to make way for the massive canal and dam. Without land to farm, residents were obliged to work as waged labourers for the company. While wages rose, economic security was compromised, and the household forms of labour were disrupted with the new regime; the new workers no longer had control over their economic life. Even those farmers who retained their farm properties found their community, their economy, and their households transformed. Earlier patterns of transportation and communication were profoundly disrupted by the massive rearrangements of land to create the dam. The new dam cut the community in two, and no road was built to link the two sections, making...
it extremely difficult for farmers to get their produce to markets, and for people to travel throughout the municipality to visit or shop. Whereas decisions about such key issues relating to landscape—where roads would be, where people would live—were previously made by municipal governments, with the installation of the new industry in the area, decisions were increasingly made by company owners concerned with maximizing the production of electricity. Even worse for the community, the company sold some of its lands to the federal government, which was not required to pay municipal taxes. Without a tax base, members of the municipality were unable to pay for the kinds of infrastructure—roads, sewers, lighting—that they needed. As Pelletier argues, the company had a profound impact on the land, on the particular landscape, and, as a result, on the society, economy, and culture of the people of comté de Beauharnois.

Microhistorical Practice and the Approach to “Topic”

It is worth elaborating here on just how different microhistorians’ focus is from that of many historians. Often the process of historical research begins with the historian making a number of decisions about the particular issue, event, or theme that he or she would like to research. A historian typically begins a research project by focusing on a topic related to a “big question” in his or her chosen field of history—why did industrialization occur, for example, or what factors explain the increase in consumerism? Then the historian must narrow his or her focus to find a particular project that, while addressing that question, is nevertheless small enough to research and write about. By contrast, microhistorians begin their research by choosing a particular place or, less commonly, a single entity or phenomenon. Microhistorians’ task is to find in the place they are examining the kinds of relationships out of which they can construct meaningful themes and issues—even if these had nothing to do with the historian’s original “hunches” about the place.

Here’s another example from my own experience studying Saltspring Island. Before beginning primary research, I had read a number of local and regional histories of the area. I knew that the island was one of the first areas resettled by non-Natives in the late 1850s, and it was widely described as one of the first agricultural communities in British Columbia. One of my initial research interests, then, was to explore a key theme in Canadian 19th-century history: the growth and development of farming from pioneer days through to the development of commercial agricultural production. I read widely in the field of agricultural history across Canada and elsewhere, and began to look for evidence of agricultural production and sales on the island. My preliminary research led me to a number of documents that described farming activity on the island, and confirmed that more than 80 percent of landholders on the island identified themselves as farmers. A close examination of evidence about individuals in a single year, the census year 1891, allowed me the opportunity to explore the economy and the meaning of “farming” in the community. Census takers collected information about individual farmers, including their absolute production of agricultural products, yields per acre, livestock, butter, eggs, and milk production; however, in Canada this information is available only in aggregate form, not for households, after 1871. Some time in the 1900s the government of Canada destroyed these records. In 1890/91, however, a number of factors coalesced that made it possible for me to obtain detailed information at the level of the household. The provincial Department of Agriculture asked Saltspring Island’s Anglican
minister, Reverend E. F. Wilson, to gather statistical information about agricultural production, yields, and land clearances from the major farmers on the island. His reports were published both in the Department of Agriculture Report for that year, and in a small promotional pamphlet about Saltspring Island written by Wilson and published by the government in the hope of improving immigration to the province. The year 1891 was the last that Saltspring Island was considered a separate region in the aggregate census data. With the information from those identified by Rev. Wilson as the 11 major farming families on the island, and with aggregate data published in the census report for 1891, I was able to calculate that the vast majority of farm produce sold by island farmers came from the “big 11” of the 100-odd farms on the island. Also comparing aggregate and individual data, I was able to calculate that the remaining 90 percent of “farmers” had cleared, on average, only about five acres during their stay on the island, about enough to support one household, in vegetables, meat, and eggs, but with no surpluses left over to sell.

If I had been researching the island as part of a larger study of a particular theme or issue—farm exports or crop production—my interest in the island would have ended at this point, or it would have been limited to those 11 farms that were doing what I had initially been interested in. As a microhistorian, however, my task remained the same: to examine the relationships among people on the island, and between islanders and their environment, in order to understand what people did on a daily basis to make a life and a living.

Although my task remained the same, one of my main research questions was now reframed, however: if most of the “farmers” on the island were not farming (clearing land or selling agricultural produce) how, then, were they making a living? In the end, my detailed examination of the behaviour of people on their land revealed that after a brief period of enthusiastic land clearing and crop growth in the early 1860s, most Saltspring Island residents realized that the government was not regularly enforcing the homestead regulations that required settlers to improve land before paying for it. The vast majority of those taking up land on the island “abandoned” their land without either improving or purchasing it, but some of those did so only after living on it for 5 or 10 years. Many of those who in the end did improve or purchase their lands took more than 10, and in some cases 20, years to do so.

Freed from the obligation to pay for the use of their land, islanders also realized that they did not need to farm it in order to live. Primarily through the specific, environmentally sensitive practices of their First Nations wives and in-laws—mixed-“race” marriages being very common in these years—they became aware they were living in one of the richest and most benign natural environments ever known to human beings. As the First Nations of the Pacific Northwest have known for millennia, the region’s mild climate and bountiful oceans and forests provide a rich living for those who live by hunting, fishing, and gathering. Early settlers on Saltspring Island were able to exploit both a generous land-granting system and a rich environment to create a way of life that was supported by a variety of work contributed by every member of the household. This is not to say that the islanders lived entirely off the land. When they needed cash for paying their taxes, or purchasing goods like flour, tea, and cloth, they worked in a seasonal and intermittent way in resource industries such as fishing, logging, and whaling. These industries relied heavily on the part-time and seasonal work provided by people whose lands were not quite sufficient to support them. But hunting, gathering, fishing, gardening, and preserving food was done by all
members of the family, except the very youngest, and these kinds of self-provisioning work were a key support to households. To reiterate, if my study had been of only commercial farming, or the fishing industry, or logging, then I might have missed the complex interplay between household, the local environment, and international capitalism that provided the framework for the complex and multifaceted economic life of island residents.

The advantages of a microhistorical approach to environmental history are obvious in my study. Saltspring Island was a Canadian settler community that bore a superficial resemblance to a typical agricultural community, but, as closer analysis revealed, it differed in some key ways from that norm. Without focusing on the day-to-day experiences of those settlers, and the decisions they made about land and their place on it, those differences were difficult to see, and even more difficult to understand. Like other microhistories, therefore, my study of microhistory was an experiment; I had to wait for a detailed analysis of the relations between people and place to grow out of my research before I could be sure of the themes, issues, and events that I needed to explore. This study revealed atypical relationships between people and land that can contribute to our understanding of the contours of daily life and therefore what comprised the society, culture, and economy of Canada. But more than this, it forces us to consider the idea that “typical” is not always a useful way of thinking about the “big picture” of history. Here, we see that 11 “typical” farmers were generating one kind of economy, while 90 percent of residents were living another—but this would be completely obscured if we were to look only at the aggregate farm production.

Choosing to Study a Place, and Choosing a Place to Study

When choosing the kind of place they want to look at—farm, city, marsh, island—microhistorians need to consider three questions as they refine their choice. First, how will this place be distinguished from others—can they articulate the boundaries between what is being looked at and what is outside the range of the microhistory? Second, is there enough usable documentation available to potentially address the kinds of questions they want to ask? And third, is the place small enough that the details of everyday life can be observed?

Choosing a place that meets these criteria can be more difficult than you might think. Microhistorians have used a variety of ways of defining place. Some have used political boundaries—a township, for example, or a city’s limits, or a county, or a national park. The great advantage of using political boundaries to define a place is that so many useful documents, and different kinds of documents, are created by government departments gathering information that locate people within a clearly defined place; political boundaries provide the organizing principle of gathering, storing, and analyzing a tremendous volume of information. It can be relatively easy for the historian to find out the population, average wheat yields, number of acres cleared, mortality and death rates of the population, and crime rates of any particular county, for example, because governments have already gathered that particular information about people in that particular place. But there are disadvantages too: political boundaries can change over time, making it difficult to compare evidence from one decade or century to another. And governments have not always gathered the kinds of information that historians, and particularly environmental historians, want to know about people and place: what were the changes in air-pollution levels in the late 19th century, for
example? How did the increase in settlement affect deer populations, and how did this affect both cougar and tree populations in the area? How did the relations between men and women change when men had to work in the woods to support a farm, being absent for many months at a time from farm work?

For the microhistorian wanting to do environmental history, political boundaries may not be the best way of defining a place, because they do not usually delineate a distinct environment, or bioregion. This is particularly true in Canada, where political boundaries were often put in place before European settlers arrived, and so these boundaries may have little or nothing to do with the way these settlers actually came to live off the land. For example, the surveying of the Canadian Prairies established a political set of boundaries, superimposing a rectangular grid onto the land regardless of terrain. The change from rocky Canadian Shield country to rich farmland might, therefore, occur right in the middle of a quarter-section of land. Microhistorians interested in how people’s agricultural practices influenced and were influenced by a particular ecosystem, therefore, might reject political boundaries, preferring instead to use geological ones—such as the Georgian Bay area or Saltspring Island—or even ecological ones—the marshlands of the St. Lawrence or Palliser’s Triangle. Or they might choose a place where a particularly significant change has occurred—a valley flooded, a lake drained, a dam built (or not built). They may simply choose a place defined as a significant region by different human populations over time, and then explore, as Daniel Clayton, Leslie Robertson, and Andrea Laforet have done in their respective studies, the competing narratives told about the place by Natives and non-Natives. Or, like William Turkel, they may decide to not only include the different stories told and retold by various human populations about one place, but also explore the stories that are etched in the region’s material remains.

The choice of place, therefore, reflects not only the historian’s themes and issues of interest (which reflect issues of interest to historians more generally), but also the kinds of questions that the researcher wants to ask. This is an obvious point, but an important one. The choice of using a political boundary to define a place will tend to privilege questions about social organization, because there will almost certainly be a lot of information gathered about issues relating to political boundaries, but there may be little about any particular landform within the boundary. The choice of a river, for example, or a watershed, will tend to privilege questions that relate more directly to the relationship between people and that particular environmental formation, because the microhistorian would not be able to focus such research without first ascertaining that there are detailed records about how it changed over time.

The most important reason to narrow the scale of observation to one place, and to work very closely with lots of different kinds of evidence about the same people and place, is that this view allows us to see more relationships, more kinds of relationships, and in more detail than usually shows up in histories. To say that microhistory has a specific, close-up focus is not to say that the topics, themes, or conclusions of microhistorical investigation are narrow or of limited value, either in themselves or in understanding the larger issues, trends, and events that they may involve.

Doing microhistory is like using a compound microscope to allow quick switches among different degrees of magnification. With a historical lens trained on the specific, the local, and the everyday, the microhistorian can see the relationships that take place there, and then see their
effects on other places, in other times, or at other scales of experience. The microhistorian looking at one place in a 100-year period may also locate the study within a much longer time frame. As Lyle Dick argues in *Muskox Land*, his study of Ellesmere Island in the postcontact period also necessarily involves a discussion of the *longue durée*, for it is only the geological time scale that can explain the climate and geographic characteristics that had such an important impact on the people trying to eke out a living in this extreme northern environment. Land and climate were not the only factors in explaining the history of Ellesmere Island, but they played a significant role in the specifics of his study.\(^{14}\)

There are two key points being made here. First, the microhistorical method allows one to see and explore connections among various scales of relationships. Even the simplest actions that we perform in our daily life—such as buying a loaf of bread—involve a number of different scales. A person exercising an individual preference for whole wheat becomes drawn into a complex system that incorporates local bakers, regional trucking companies, national farmers, and international trade regulators. Moving between these scales can reveal the intimate, urgent, and explanatory connections—between the specific and the general, between the personal and the political, between people and the environment—that are at the heart of the historical enterprise. In other words, what happens at one spatiotemporal scale has ramifications at another. The second key point is that significant historical change sometimes occurs on a scale that is visible only with a close-up view. To return to the microscope analogy, when an antibiotic agent is seen to inhibit the growth of a particular bacteria, the significance of what is under the lens is not limited to the particular cells being observed; what the scientist has done is to reduce the scale of observation to the extent that it is possible to see a tiny cause that has huge effects visible at a much larger scale.

In his book *Language, Schooling and Cultural Conflict*, Chad Gaffield looks at Prescott County, Ontario from 1850 to 1900, examining in considerable detail the households of the English and French Canadians who lived there. His study, though rooted in one Ontario county, draws on themes and issues that are of provincial, national, and even international scope. Did children of French Canadian descent have lower school attendance rates than their Ontario counterparts? If they did, at least before 1870, was that because, as some historians have claimed, French Canadian attitudes to education were characterized by “a fabric of delusion, superstition, and know-nothingness”?\(^{15}\) If so, then why (as his detailed study indicates) did French Canadian attendance rates then change after 1870, and why was there a famous controversy about the inadequacy of French-language instruction in Ontario at this particular time? Did most rural families decide for the first time in the 1870s to send their children to school because of some general fears and hopes about society and their place in it? Or were there particular family and household issues that prompted this change? Gaffield’s detailed analysis of household behaviours and the local economy sheds light on questions of both local and more general thematic and national import.

After closely analyzing detailed evidence about how families behaved, and how they supported themselves, Gaffield argues that differences in land settlement and economic strategies between French and English settlers in Prescott County created differences within family economies. These differences were reflected in many aspects of social, cultural, and economic life, including school attendance and the controversy over the language of instruction. His evidence indicates that while English settlers in Prescott county usually used land for commercial purposes, the later-settled
French Canadians “had not yet had sufficient time to establish commercial farms” by 1861. As a result, they worked in the logging industry in nearby forests, the wages from which provided an essential part of the family economy: “families were characteristically formed on the basis of agricultural ambitions, while the forest industry offered seasonal employment for certain family members, a market for agricultural product and some compensation for the onerous task of land clearing.”

School attendance of Franco-Ontarien children was limited by the demands of this family economy. However, the “communal nature of existence in Prescott county”—resting on the informal economy, barter, lending, the help of kin and neighbours, and centred on agro-forestry—was undermined after the 1870s. As the forests were logged out by intensive commercial logging operations, the timber industry moved farther from Prescott County, removing both opportunities for waged work and the market for farm goods that had been tailored to meet the needs of the hundreds of men working in the lumber camps. The “inherently temporary” nature of the timber industry before the end of the 19th century—lumber companies having not yet realized that trees were functionally renewable resources, and the people of Canada not yet realizing that farm settlement on the Canadian Shield was not guaranteed by the removal of standing timber—worked against the long-term success of agro-forestry as a strategy for family survival.

Gaffield argues that this loss of income forced many Franco-Ontariens off the land, reducing them to landless proletariat forced to work for wages to live. Under these circumstances, “schooling increasingly filled the space in children’s lives that had earlier been dominated by collective domestic industry” of the agro-foresting families. As the proportion of Franco-Ontariens increased in the area, the language of instruction became both an increasingly important cultural factor in people’s lives and an increasingly important political issue. As the numbers of Franco-Ontarien children going to school increased due to these changing social and economic factors, so did the demand for French-language education and resistance to it, thus “the history of minority language education in nineteenth century Prescott County can be better explained by the changing interaction of land and family than by inherent intercultural attitudes.”

Gaffield’s close study of the household economy, the logging industry, the timing of the move of families off the land, and the growth of education suggests that parents were, in effect, replacing the patrimony provided by land with the patrimony of education. Education, not land, was the hope for the future. Gaffield’s microhistorical study provides evidence that changes in communities like Prescott County, and in large institutions like the educational system, may indeed be the result of thousands of tiny personal or individualized relationships, interactions, and decisions taking place within a particular geographical and historical context. His study vindicates an underlying principle of microhistorical research already mentioned: “phenomena previously considered to be sufficiently described and understood assume completely new meanings by altering the scale of observation.” The “something new” here is not so much the generalization that “all people who own land in marginal areas where there is a forest industry and no government sponsored safety-net decide that education is going to replace the inheritance of land,” even though other microhistorical studies might eventually demonstrate the validity of this hypothesis. The key point is that a study of households in particular environments can reveal relationships that help to explain broader historical change.
Conclusion

Microhistory is defined by its scale and focus, and not by specific issues, themes, events, or theoretical frameworks. Instead of working from the premise that general truths and average patterns determine historical significance, microhistorians’ purpose is to use the evidence available in one place to examine the relationships among people, and between people and the non-human environment as they are worked out, and made visible, in one place over time. Because microhistorians work so closely with so much evidence about such a small area, and because of the complexity and variability revealed by microscopic analysis of people and place, there can be no handbook of microhistorical research for each place and time. There is no official “school” of microhistorians that relies on particular, established theories or concepts about how, for example, human societies generally function as part of, or separate from, their environments, or how land resettlement generally occurred in rural Canada, or whether 19th-century farmers were market oriented or simply trying to feed their families and provide an inheritance for their children. Microhistory offers environmental history a focus and a process, just as environmental history offers microhistory the opportunity to pay more attention to the particularities of the physical world, augmenting our understanding of the relations among people and places.

DISCUSSION QUESTIONS

1. There is an environmentalist slogan that we should “Think globally, act locally.” How does that relate to the argument presented in this chapter?
2. Does microhistory have to be local? Why or why not?
3. What are the limitations and advantages of the microhistorical method?
4. The author makes a strong case for the advantages that microhistorical perspective can bring to the practice of environmental history. Do you think that microhistory can be similarly improved by using methods from environmental history? Think of some examples.
5. The author writes that microhistory forces us to consider that “‘typical’ is not always a useful way of thinking about the ‘big picture’ of history.” Do you agree? Why or why not?
6. What are some examples of different spatiotemporal scales? Can you think of ways that they might be causally related?
7. Outline a research project that meets the criteria of an environmental microhistory, as described in this chapter.

NOTES


9. The Torrens System of land registration characterized land registration in western Canada and the United States, but in central Canada land continued to be registered as it was in the B.C. Surveyor General’s Office: organized by the piece of land, not by a numbered sale.


16. Ibid., p. 82.

17. Ibid., p. 63.

21. Ibid., p. 185.

**FURTHER READING**


Learning by Looking

Colin M. Coates
“Seeing and Not Seeing: Landscape Art as a Historical Source”

Catriona Mortimer-Sandilands
“Finding Emily”
During the years that I taught Canadian Studies courses at the University of Edinburgh, I sometimes asked my British students to complete the phrase, “As Canadian as . . .” The answers they gave were usually fairly predictable: “maple syrup,” “snow,” “a Mountie.” If I had to answer the question myself, I would probably finish the sentence with “landscape.” After all, as the second-largest country in the world, Canada has a lot of landscape. More importantly, the image Canadians project to themselves and others is often of rural or “wilderness” landscapes, even if they rarely visit them, and the human population of the country is crowded into the cities and towns that hug the American border. But the images of Canada iconic to Canadians and tourists alike are usually (apparently) pristine forests, lakes, mountains, and icebergs, not the cities, high-rises, and highways that more accurately define the day-to-day life of the vast majority of Canadians today.

Canadians are not unique in finding the essence of their country outside their urban settings. Many countries locate their self-image in the countryside or the wilderness: Scotland, for instance, markets its majestic lochs and craggy islands, even if most Scots live in the tamer cities and suburbs near the English border. In the Canadian case, landscapes are often refracted through particular aesthetic approaches. We see the world around us, in part, as we are trained to do. In Canada the Group of Seven painters and Emily Carr (the latter discussed in Catriona Mortimer-Sandilands’s chapter of this volume) assume a very important role. The Group of Seven painters were unabashed nationalists, attempting to capture the essence of the Canadian spirit by depicting the country’s wilderness landscape in the bright colours that infused it with meaning. The catalogue for the first Group exhibition in 1920 claimed in compelling and organic terms, “an Art must grow and flower in the land before the country will be a real home for its people.”

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The purpose of this chapter is to examine how to interpret historical depictions of landscape. Art galleries and archives contain many examples of such paintings, and sketches were published in many of the travellers’ accounts of the time. Here we will examine how those artists chose to depict the landscapes of the colony. Who painted? Why did they paint and for whom? What did they choose to see and to depict? Is there more to landscape art than its function as a document of natural forms?

George Bulteel Fisher

At first glance, landscape paintings may appear to be transparent historical documents, showing us a clear image of the environments in which people lived in the past. Look at George Bulteel Fisher’s ca. 1795 View of Quebec City, for instance (Figure 8.1). Here we see a distant view of the largest town and port in British North America; the streets and buildings are seen cresting over a

Figure 8.1 George Bulteel Fisher, View of Quebec City

Trained at Britain’s Royal Military Academy at Woolwich, George Bulteel Fisher depicted Quebec City following the conventions of British military topographical painters of his day. Framed by trees, the city is located in the light middle ground, with bucolic figures and scenery in the foreground.

hill far away from where the painter is situated. It is summer. Ships lie peacefully at anchor in the St. Lawrence. Deciduous trees on either side of the painting force our eyes to look toward the lighter middle area, the location of the colony’s capital city. Shaded in the foreground is an aboriginal family conversing with a hunter. On the left side of the image, another hunter is shooting at prey outside the frame, his dog already in pursuit of the game. The horizon in the distance is flat, and clearly of a higher elevation than Quebec City. Surely this painting serves the same purpose as a photograph might today—it is a reproduction of the landscape from a particular vantage point. Around 1795, we imagine, Quebec City must have looked like it does in this image.

But of the many places from which Fisher could have chosen to depict the city, why did he look at it from that distance? Would we not “see” Quebec City much better if we could view the steep hill separating the lower town from the upper town, the way in which the religious and military buildings dominated the streetscapes, the livestock that would have provided the pungent smells of a preindustrial city, or the jostling of French and British in the small trading and government town? Moreover, how do we account for the fact that innumerable cities in Europe and around the world appear with almost exactly the same artistic composition? (As with the study of written documents, it is essential to situate artistic evidence within a larger corpus of similar texts.) While certain buildings and the presence of an aboriginal family in the foreground may translate the specificity of the city at the historic moment of the painting, the painting seen in a broader context shows how Quebec looked very much like other cities. The aesthetic approach taken by topographical painters has been described thus: “In this format, the city lies in the lowered, middle and far distance, bathed in light which only allows major landmarks to stand out. An entirely separate foreground, if not actually rural, then certainly pastoral, is dotted with strolling fashionable couples, or game animals, in a rustic but regulated parkland.” As art historian Didier Prioul notes, Fisher’s composition closely mimics a classical landscape painting by 17th-century French artist Claude Lorrain, *Paysage avec la métamorphose du berger d’Apulie*, an image widely available in print form in the late 18th century. Such compositions were used for cities around the world. With only a few details, Quebec City could have been Lisbon, the subject of another painting by Fisher, or Montreal—compare this image with the Duncan painting reproduced in Michèle Dagenais’s chapter of this volume.

Quebec is located in the light of the middle ground, which makes the city appear approachable and entirely under control. But Quebec City was first and foremost a military location. Established in 1608 by Samuel de Champlain, Quebec stands at a point where the St. Lawrence River narrows dramatically. The imposing elevation was an excellent location for a fort that would guard any movement beyond the city. City views drawn by the French emphasize how the fort dominated the town, reassuring the king and French authorities that this small settlement could indeed withstand the assault of larger numbers of aboriginals and Anglo-Americans. French sketches were taken from a vantage point at the same level as the lower town, either in a boat on the St. Lawrence or just across the narrows in Lévis. The fort was significant both visually and practically. Until 1759, the fort fulfilled its purpose, and the sparsely populated French colony held its position through many decades of Iroquois and Anglo-American hostility.

However, Fisher did not emphasize Quebec City’s defensive capability; instead he assimilates the town into a standard pictorial approach common among military artists of his generation.
Fisher’s military training was at the Woolwich Academy, the centre for military painting. Fisher had arrived in Quebec in 1791, a second lieutenant in the Royal Artillery and part of the retinue of Prince Edward Augustus, sent to British North America to shore up support for the British imperial authorities during the early years of the French Revolution and in the aftermath of the American Revolution settlement. Quebec had been a British colony since 1763, following the Treaty of Paris that ended the Seven Years’ War. Therefore, only one generation had passed since the time of French control over the colony, and many members of the British colonial elite believed that they had reason to doubt the loyalty of the French Canadians who formed the vast majority of the local population. The image Fisher produced of Quebec, likely made after his return to England in 1794, contained many similarities to other landscape paintings of the time. The painting showed a path that one could travel through to attain the city, and indeed, despite its fortress, the 1759 British victory on the Plains of Abraham had shown that it was not impregnable. Thus the Fisher painting demonstrated how the city was anchored in the British empire. At the same time, there was some recognition of local differences: the aboriginal family in the foreground, their presence a romantic reflection on the passing of the noble race, as conceived by the British in the time period.

Fisher’s painting of Quebec City may tell us something about the city and the landscape around it. But it also tells us about him and more generally about British understandings of the former French colony. And in this way Fisher’s art provides evidence, like more traditional forms of historical sources. Taking into account the formats and conventions of the source, art can help us see the worlds that the painters saw—or chose not to see.

Elizabeth Hale

I was led to reflect on the meanings of landscape art during the course of my research for my doctoral dissertation. I had chosen to focus on two rural seigneuries in the St. Lawrence Valley, covering a long time period from the early French settlement in the 1660s to the early 19th century. In part, this choice reflected my interest in social history and the acknowledgment that in this period the vast majority of the French population lived in such scattered rural settlements. (I came to study this particular region for reasons that had nothing to do with the topic of this chapter, but rather from a desire to extend my analysis of a particularly lengthy and bawdy court case from the 1730s.)

One of the two seigneuries was Sainte-Anne de la Pérade, owned for most of its existence by the Lanouguère/Lanaudière family. In 1819, the seignery was purchased by a well-placed English family, the Hales. After a career in the army and a stint as the aide-de-camp to Prince Edward Augustus, John Hale had been appointed in 1799 the deputy paymaster general for the British army in the colony, in charge of the budget sent over from London to run military affairs. His wife Elizabeth (Amherst) Hale was from an even more prominent family. Her uncle, General Jeffrey Amherst, became the ranking British commander upon the death of General James Wolfe at the Battle of the Plains of Abraham. In 1760, General Amherst accepted the French capitulation in Montreal that secured British control over the colony. John and Elizabeth Hale were ambitious, hopeful that their time in the distant North American colony would allow them to return to an even more prestigious post in Britain. This was not to be the case. By the late 1810s, once the American threat had subsided after the War of 1812, they made a symbolic—and, they thought,
financially sensible—choice to establish roots in the colony by purchasing the seigneurie of Sainte-Anne de la Pérade.

Elizabeth Hale maintained a lengthy correspondence with her brother, the second Lord Amherst; these letters can be found in the University of Toronto’s Fisher Rare Book Room and Library and Archives Canada in Ottawa. She also left a series of sketches and paintings, many of which also found their way to Library and Archives Canada. Some of the paintings are her copies of other works—her painting of early York (Toronto) is well known as one of the first depictions of the town, even though she never visited it. In a small sketchbook, she also depicted her urban and rural homes. After 1820, the family spent a good deal of the summer at Sainte-Anne de la Pérade, escaping the oppressive summer heat of Quebec City, no doubt made more intolerable by the stench of livestock and the inadequate sewage facilities. The rural seigneurie was an idyllic refuge for the family, as well as the home to around 2,000 French Canadian farmers and merchants.

Elizabeth Hale was a talented amateur artist, and her interest in drawing was very much conditioned by the particular time period in which she lived. In the 18th and 19th centuries, art became an acceptable pastime for men and women of the British upper classes. It demonstrated their superior culture and emphasized the fact that they had the leisure time to develop their skills. Hale clearly did not like to sketch people, and she was not very successful in doing so; her training had likely not included work with the human body. But she was more successful with her landscapes, and she had copied the work of other artists in honing her techniques. Some of her panoramic views may have benefited from the use of a camera lucida, by which means the view was projected onto the paper and she could sketch it directly onto the paper. She may have had less geometric precision in her rural sketches, but her loving portrayal of trees compensated in creating a coherent image.

For me this was a problem. I initially found Hale’s fixation on trees rather frustrating. As a social historian, I had wanted Hale to provide pictorial evidence of the French-Canadian community that I was studying—imagine, a talented artist living in the countryside I was researching, and recording images of the habitants and merchants who peopled the area. The social relations of the community would be rendered visible in a way that documents failed to do. What an archival treasure this could have been. Yet image after image did not capture what I was looking for. Hale clearly had other ideas than I did about what was noteworthy.

Instead, Elizabeth Hale chose to focus her artistic talents and her correspondence narrowly on her family’s interests and possessions. She was effusive in her descriptions of the purchase. “Only consider,” she declared to her aunt, “what an immense tract of land [is] 60 square miles!” She praised its virtues to her brother, who incidentally resided in the English county of Kent at the country estate that the first Lord Amherst had named Montreal. For the Hale family, Sainte-Anne de la Pérade was, in Elizabeth’s images, a place for leisure, where few worked, and fewer French Canadians were depicted. The family estate fronted on the St. Lawrence in one of the more desirable parts of the seigneurie, not far from the small village that had grown up around the Catholic Church. With only a couple of exceptions, Hale did not sketch the village. In Hale’s hands, the scenery could be rendered according to picturesque criteria, combining a series of stock images (see Figures 8.2 to 8.4). In one sketch, the manor is framed by large deciduous trees. In a second, her sketch of a small stream in front on the manor comprises three planes, with trees on either side forcing the viewer to look into the distant light along the waterway. In a third image,
the St. Lawrence appears in the distance. Note the dead tree in the foreground, as we will return to the significance of this feature later.

Hale’s letters to her brother conveyed many of the same ideas as her paintings. When the family was detained longer at Sainte-Anne because of the onset of winter weather, her daughter clearly became bored with the surroundings in the rural idyll: “Fanny began to be a little tired for you must recollect that we have not a single being above the capacity of a common farmer in the neighbourhood,” Elizabeth complained. In her correspondence with her brother, from Sainte-Anne de la Pérade or Quebec City, Hale hardly ever mentions the presence of French Canadians in a colony where the British formed only a tiny minority.

The vantage point of the artist is always worth considering, so I compared the sketches with the detailed maps of the seigneuries, and concluded that she sketched almost exclusively from land that belonged to her family: the seigneurial domain, or the islands that the family owned in the mouth of the Sainte-Anne River. The family’s holdings were the central focus of the sketches, whether it was the manor house, the saw mill (named “Manitou”) that they ran, or various parts of the domain. In every way, the sketches were a celebration of her family’s ownership of the seigneury—a complicated ownership, given the limitations on the seigneur’s power in the French civil law that protected the habitants’ (or censitaires’) title to their land. In theory, the habitants

Figure 8.2 Elizabeth Hale, Manor at Sainte-Anne

An image from Elizabeth Hale’s sketchbook, framing the seigneurial manor, the focal point of the artist’s life while in the family-owned seigneury of Sainte-Anne de la Pérade, as the focal point of the drawing.

Source: Library and Archives Canada, Acc. No. 1939-252-5R.
owed a number of obligations to their seigneur: a yearly rent (part of which might be paid in capons or chickens), mutation fees when the property was sold, part of their wheat harvest as a fee to the miller, every 12th fish they caught, and so on. More significantly for the Hales, there were large parts of the seigneury that had not been conceded yet to settlers, and in those parts they could benefit from cutting and milling the trees and attracting new settlement. They could even dream of altering the ethnic balance. The Hales thought of establishing a Protestant village some six to eight miles back from the St. Lawrence. “We might perhaps be able to make a Protestant village of it from the many settlers who come here & then have a Protestant Church.” In practice, however, the settlers did not come in large numbers and the payments the Hales received from their French Canadian tenants never provided the return on investment that they had anticipated.

Unlike some other upper-class women of her generation in British North America, such as Elizabeth Simcoe or Anna Jameson, Elizabeth Hale was not adventurous. She spoke of interesting vistas further into the backwoods of the seigneury, but she did not plan to visit them:

The Surveyors have been at work & about 5 Leagues from our house came to a beautiful little Lake covering about 6 acres of Land with large Trees & a very rapid river full of Trout—they found a very compleat Beaver dam which Mr Hale intends seeing but the road not being yet made I have no chance of getting there.
She stayed close to home and admired the natural surroundings. Hale loved trees most of all.

Although this fact should have been apparent to me, perhaps, I thought it worthwhile to ask a professional artist friend of mine, Lise Fradet, for her interpretation, and this was her conclusion. Hale drew her trees with care and feeling, almost always sketching deciduous trees, though it was an area where coniferous pines grew alongside the leafy trees. The deciduous trees reminded her, no doubt, of her native southern England, and she desired to remake her land in a British mould. Describing the local foliage, only deciduous trees were worthy of mention: “our trees consist of Walnut, Maple, Elm & Ash & Lime . . .” In particular, oaks were associated as a symbol of England and particularly of the aristocracy. “I am sorry to say,” Elizabeth told her brother, “there is not an Oak to be seen here or in the neighbourhood, but I intend trying some for the honor of my native country.”

Was this not the story of much of the early history of the European presence in North America, recreating the landscape so that it looked a lot more like home?

My point here is that the same process was taking place “on the ground” in Sainte-Anne de la Pérade and in the sketchbooks of Elizabeth Hale. Both tree planting and sketching fulfilled the same purpose for Hale: she wanted to make the landscape hers, and that meant making it appear more “British.” Moreover, she was following the tendency of other British immigrants in the

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**Figure 8.4** ELIZABETH HALE, RIVER IN DISTANCE

The presence of a dead tree, such as the one in the foreground of this Hale drawing of the St. Lawrence River, provides a stock opportunity to contrast mortality with life, offering a moral and spiritual lesson in the landscape.

*Source:* Library and Archives Canada, Acc. No. 1939-252-6V.
colonies. But what are the implications of this tendency? To examine this issue, we shall need to explore the meanings of aesthetic approaches, first in the British homeland and then in the North American context.

The Picturesque and the Sublime

Despite the lengthy French imperial presence in northern North America, there are no real landscape paintings dating back to the French regime (with the possible exception of Frère Luc’s *France Bringing the Faith to North America*). This point underscores the Britishness of the landscape aesthetic. Many cultures do not choose to dedicate their art to landscapes, but in the 18th and 19th centuries the British elevated these depictions to the top level of their art. It is true that they drew on Dutch, Italian, and even French artists for their inspiration—the word “landscape” comes from the Dutch “landschap”—but British, primarily English, artists brought the particular aesthetics of landscape painting to a new level.

The British take their landscape, like their weather, very seriously. Estate owners removed peasant villages that interfered with their view of the surrounding landscape in order to create more pleasing vistas, and they remodelled their grounds to design pleasing perspectives. Tourists undertook set itineraries in the Lake District in England, the Wye Valley in Wales, and the Scottish Highlands, in order to appreciate the varied landscapes that the island of Great Britain had to offer. Painters were hired to depict the manors of the wealthy, and gentlewomen and gentlemen took up easel and brush to undertake the same celebratory functions of the pleasures of ownership.

Historians of art have argued that this desire to depict the landscape occurred at a specific time in British history and in a specific sociopolitical context. In the first place, the enclosure movement of the 18th century removed many British peasants from the land they had tilled, forcing them into burgeoning industrial villages and cities. The landscapes that painters portrayed and that landlords created commemorated images of society that were rapidly changing. The bucolic scenes were created to decorate the homes of the wealthy at precisely the same time that they were disappearing. They were therefore more nostalgic than documentary. As John Barrell has pointed out, peasants appear in the paintings, but they are almost always located on the “dark side of the landscape.” They exist in the shade. Consequently, the picturesque paintings of peaceful, bucolic countryside were wistful celebrations of a disappearing society, and the impact of the images came from the emotions that they invoked. Hanging on the walls of the wealthy, either in countryside manors or urban villas, the paintings invoked a past that the owners of the works were themselves in the process of abolishing.14

In the 18th century, British theorists developed a new aesthetic language to understand the landscape. The “picturesque” and the “sublime” covered the two main approaches. The word “picturesque” had a more precise meaning than it does today, but it still covered the same sense of acknowledging that which can be depicted in a picture. However, the attributes of a pleasing image were fairly precise. Landscapes were deemed picturesque if they could be understood to convey movement, variability, and emotion. There were clear conventions. Framing devices (“repoussoirs” or “side-screens,” usually trees) forced the viewer’s gaze to the middle of the frame. Three planes (foreground, middle ground, and background) enticed the viewer’s eye toward the lighter vanishing
point in the distance. Moreover, these paintings often contained some intimation of mortality: a ruin or a broken tree. These picturesque landscapes were intended to inspire nostalgia, a reflection on the passage of time and life (Figure 8.5). They were also intended to celebrate the diversity of the phenomena depicted, at the same time that they emphasized the overall unity of the composition. As art historian Ann Bermingham argues, when considering the public discussions of the 1790s about the significance of the picturesque approach, it is necessary to keep in mind the larger political context within which this was occurring. The French Revolution had entered a bloody and expansionist phase, and the English on the one hand feared a French invasion, and on the other celebrated the British acceptance of diversity over the uniform social and political theories that the French were imposing. The picturesque approach to landscape, with its calming depiction of social and natural variations, was one aspect of this assertion of the superiority of British culture.15

The sublime conveyed different connotations than the picturesque, although there were links between the two approaches. A sublime landscape inspired fear and awe, and showed the viewer how insignificant humans were in this landscape. Mountains, windswept shorelines, and waterfalls could inspire feelings of the sublime. Edmund Burke, the 18th-century Tory politician and conservative political theoretician, wrote a fundamental treatise on the ways to understand, appreciate, and fear landscape: *Notes on the Sublime* (1788). Like the picturesque sensibility, the sublime helped place the individual spectator in a deep and spiritual relationship with his or her landscape.

**Old and New World Landscapes**

British painterly techniques were widely appreciated in the North American colonies, and not just by amateur artists like Hale. Joseph Légaré offers an interesting example. Légaré was a self-taught artist, the most prominent of French Canadian painters in the early 19th century. Closely allied to the Patriot rebels in the 1830s, he made his living through his art, and accepted many diverse commissions. For instance, he executed a painting of King George IV in 1834 for the Papineau family. In the 1830s, he also painted the country house of prominent French Canadian lawyer Philippe Panet, *Le Bocage (The Grove)* in a picturesque mode (Figure 8.6). Légaré combined bucolic images of working
peasants and their livestock with a celebration of the imposing house itself. The house is depicted in light colours, contrasting with the work of the peasants occurring in the shade. Here social class defines the image.

Légaré, skillful as he was, was no innovator. He produced what he could sell, and in this painting he adopted many of the techniques of the picturesque to illustrate how Panet’s house dominated its situation.16 The standard picturesque reliance on watercourses, vegetation, and pastoral imagery all contribute to the composition of a peaceful landscape. The leading French Canadian painter of his day thus used many of the usual conventions of the British approach to celebrate the property of this member of the French-Canadian elite.

The landscape of British North America not only was picturesque but also contained many sublime elements. Waterfalls were the best examples of these. They were extraordinary, far beyond any similar natural phenomenon available in Great Britain. Early European artists sketched, painted, and etched images of Niagara Falls, and the Sainte-Anne River and Montmorency Falls, near Quebec City, for their own enjoyment and also for transmission of this aspect of the British North American landscape back home. Writer and postmaster-general George Heriot described Niagara in his 1805 account of the colonies: “The falls of Niagara surpass in sublimity every description which the powers of language can afford of that celebrated scene, the most wonderful and awful which the habitable world presents. Nor can any drawing convey an adequate idea of the magnitude and depth of the precipitating waters.”17 Nonetheless, many drawings attempted to do just that. They tried to capture the rushing waters, the fear of falling, the frisson of danger that the falls invoked. But equally their images showed how peacefully one could approach the falls.

Elizabeth Simcoe, wife of the first British governor of Upper Canada, pictured Niagara Falls in harmonious terms. In fact, she arrived there herself after a pleasantly picturesque journey. She recorded her surprise at how alike the approach to Niagara was to picturesque scenery in Britain, commenting on “the similarity between these Hills & Banks & those of the Wye about Symond’s Gate & the lime Rock near Whitchurch in Herefordshire.”18 Despite the awe that the falls inspired, Simcoe’s sketch (Figure 8.7) still emphasized the harmony in the landscape that the picturesque

French Canadian painter Joseph Légaré’s depiction of lawyer Philippe Panet’s estate. Légaré illustrates Panet’s social standing by painting the house in light colours and having it dominate its pastoral setting, with the livestock and peasant labourers situated in the shade.

required, framing the perspective on both sides with trees, and remaining a safe distance away from the edge. As historian John Crowley concludes, scenes of majestic waterfalls confirmed the majesty of the British presence in British North America: “The sublime glory of British arms [in capturing New France] was reinforced by the picturesque landscape in which they had prevailed, and vice versa.”

Eastern British North America offered much to those influenced by the aesthetic of the sublime and the picturesque.

Overall, Europeans in what is now Eastern Canada had relatively little difficulty depicting the “new” landscapes. After all, much of eastern Canada is analogous geologically and biologically to parts of western Europe. In the Cretaceous period, eastern Canada had been joined to western Europe. The flora and fauna certainly have some differences, but overall they are fairly similar. Canada, and specifically eastern Canada, was not as foreign in a visual sense as, for instance, Australia was to British eyes.

Nonetheless, we should remember that some parts of eastern Canada inspired awe among some of the early European explorers, with Jacques Cartier typifying the north shore of the Gulf of St. Lawrence as “the land God gave to Cain.” This was no compliment, and Cartier, like subsequent explorers, preferred particular types of landscapes, ones that promised future agricultural development. Explorers saved their praise for flat lands with apparently good soil and places where the phalanxes of primeval forests opened onto clearings. Here farmers could establish an agrarian economy, just as in Europe and in contrast to the hunter-gatherer economies of many of the aboriginal peoples of northern North America. For Europeans, the future of North America was primarily agricultural, and those areas that were most likely to fit were most coveted for settlement.

The rugged coastlines of Atlantic Canada and the undulating plains of the St. Lawrence Valley and southern Ontario had their counterparts across the Atlantic, and they could easily be perceived according to British aesthetic principles. After a century and a half of French agriculture in the St. Lawrence Valley, a recognizable agrarian landscape had emerged, and the British looked forward to recreating a British landscape in the potentially rich farmlands of southern Ontario. Settlement implied a concentrated attack on the forests of southern Ontario. Although many welcomed the economic development that was occurring, cultural elites also reacted strongly against the aesthetic disturbances—just as in the late 20th century environmentalists protesting clear-cut logging were easily able to demonstrate that a clear-cut forest is extremely ugly. Pastoral images without tree stumps and slash were much more attractive, although some artists chose to capture images of

**Figure 8.7 Elizabeth Simcoe, “Niagara Falls,” ca. 1795**

Wife of the governor of Upper Canada, Elizabeth Simcoe here sketches the approach to Niagara Falls. She “tames” the sublime landscape of the falls by depicting it in a picturesque fashion, framing the perspective with trees and demonstrating an overall unity to the scene.

Source: Archives of Ontario, F 47-II-I-0-178, 10007030.
deforestation in order to emphasize the industriousness of the settlers. Elizabeth Hale was spared this phase because of the length of French Canadian settlement in Quebec. But in mid-19th century Ontario, as the writer William Smith worded it, “The new settler . . . looks upon trees as enemies.”

When British travellers, explorers, settlers, and officials came to North America and other parts of their world in the late 18th and early 19th centuries, they brought their aesthetic principles. In particular, they applied sublime and picturesque criteria to eastern North America, at least as far as they could. Some landscapes did not fit easily into these categories, and Europeans felt uncomfortable in the western Prairies and the northern tundra, not only because of difficulties in traveling through these territories, but also because the landscape did not easily reflect the criteria they knew and had been taught to admire. Likewise, the tall, dark temperate rainforests of the West Coast restricted the perspectives to which they were accustomed.

**Applying the Aesthetic Principles in a New World**

It is only natural that one would apply one’s artistic training to whatever view one was regarding. But given the ideological bases of that aesthetic at home, how did that apply in a new geographical and social context? Unlike Britain, early 19th-century British North America was certainly not overcrowded, and it was not necessary or logical to dispossess the peasants in order to acquire land for large flocks of sheep or herds of cattle. On the contrary, government authorities and political elites in general projected an agrarian future for much of the northern part of North America. This was certainly true in the 19th century, when the image of the farming family was the basis of the Lower and Upper Canadian economies and polities. The trend continued into the 20th century. As late as the 1920s, provincial and federal governments encouraged the opening up of marginal and distant farmland in Palliser’s Triangle in Saskatchewan and Alberta, the Abitibi-Témiscamingu region of Quebec, and the Peace River district of British Columbia. If pastoral and agrarian landscapes were considered the ideal, what implications did this hold?

These landscapes excluded aboriginal peoples. Aboriginal families could themselves become farmers, of course, as long as they were allow to compete fairly with their non-aboriginal neighbours. But as historian Sarah Carter has shown, where they did succeed in agriculture in the Prairies in the late 19th century, their non-aboriginal neighbours convinced the Canadian government to take away their machinery and allow them to farm only a single acre. Euro-Canadians usually preferred to imagine that the aboriginal peoples were a noble, but dying, race.

But even while aboriginal peoples were, in fact, excluded from the land, they remained an important cultural presence. In Canada, there were no ruins of castles to supply the picturesque ruminations on mortality. Instead, the theme of progress, crushing under its heel the aboriginals—and French Canadians to some extent, too—allowed some English Canadians to reflect on the passage of time and the necessary disappearance of a romantic past, supplanted by visions of agricultural and industrial growth. In a “new” land, where was one to locate the nostalgia? The aboriginal presence offered one possibility, a sense of loss for the non-aboriginal viewer, who assumed that the First Nations were about to die out, the imputed losers of what would later in the century be interpreted as a social Darwinist race for survival of the fittest. French Canada similarly evoked a sense of time passing. A view of the Plains of Abraham at Quebec, site of the final battle between Wolfe
and Montcalm, could convey some sense of history. A crumbling mill, or even a fallen log, could inspire the same reflections. Look back at Figure 8.3, Elizabeth Hale’s sketch of the stream near her manor, and notice the leaning log in the middle foreground. Or, in Figure 8.4 look at the dead tree in a left-centre position in the foreground of the sketch. Think even of the Group of Seven paintings that include a stump or a forlorn twisted pine tree in the foreground. As Patricia Jasen argues, Canadians came to adopt a form of romantic nationalism: “The romantic sensibility, especially when infused with landscape and history, encouraged an appreciation of those scenes in which landscape and history, especially in the form of ruins and graveyards, were blended together.”26 Just as ruins could intimate mortality in a pastoral image, in forest landscapes, dead or buffeted trees evoked humans’ struggle with life and time.

Therefore, the meanings of picturesque landscapes were quite the opposite of what they became in Great Britain, even while they desired to capture the same imagery in the new land. In the mother country, paintings focused on the celebration of unity from variation, social as well as natural. In Great Britain, the hierarchical ordering of society could be portrayed in a landscape painting, showing implicitly where the different social classes fit into the larger coherent and peaceful world. In northern North America, artists celebrated sameness—the similarity to the Old World, and the regrettable disappearance of the distinctive features of the New World. Whereas the picturesque approach was intended to train people to see in Great Britain, in British North America it encouraged them to ignore or to suppress what they saw. In this way, the fact that Elizabeth Hale so steadfastly refused to depict the images that I wanted to see is the story itself.

The Group of Seven

What of painters whose philosophy led them to embrace more fully the Canadian landscape? The Group of Seven painters, with their avowedly nationalist intent, wished to create new images of Canada. They believed in their revolutionary approach to the Canadian landscape. Yet their work betrays some of the limitations of the aesthetic approaches they used.

The work of the Group of Seven focused primarily on the Canadian Shield of northern Ontario, the huge plug of hardscrabble land that forms a stark barrier between the agricultural land of southern Ontario and Quebec and the prairie lands of the west. The Canadian Shield was inhabited, from time immemorial, by aboriginal peoples and more recently by non-aboriginal fur traders, miners, loggers, fishers, tourist guides, and summer cottage dwellers. But the Group of Seven’s images of the landscape do not contain much clear evidence of that human presence. Even the painters, beset as they must have been by swarms of mosquitoes and blackflies, stake a distant pose from the trees and mountains they are depicting—they are not in the forest, but gazing at it from a safe distance. For the Group of Seven, natural phenomena take on human qualities. This is particularly true for the many images of pine trees bravely growing out of shallow soil and withstanding fierce winds. As with A. J. Casson’s White Pine (Figure 8.8), trees become an image for and of Canada, a symbol of survival against the odds; these images of hardy trees are Canada.

In a surprising number of ways, the work of painters like the Group of Seven show similarities to landscape depictions from the previous two centuries, combining—in an original way, to be
sure—picturesque framing techniques and reflections on mortality. The revolutionary approach that the Group of Seven adopted was perhaps not as dramatic as they claimed. The landscapes celebrated ownership of this land by Canadians. But which Canadians? Not the aboriginal peoples who had served as their guides into the wilderness areas. Unlike the elite artists of the late 18th and early 19th centuries, who appropriated the landscape of British North America to validate the British empire and their social class, the Group of Seven had a larger democratic impulse. But that does not mean that their landscapes did not exclude—as indeed they must. Painting, like writing, means making choices about what to leave in and to leave out.

**Conclusion**

Like the Group of Seven painters, 18th- and 19th-century British artists attempted to capture the North American landscape in ways that evoked a sense of ownership and belonging. The use of picturesque and sublime conventions served to tame the new landscape according to British

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**Figure 8.8** **A. J. Casson, “White Pine”**

A. J. Casson’s “White Pine,” like many Group of Seven landscape paintings, anthropomorphizes nature, ascribing human characteristics to the tree’s struggle to survive in a harsh wilderness. Here the pine tree grows out of the rocks and survives the strong winds that buffet it.

aesthetic criteria, as the same techniques attempted to do in many parts of the world. But the exclusion of human occupants of the landscape also served to deny the novelty of the landscape. North America had a different past, to be sure, that could be recognized by emphasizing an aboriginal presence—and very occasionally a French Canadian presence—but these were romantic nods and wistful smiles at what the painters viewed as peoples in decline. These peoples were destined to be supplanted, the painters implied, by a British future in which the North American landscape would be fully assimilated to Europe.

Perceptions of landscape stem from the emotions that humans project upon the surrounding environment as much as they reflect an objective view of the biota and geomorphology of the place. As historian Claire Elizabeth Campbell writes, “This almost schizophrenic dichotomy between celebrating progress and celebrating the primeval persists in Canadian attitudes toward the environment.” Understanding landscape forces us to consider culture as well as biology, geology, and climate. To a certain but not unlimited extent, people create the environments in which they live. And they perceive their surroundings according to the aesthetic principles of their society. As Elizabeth Hale and other artists of her time period did, Canadians project their personalities and anxieties onto the land. In doing so, they perceive many things and fail to see others.

**DISCUSSION QUESTIONS**

1. Look at some Group of Seven paintings on the web. Analyze what is (and is not) represented in the images. What considerations may have governed the artists’ choices?
2. Imagine an attractive country scene. What elements make the scene attractive to you?
3. What were the specific meanings of the words “picturesque” and “sublime” in the contexts that they were first used to describe landscapes? Do we still use these terms in the same way?
4. Why do some cultures not have traditions of landscape painting? Why have western European cultures, at certain times in their past, emphasized this genre?
5. Does it make a difference whether a British artist applied British aesthetic criteria to British landscapes or to landscapes in locations that the British had occupied by conquest?
6. Why does the Canadian Shield landscape form such a big part of (English) Canadian imagery?
7. Have photographic images of landscape supplanted the need for painted landscapes? Do photographs rely on some of the same framing techniques as landscape paintings?
8. Historically, few people painted. The materials alone imply that the painter either enjoyed leisure and wealth or depended on the patronage of richer people. How might these conditions have limited the range of images depicted?
9. Do you agree that Canadians perceive ideal landscapes as being “wilderness” or “agrarian”? What are some iconic images of Canadian urban centres?
NOTES


6. These letters have since been published by Roger Hall and S. W. Shelton, eds., The Rising Country: The Hale-Amherst Correspondence, 1799–1825 (Toronto: Champlain Society, 2002).


9. E. F. Hale to Lady Amherst, June 25, 1819, Hale Family Papers, University of Toronto, Fisher Rare Book Room.

10. E. F. Hale to Lord Amherst, December 15, 1820, Hale Family Papers, reel A1085, Library and Archives Canada (LAC).

11. E. F. Hale to Lord Amherst, January 11, 1820, Hale Family Papers, reel A1085, LAC.

12. E. F. Hale to Lord Amherst, December 15, 1820, Hale Family Papers, reel A1085, LAC.

13. E. F. Hale to Lord Amherst, n.d. (July 20, 1820?), Hale Family Papers, reel A1085, LAC.


**Further Reading**


Daniels, Stephen, and Denis Cosgrove, eds. *The Iconography of Landscape.* Cambridge, UK: Cambridge University Press.


Finding Emily

CATRIONA MORTIMER-SANDILANDS

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At one stage in my Victoria, B.C., childhood—I must have been 10 or 11 years old—my parents thought it was a good idea to try to encourage whatever fledgling artistic talent I may have possessed. I remember with painful clarity the cold lumps of grey and brown clay that simply would not submit to my aesthetic will during pottery class, confirming for me yet again my utter inability to transform the images in my head into any kind of visually recognizable facsimile. With rather more affection, I also remember being sent off to the Royal British Columbia Museum for art “appreciation”: presumably, if I couldn’t do art, at least I could be taught to recognize it. Exactly one artist dominates this memory of art appreciation: Emily Carr.

Carr’s paintings of dense, green rainforests were so much a part of my cultural milieu that it did not consciously occur to me until years later that Carr was not a realist painter; for me, Carr’s modernist vision of the West Coast was the West Coast.¹ This influence is not surprising: as cultural geographer Bruce Braun discusses, not only are her paintings habitually displayed in all manner of galleries across the country, but also her work is almost endlessly reproduced on T-shirts, postcards, calendars, fridge magnets, and “dog-eared posters [that] hang on the office walls of local environmental organizations, realtors, and travel agents.”² That I see Carr’s West Coast as “mine” thus has a great deal to do with the fact that I was so routinely exposed to her images: her vision has so influenced mine that I see the forest for her trees.

Carr was, in fact, famous as both a painter and a writer; during her lifetime, in fact, more for the latter than the former. Her first book, Klee Wyck, won the Governor General’s Award for Literature in 1941, and she published two other popular literary recollections of her life before her death in 1945 (several others were published posthumously).³ Indeed, I remember from my childhood not only her forest landscapes, but also the stories she wrote about Woo, her Javanese monkey, and the legions of other animals with whom Carr cohabited over the course of her rather unusual life.⁴ Certainly, her artistic and literary legacy has spawned a huge number of academic, literary, theatrical, artistic, and even musical and choreographic responses to her work, placing her among not only the most publicly recognized but also the most debated and discussed artists in Canadian history.⁵
A lot of environmentalists would consider Carr’s influence on Canadian collective vision and culture a definite boon: her famous paintings depict a nature that seems to demand our awe and respect. Although it would be problematic to call Carr an “environmentalist” per se, more than one commentator has suggested that “she has been enthroned as a kind of proto-ecofeminist heroine who understood in advance of her time and place the importance of nature.”

In this regard, most people focus on her forest paintings. *Forest, British Columbia* (1931–32), for example, depicts a thick growth of massive, magnificent trees, and the browns and greens of the individual cedar trunks both absorb and reflect the diffuse light that animates the whole forest as sacred. This forest is alive, sensuous, and profoundly humbling in its solidity and permanence. It would, I think, be quite difficult to look at *Forest, British Columbia* and reduce the huge, luminous trees to an industrial and instrumental calculation of board feet of timber.

It is this quality that has been remarked on in recent environmentalist “uses” of Carr. For example, a 1992 working paper from the UBC Centre for Applied Ethics uses the popularity of her work *Wood Interior* (1932–35), with its emphasis on nature as a place of sublime beauty, to encourage policymakers to attend to artistic representations of the forest such as Carr’s in order to “shape their practices into images the public will support.” Along similar lines, a 2001 article in *The Atlantic Monthly* examines *Forest, British Columbia* (Figure 9.1) as part of an argument that “landscape paintings [of the Pacific Northwest] are pictorial dispatches from a long war that is more heated now than at any time in the past 200 years.” As Braun sums it up, “although we have scant evidence that Carr intended her forest paintings to be statements of environmental protest, . . . there is merit in the view that Carr’s rainforest paintings disrupted the objectifying gaze of capital.”

Insofar as her paintings inspire a desire and respect for nature outside, say, practices of industrial logging, the images can be claimed as part of environmental history, and particularly a history of environmental ideas.

But Carr is also a controversial figure, and some of the arguments are instructive to consider as we examine her environmental contributions. One debate in particular has polarized both scholarly and popular ideas about Carr, and that issue concerns her relationships with the first peoples of British Columbia. In *Klee Wyck*, Carr claims a strong, personal relationship—against the social conventions of her time—with a wide variety of native individuals, and certainly expresses a deep admiration for aboriginal cultures as a whole. In particular, Carr understands native peoples as having a special relationship with nature. As she writes, “I was to them a child, ignorant about the wild things which they knew so well. In these things the Indian could speak with authority to white people.”

In the same vein, many of Carr’s early paintings focus on native artefacts such as totem poles and longhouses. Although the paintings clearly depict such items as beautiful and spiritual, these artefacts are also frequently portrayed as decaying, receding into the forest, returning to nature. For many critics, both her professed intimacy with and her visual eulogies for a “dying” native culture are deeply problematic. For Marcia Crosby, a Haida/Tsimpsian writer, not only was Carr’s relationship with aboriginal people already shaped by colonialism, meaning that she did not, as she claimed, significantly challenge her privileged position as a white observer of native peoples, but also in both her art and writing she actively appropriated native cultures to an ongoing project of constructing an imaginary, romantic, thoroughly colonial “Indian.” As Crosby puts it, “if [Carr] did forge a deep bond with an imaginary, homogeneous heritage, it was with something that acted as a container for her
Figure 9.1

Emily Carr, *Forest, British Columbia*, 1932

*Source:* Emily Carr, *Forest, British Columbia*, 1931–1932, oil on canvas, 130.0 × 86.8 cm, Collection of the Vancouver Art Gallery, Emily Carr Trust, VAG 42.3.9, Photo: Trevor Mills, Vancouver Art Gallery.
Eurocentric beliefs, her search for a Canadian identity and her artistic intentions. To accept the myths created about Carr and her relationship with ‘the Indians’ is to accept and perpetuate the myths out of which her work arose.”

As Douglas Cole admits, there is no question that “Carr appropriated Northwest coast Aboriginal peoples in that she incorporated them into her conception of Canada and the West.” And it is quite true that the romantic “myth of the vanishing Indian” (as discussed in Chapter 8 of this volume by Colin Coates) was an important element in colonial discourses of Carr’s time: if aboriginal peoples were dying out, then white people could safely romanticize their cultures without having to recognize, say, their territorial claims. What is particularly important to us here, though, is that there is a strong relationship between Carr’s appropriation of native cultures and her depictions of forests like Forest, British Columbia. Although toward the end of her career Carr had completely turned her attention toward representing nature in itself, rather than focusing on aboriginal presences in nature (the totem poles completely disappeared as her focus changed), there are distressing similarities between a view of aboriginal artefacts and communities as dying and “returning to nature,” and an image of nature as “wilderness,” as uninhabited, and especially, as devoid of precisely the ongoing and visible aboriginal peoples for whom the forests were, in fact, “home.” Carr may have stopped actively using native images (for artistic, not political reasons), but her subsequent “wilderness” paintings proceeded as if aboriginal peoples were not just dying but already dead. Carr was clearly, then, a product of her time, and much as she might have been a “proto-ecofeminist,” she was also steeped in particular colonial assumptions that shaped her views of nature in ways that might not be entirely progressive.

How are we, then, to understand Carr as a figure of importance to environmental history? As is made apparent by much of the Carr controversy, it is necessary to examine the ways in which her particular portrayals of nature have had an effect on subsequent environmental ideas; here, the subject of analysis is as much her influence as her life. What does it mean, one might ask, that people like me grew up surrounded by Carr’s forests? How did the emptiness of her wilderness, as portrayed on T-shirts and in art appreciation classes, affect my views of nature? What does it mean that her images are still so influential? In this vein, it is entirely reasonable to ask, as Braun does especially well, about the implications of what one might call the “Carr industry” for the continuing romanticization of aboriginal peoples’ lives and livelihoods in, and also their erasure from, a modern imagination of West Coast natures, including an environmental imagination. The ways in which Carr has been interpreted, distributed, and discussed form a complex story in their own right; her changing reputation is part of a history of environmental ideas in which Carr has been a player after her death.

On another level, however, it is also important to understand Carr as a particular person with a rich biography that cannot be summed up by any one set of relations. In this view, it is important to look at not only the most public version of Emily Carr, but also sources that might offer a more nuanced picture of what she thought about nature, what role it played in her art and writing, and—crucially—how her views might have changed over time. This picture is of Carr the person rather than Carr the icon. Although such a picture does not supplant or disprove a critical view of her work as it is received in the present, it does suggest that a closer look at her life has something to reveal about her environmental contributions.
Finding Emily?

There are huge issues, of course, involved in undertaking such a project. First, as Stephanie Kirkwood Walker has demonstrated with specific reference to Carr, biographical writing says as much about the biographer as it does the subject. Any attempt to reconstruct a life emphasizes certain features and diminishes others, and especially in the context of the vast and controversial literature about Carr, all choices are complicated. Second, any research involving Carr requires dealing with an enormous and intricate archive. There is the huge visual record of her own making, her paintings and sketches; there are her seven major books, some of which were written as memoirs of long-past events, others of which were left as relatively unedited “journals” that were nonetheless intended for eventual publication and have since been compiled and edited (and re-edited) by others; there are her letters, saved unevenly by her friends and correspondents, some published and some not, and mostly from her later years when she was relatively well known; and, of course, there is the voluminous scholarship, including several biographies written by people who actually knew Carr, that has emerged following her death. Complicated choices are made even more so with this kind of archive: Where do we go to find Emily?

As Walker discusses, it is important to acknowledge, when doing or reading a biographical work, that the biographer-historian is an interpreter of her or his subject’s life, and that the act of writing an account of that life involves the unfolding of a creative and speculative relationship between, on the one hand, the particular concerns of the writer and, on the other, the details available in the subject’s archive. Indeed, as Walker writes, “the biographical subject confers a coherence and legitimacy upon the biographer’s speculations that would not otherwise be granted,” and thus the act of writing requires that the author pay careful attention to the concerns animating the biography in the first place. Neither Walker nor I would argue that this kind of reflexive approach to writing a self-consciously created account of a subject’s life excuses relativism or solipsism. Quite the contrary: awareness of her/his own concerns and interests when approaching a subject allows a writer to consider the tasks of research and writing as the development of a conversation between current ideas and historical figures, in which the work of biography stands as an important moment in the development of a relationship between present and past. In other words, the fact that I am interested in Carr as an environmental thinker does not mean that I can discover a new truth about her as “an environmentalist”: this stance would be an exercise in anachronism, in which I impose early-21st-century ideas onto her early-20th-century writings and paintings. What I have instead is an opportunity to sharpen and develop my understanding of the specificity of both historical and more recent environmental ideas about nature, a process enabled by a careful reading of the unique character of Carr’s life and works.

But the question remains: To which works will I go to develop this conversation with Carr’s biography about her environmental thought? The complexity of Carr’s archive offers many possible strategies, but here the richness of the available material would suggest that one can turn to multiple sources of information, and also involve multiple modes of interpretation. I will, then, investigate three different sets of sources to see what each reveals about Carr’s understandings of nature. In the first, I will look at selections from one of the literary memoirs Carr published before she died: The Book of Small, Carr’s 1941 account of her childhood in Victoria in the late 19th century.
Although, as Doris Shadbolt states quite plainly, *The Book of Small* “is really a collection of episodes recalled later in life when self-mythologizing had become [Carr’s] habit,” it is interesting to read these recollections in terms of what they say about the later Carr’s understanding of herself in relationship with animals, plants, and landscapes. If, as I will argue, we look closely at some of Carr’s literary choices to present her childhood in the particular manner she does (i.e., “reading beyond the words,” as discussed in Carolyn Podruchny’s contribution to this volume), what we see is a clear picture of Carr’s adult view of herself as an outcast, a rebel even in childhood against the gendered social conventions of her time. In particular, Carr presents us with a strong notion that nature was always already part of her rebellion; her relations to plants and animals were always (she intimates) both more satisfying and more “authentic” than her relationships with other human beings.

The second source I will examine is a selection of entries from her posthumously published journal, *Hundreds and Thousands*, which Carr set down between November 1927—when she first encountered the Group of Seven and achieved some degree of recognition and respect for her work and views—and March 1941. As Susan Crean notes, although Carr certainly intended her memoirs for publication, “it is also evident from letters that the original idea for the book was a collection of stories in the format she had used for all her other books. It may be that she regarded her journals as raw material for that venture.” Certainly, there are considerable variations in the tenor and address of the different entries in *Hundreds and Thousands*, suggesting that some parts of the journals were more polished than others, and possibly also that Carr was writing partly to herself, in order to jog rather than record memory. However one might choose to read the memoirs, many of the entries in *Hundreds and Thousands* directly concern Carr’s understanding of her own artistic process. The quality of Carr’s memoirs is descriptive/reflective; particularly among the varied passages that involve Carr speaking directly, almost to herself, about issues of God, art, and nature, we see an interesting shift in the journals as Carr ages.

The final set of sources I will examine is Carr’s paintings. Although many art critics pay most attention to the dramatic differences between Carr’s earlier, more “anthropological” paintings of totem poles and her later, more modernist “nature” paintings, I will not endeavour here to draw a comparison between these two periods. Rather, in order to juxtapose relatively synchronous writings (the memoirs and the journal) and paintings (Carr’s post-1927 oeuvre), I will focus on a selection of paintings that demonstrates some changes to Carr’s views of nature within what is often called the “nature” period of her artistic work. Specifically, although Carr is best known for the dark, interior forest landscapes that she painted in the late 1920s and early 1930s, including both *Forest, British Columbia* and *Wood Interior*, she underwent quite a significant aesthetic change during the 1930s that, I think, suggests a changed relationship with nature. Doris Shadbolt writes that “having explored the dark, forbidding side of nature, Carr began to express its animating life and joy. She extended her range of nature themes to include, in addition to deep forest and jungle, more open weeds, fields, airy tree tops, beaches with open sky, and she made corresponding stylistic and expressive changes” including, significantly, a move from an emphasis on the sculptural qualities of forests to an emphasis on light and movement in a range of spaces. This shift is particularly apparent in some of the later paintings that treat “altered” rather than apparently primal landscapes, specifically, that include evidence of large-scale logging in her depiction of the divine in nature: *Stumps and Sky* (1934) and *Scorned as Timber, Beloved of Sky* (1935). The
subjectivity and tenuousness of the central tree in *Scorned as Timber*, for example, suggests something far different from, and more fragile than, the impenetrable awesomeness of the dense forests for which Carr is generally more famous.

**Memoirs: Small in the Garden**

Emily Carr, born in 1871, was raised in Victoria on what was then a semi-rural property near Beacon Hill Park. *The Book of Small* is Carr's late-life recollection of that childhood, including vivid descriptions of both the developing city of Victoria and its inhabitants and, especially, of the various "natural" spaces that twined through and beyond that development. The book is not structured chronologically; it does not offer a retrospective explanation of Carr's development as an artist so much as it presents a series of loosely connected vignettes that often read more like anecdotes told in front of a fire than an artist's retrospection of her journey toward art.

"Small" is Carr's name for herself in the book, a literary choice that has the interesting effect of distancing the author from the character, and thus making clear the distinction between the scattered, collected stories that form *The Book of Small* and most literary memoirs. Laurie Ricou argues that this choice suggests Carr's "dissatisfaction with the potential superficiality of a memoir in which the writer records strictly what is remembered in her own past." Rather than understand memoir as a work of retrospective truth-telling, Carr's writing suggests an active attention to the fact that retrospective writing is a work of memory, and that memory is not so much a recording as a reordering of that past. What Carr offers is a narrative that highlights rather than hides the fact that it is remembered: "Small" is not the actual younger Emily as much as she is the crafted figure of the younger Emily in the older Emily's present, and the scattered and uneven quality of the remembered events actually emphasizes the fact that this collection is indeed a set of memories. Cornelia Hoogland argues, in addition, that the voice Carr chooses in Small is itself childlike: what we read is not a calmly remembered past told in the voice of a middle-aged woman, but a series of vividly present events, told in the past tense but giving "the impression of a child narrator bursting to tell her story." That story is never completed; indeed, one could argue that the fragments of her life presented in *Small* are more like pictures than narrations. A good artist, Carr is more interested in showing than telling, and her choice to speak of the past in such immediate and childlike terms gives the reader (rather like the viewer of a painting) a sensuous rather than narrative picture. Consider the following passage, in which the immediate, intensely visual experience is rudely interrupted by the insertion of narrative time:

> Everything was going so fast—the butterflies' wings, the pink flowers, the hum and the smell, that they stopped being four things and became one most lovely thing, and the little boy and the white horses and I were in the middle of it, like the seeds that you saw dimly inside the white currants, like a big splendid secret getting clearer and clearer every moment—just a second more and—. "Come gather up the white currants," a grown-up voice called from the vegetable garden.

The most beautiful thing fell apart.  

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*Catriona Mortimer-Sandilands*
The contrast Carr sketches in *The Book of Small* is quite clear. On the one hand, there is her family, deeply conservative, Christian, and attached to its social position in the new capital city, and on the other hand, there is Emily. A large proportion of Carr’s sharp descriptions involves her childlike opposition to the rigid, adult social codes surrounding her. From Small’s perspective, the adults around her—especially her eldest sister, Dede—are fairly horrendous, spanning a range from cruel and abusive to pious and stupid. We know Small through vivid depictions of her profound childhood pleasures, most of which are rudely interrupted—like her reverie among the white currants—by some arbitrary, careless, or cruel adult demand. Consistently, Small’s pleasures occur in her direct contacts with plants, animals, and natural landscapes; nature is her delight, and also her refuge. In fact, what Carr offers us is a consistent opposition between what Small considers important, namely the exquisite possibilities of the nonhuman world, and the violent destruction of those possibilities by the adult world around her.29 That Small is a girl is no trivial matter, here: she is defying both class and gender rules in her insistence on exploring the immediate pleasures of the natural world rather than the ritual trivialities of her sisters’ proper and (for Small) hollow lives.30

In one memorable vignette called “Time,” Small’s family, including a particularly prim auntie from San Francisco, goes on a picnic to Mill Stream. After they have their lunch, Emily and her siblings are allowed to explore freely for four hours.31 Carr describes particular elements of the landscape in great detail, from the stream that “would rush around the corner of a great boulder and pour bubbling into a still pool, lie there pretending it had come to be still, but all the time it was going round and round as if it were learning to write ‘O’s,’” to maidenhair ferns that “spread their thin black arms over the edge [of the banks] and, dipping their fingers in the water, washed them gently to and fro.”32 Carr depicts stream, fern, flower, and even the wind as animate parts of the landscape: “it was not strong enough to sweep boldly up the tunnel, but quivered along, giving bluffs and boulders playful little whacks before turning the next corner and crumbling the surface of that pool.”33 Indeed, even the smell and the sound of Mill Stream are alive: “it was like the stillness of a bird held in the hand with just its heart throbbing.”34 The passage is breathless, full of awe and intimacy; one feels exhilarated reading it, as if one were the child perceiving that world. Certainly, Carr presents the landscape as a place outside conventional adult time. When called by her eldest sister to return to the city, her four hours’ attention to nature over, young Emily wonders that “a stream can squeeze a whole afternoon into one minute. A clock could spread one week out into a whole year.”35 Emily attempts to take this world home with her, carefully smuggling onto the bus carrying the family back to Victoria a toad in a tin, under a skunk cabbage leaf (“One sister said, ‘Ugh!’ The other said ‘Warts.’”36). But Auntie can’t stand the smell of the leaf. The tin is revealed, the toad frightens Auntie, and eldest sister throws the toad out the window. Deflated, Emily settles back and in the quiet listens to the pocket-watches of her relatives; she is back in Victoria time.

This story clearly illustrates the overarching opposition between childhood/nature and adulthood/Victorian society that animates the book as a whole. In addition, however, it demonstrates a great deal about Carr’s late-life appreciation of nature. For Carr, the natural world is full of animate actors—from streams and breezes to the many animals that also populate the book—that are accessible to a child’s wondering eye. It is not so much that Small is innocent because she is a child and thus able to “see” nature, as it is that she is an outcast, a rebel. Small actively looked for life in nature because she could not find it in the social world that comprised her childhood.
Although Carr produced this image of herself as a child quite self-consciously—she thought herself a rebel and an outcast—it remains the case that Carr considered the embrace of the natural world as rather an oddity, especially for a girl. Nonetheless, it is an oddity with great reward: unlike her sisters, aunties, and often cruel male acquaintances, Small could take in the quality of life and timelessness that, in her view, eludes a more rational, adult view of the natural world.

Crucially, the childlike wonder in the natural world portrayed by Carr as Small’s rebellious habit is set in explicit opposition to a more instrumental view of landscape or animal, and in particular to a view that would insist that nature should have a moral agenda. For Small, the stream anthropomorphically practising its O’s is not a metaphor for anything at all (except perhaps herself): not a message about progress, and certainly not an invitation to hydroelectricity. The stream is, simply, a wonderful thing to be apprehended, to be experienced in as rich detail as humanly possible. It is thus not surprising that Carr presents her “wonders” as scattered memories, rather than as links in some greater chain of meaning. As readers, we are to get pleasure from each experience in its own right, and even if the stories might be connected as moments of testament to Carr’s self-professed ill fit with the social world around her, the detail of her descriptive moments suggests a sensuous richness in the natural world that is ultimately what Carr wants her memories to provoke.

The impressionistic nature of The Book of Small is particularly interesting in light of Carr’s other writings, and her paintings. As I will suggest below, Carr moved quite dramatically away from a view of nature as universal and abstract, to one emphasizing the intimate and personal relations that comprise human/nature interactions, in both her painting and the reflections on painting she set down in her journals. Significantly, Small was created during and after these other works; it is almost as if Carr decided to return to her childhood to find the most intimate and personal stories about nature.

Journals: Carr in the Wilderness?

The March 7, 1941, entry of Carr’s journals, Hundreds and Thousands, is fairly typical in that it contains rich descriptions of Victoria and its surrounds: “The sun was powerful, the Olympic [Mountains] strong, delicate blue, Mount Baker white. The cat bush is already green and the weeping willows round the lake droop with the weight of flowering life, but there are no leaves yet.” It is relatively unusual, though, because it comments on the political events of the world around her: “The war is staggering. When you think of it you come to a stone wall. All private plans stop. The world has stopped; man has stopped. Everything holds its breath except spring. She bursts forth as strong as ever.” Indeed, the final lines of the journal seem to radiate false optimism, with their description of the birds “fulfilling their moment” and the exhortation that they—or is it the reader?—“carry on, carry on, carry on.” But Carr doesn’t carry on: this entry is her last one. Although Carr continued to write and edit what were to become three books (not dying until March 1945), she moved at this stage of her life from an intense focus on writing her present, as she had done quite regularly for nearly 14 years in her journals, to working far more concertedly on publishing her past, in the form of her memoirs.
Across the years that she wrote them, however, the journals themselves contain a terrific wealth of material about Carr’s life and thought, including how many of her ideas changed and developed. Although there are some vivid descriptions of events, places, and people, including Carr’s trips to eastern Canada and the Chicago World’s Fair (where she missed the art exhibition by one day), some of the most interesting passages are those that involve long passages of direct address. In these segments, Carr not only records the circumstances and status of her painting (and, later, writing), but also offers provocative challenges on the artistic process itself. She evaluates her own work honestly and harshly, all the while attempting to articulate a philosophy—or, perhaps, a theology—of painting, which she sees as a profoundly spiritual quest both to know divinity through painting nature and, perhaps, to represent the divinity of nature in painting.40 In September 1933, for example, she writes,

I begin to see that everything is perfectly balanced so that what one borrows one must pay back in some form or another, that everything has its own place but is interdependent on the rest, that a picture, like life, must also have perfect balance. Every part of it also is dependent on the whole and the whole is dependent on every part. It is a swinging rhythm of thought, swaying back and forth, leading up to, suggesting, waiting, urging the unworded statement to come forth and proclaim itself. . . .41

The literary rationale for such passages is not immediately obvious: to whom is Carr speaking as she writes? Is she attempting to justify her work to a larger audience, or capture something of her own version of modernism for eventual publication as a philosophy of her art? Or is she trying to pin down something for her own reference, using the written page as a place in which to explore, in a more reflective and private manner, her developing aesthetic? Sometimes the passages are written in the first-person singular and describe in some detail what it is that she understands herself as doing as she paints: “I grasp for a thing and a place one cannot see with these eyes, only very, very faintly and with one’s higher eyes.”42 Sometimes they are written in the first-person plural, as if she is writing to a member of an artistic community to which she belongs: “I think we miss our goal very often because we only regard parts, overlooking the ensemble, painting the trees and forgetting the forest.”43 And some of the most interesting passages are written in the imperative voice, as if Carr is telling herself or the reader what s/he must do:

Go out there into the glory of the woods. See God in every particle of them, expressing glory and strength and power, tenderness and protection. Know that they are God expressing God made manifest. Feel their protecting spread, their uplifting rise, their solid immovable strength. Regard the warm red earth beneath them nurtured by their myriads of fallen needles, softly fallen, slowly disintegrating through long processes, always living, eternally changing yet eternally the same. See God in it all, enter into the life of the trees. Know your relationship and understand their language, unspoken, unwritten talk. Answer back to them with their own dumb magnificence, soul words, earth words, the God in you responding to the God in them.44
Potentially, Carr was trying to capture something of her own creative inspiration for herself in order to sharpen and develop it, but it is also highly likely that she had an eye to the eventual publication of these particular philosophic words for a larger audience. Certainly, however, Carr had particular interlocutors for these weighty thoughts about art and nature, and especially so during the earlier part of the journal’s existence, the entries she wrote in the years immediately after her initial contact with the Group of Seven. I will discuss the influence of the Group of Seven on Carr’s art in the next section; what is interesting to note here is not only the overt spiritual insistence throughout these passages—for Carr, God is revealed in nature, and nature is a sacred embodiment of God to be painted with humility and something approaching reverence—but also that modernism, with its emphasis on the essence of the world below appearance, offers a particular aesthetic path toward the perception and revelation of the hidden divinity in painting. For Carr, modern art sought to reveal the essence of the subject—nature—beneath its outer layers. Her quest for the divine, then, was oriented to the representation, through different modes of perception and abstraction, of a divine essence of nature that could not be revealed in the static realistic tidiness of most of the painting around her at the time in Victoria.

In the earlier passages in the journals, Carr’s modernism was deeply influenced not only by her general contact with the Group of Seven, but also by her particular relationships to Group member Lawren Harris and to Bess Housser, wife of art critic Fred Housser. Harris and Housser were deeply involved in theosophy, an esoteric religious movement emphasizing the universal divinity of all things, including nature, and the achievement of a knowledge of God through the individual revelation of truth. At the outset, Carr saw enormous similarity between Harris and Housser’s theosophical beliefs and her own, mirroring her deep admiration of Harris’s art and her reliance on his critical opinion of her work. Her painting leaned, in these years, toward abstraction; so did her written reflections on painting. Carr’s words were written in bold prose, and very often in the imperative. They emphasized universal qualities such as balance, ensemble, splendour, glory, and even, in several places, the soul: “Oh to realize that intensity! It is of the soul.” In addition, they resonated with many elements of theosophy, including ideas of universal knowledge and expression. The following passage bears particular imprint of this influence:

"Remember, the picture is to be one of concerted movement in a definite direction for a definite purpose, viz., the expression of a definite thought. All its building is for that thought, the bringing into expression and the clothing of it. Therefore if you have no thought that picture is going to be an empty void, or worse still, a confusion of cross purposes without a goal."

In 1934, Housser divorced her husband, Harris divorced his wife, and they married. Emily was, to put it mildly, not impressed. She wrote: “November 1: A letter from Lawren. He and Bess have divorced and married each other. None of my business but I feel somehow as if my connection to the east is over.” Although, perhaps, this perceived personal betrayal was a last straw, Carr had actually diverged considerably from Harris on matters spiritual some months before. This divergence is reflected in the following passage both overtly—she says it—and in a more subtle shift in...
Carr’s spiritual emphasis from a universal idea of God in nature to a far more particular one, emphasizing trees as individuals in need of a far less abstract mode of apprehension:

Somehow theosophy makes me shudder now… It’s that pedantic know-it-allness that irritates me… Instead of trying to force our personality on to our subject, we should be quite quiet and unassertive and let the subject swallow us and absorb us into it; and not be so darn smart of our importance. The woods are marvelous after the sun has dipped and quit tickling them. Then they get down to sober realities, the cake without the icing. They are themselves, then, like people alone and thinking instead of persons in a throng trying to sparkle and taking on reflection from others. Dear trees, we don’t stop half enough to love and admire them.50

In this passage, Carr deviates significantly from some of her earlier, rather strident spiritual rhetoric toward a much gentler, more intimate voice. She also clearly moves from thinking first into looking first. Rather than find abstract forms in nature (which was what Harris did increasingly in his own work), Carr looked to nature to see what forms it revealed. Her journal entries are still often absorbed with questions of nature, divinity, and art (Carr began to re-embrace the mainstream Christianity available to her in Victoria churches), but she is increasingly focused on particular landscapes and on the evocative possibilities contained not in grand sweeps of words, but in intricate descriptions. God moved, as it were, into the details, and especially into the realm of sensuous apprehension rather than cerebral reflection.

Shadbolt is describing Carr’s painting in this period, but might also have been describing her writing, when she states, “her route by this time was becoming expressionist, immediate, based in the senses though informed by spirit.”51 Carr herself wrote, in 1934, that abstraction “seems rather like cutting a flower out of cardboard. The form may be correct, but where’s the smell and the cool tenderness of the petals?”52 And as the following passage demonstrates, by the late 1930s the larger discussions of God and Art so indicative of her conversations with Harris have shifted into intimate, often minuscule descriptions of the world around her as an approach to the divine:

The wild bit of Armadale is bursting out in tender leafage and the birds do a great deal of discussing there. Wild lilies of the valley are shooting up umbrella-like leaves to hide the blossoms they are going to get. The salmonberry bushes are dotted with deep pink blooms. Skies are fine these days. White clouds dance over the blue dome. Oh, that dome! The blue is so much more than blue, the illusive depth boring into Heaven’s floor.53

Given my previous emphasis on the intimate natures of Carr’s descriptions apparent in her memoirs, it is interesting to see that the movement into such intricate detail was present in Carr’s writing well before she began the memoirs. It is also interesting to note that Carr explicitly recognized and addressed her artistic choice in this regard; Carr’s stories about Small are not simply nicely written little stories about details from her childhood memory, but their very detail reflects a commitment to the sensuous apprehension of the divine that Carr increasingly understood as part of her spiritual relationship with the world.
In the final section of this chapter, I will turn to a third element of Carr’s work—her painting itself—in order to see how Carr’s commitment to detail was manifest on canvas, and how we can see, in her images, a particularly revealing segment of Carr’s developing understanding of her relationship, as artist, to the natural world. Specifically, Carr is not simply descending into autobiography as she ages. Rather, her increasing focus on motion in landscape, and her increasing attention to the effects of human contact on natural landscapes—a facet of her work not often discussed—suggest that Carr’s later-life attention to particularity, detail, and relationship can be viewed as a nuanced and sophisticated move beyond some of her artistic colleagues’ works.

Painting: Emily among the Stumps

Although Carr had had significant contact with several different currents of modern art at different points over the course of her life, her 1927 contact with the Group of Seven was particularly influential. In the Group Carr finally found a community of artists receptive to ideas that were similar to hers: that there was something deeply significant about the landscape that deserved more than picturesque representation in paint; that there was something especially significant about the Canadian landscape that required an “organic” expression such as the one Carr was attempting to provide of the West Coast; and that modernist aesthetic experiments supplied some of the tools necessary to develop this unique art movement. The Group understood itself as creating a uniquely Canadian body of art. Their landscapes were intended to represent the essential nature of Canada, against both the subject matter and the aesthetic conventions of other nations (Harris was particularly attached to this project). In this respect, Carr shared more than just aesthetics with the Group. As the following passage from a 1929 article demonstrates, Carr also shared their nationalist artistic aspirations.

What are Canadian artists of the west going to do with our art? . . . Shall we try to make Canada look English or French or Italian by painting conscientiously in a style that does not belong to us? Or shall we search as the Indian did, amid our own surroundings and material, for something of our own through which to express ourselves, and make for ourselves garments of our own spinning to fit our needs and become a very part of us?

The Group of Seven has been lauded for their bold and moving depictions of Canadian wilderness en route to this uniquely Canadian representation. They have also been castigated for their complete erasure of aboriginal peoples from the landscapes they painted, and for their contribution to the development of a nationalist fantasy of a romantic, pristine, Northern “Canadian” nature, devoid of any human presence at all, and resonating with ideas of intimate unity with the natural landscape irrespective of any actual activity, settlement, or human contact. As the passage above indicates, Carr is not exempt from such criticism. After 1927, her landscapes increasingly de-emphasized the presence of aboriginal artefacts (Harris specifically counselled her to turn her artistic attention away from totem poles), even as she rhetorically took on the position of “Indian” in her claim to an unmediated relationship with the landscape. As discussed earlier, these aesthetic
and ideological claims are a strong part of what fuels the controversy concerning her relations to aboriginal peoples. Here, it is worth emphasizing that, in the midst of her closest contact with the Group of Seven, her depictions of “primordial” forests not only erase the actual lives of aboriginal peoples, but also paint out of existence the large set of social and technological relationships by which she was able to paint many relatively remote B.C. settings.57

In this light, paintings such as Forest, British Columbia and Wood Interior are not simply beautiful and moving paintings that would seem to be offering the viewer a non-instrumental view of West Coast rainforests; they also participate in a view of nature in which the “real” nature of “pristine” wilderness is the primary site of value, to the exclusion of human contact. What is not in Wood Interior is the set of relationships by which Carr is able to paint the forest. These relationships are absent from the frame because, for Carr, the essence of nature—and of the nation—is actually that part of the forest that lies beyond human, social life. Although one might well argue that the depiction of a nature “beyond” social relationships serves to highlight the need for a respectful approach to the environment based on awe or reverence, many recent environmental thinkers—and many critics of Carr and the Group of Seven—are quite correct when they point out that this view of “pristine” nature is not only historically inaccurate but also politically deeply problematic.58

What is clear from both Carr’s writing and painting is that she was very much engaged in a project of representing Canadian nature as part of an overtly nationalist art movement at the time she painted some of her most famous canvases. Her dense forest interiors are not only the dark mysteries of the forest, but also the primordial origins of Canada, and the West Coast in particular. Wood Interior is a perfect example: it focuses on trees as pillars, thrusting upward from a green mass of abstract undergrowth to a light-dappled canopy. The trees are the stuff of a solid and almost inviolable nature, as well as the sculptural foundations of the nation, stretched upward from a swirling and indistinct past to a light-filled, divine future—in short, toward God.

In much the same vein, Forest, British Columbia draws our attention “into” the mystery; the thick and textural tree trunks reveal a path of light that ends in the middle distance, again suggesting a view of nature/nation as a solid line between the origins of the nation in a thick and impervious nature, and its glorious path to the future, to the light, and to God. Both paintings represent nature as solid, sculptural. There is a quality to them of heaviness and permanence that speaks volumes to the Group’s ideas of the nation as rooted in a timeless nature, as being permanent, unyielding, destined.

As Shadbolt notes, however, these densely packed forest interiors of the late 1920s and early 1930s were not Carr’s only (or final) subject choices. Carr was certainly influenced by Harris, nationalism and all, during this period, but she actively turned away from both his theosophical outlook and his artistic trajectory—and, I think, his particular project of aesthetic nationalism—by the mid-1930s.59 Although Carr remained committed to the idea that she was representing the West Coast, her later paintings are far more concerned with particularity and transience than they are with nationality and permanence; her natures come to express movement rather than solidity, and—importantly—show the influence of human beings on nature, rather than its pristine-ness or imperviousness, both of which suggest a very different kind of representation of the landscape indeed from the one with which she and the Group are generally associated. As Robert Linsley writes, “Carr’s late expressionist paintings of the forest . . . have to be seen as profoundly historical.
If the frozen quality of Harris’ work . . . is a defensive response to modern history, then the turbulence of Carr’s paintings . . . talks about the real turbulence of that history as enacted on the land—the industrialization of the wilderness.60

The turbulence of a landscape enacted upon: Carr’s 1934 painting Stumps and Sky, and her 1935 Scorned as Timber, Beloved of the Sky, are both good examples of this theme. In Stumps, the foreground is dominated by a clear-cut, complete with rows of stumps and the detritus of cut branches. There is no question of permanence here: the standing trees in the middle of the painting are dwarfed and indistinct in comparison to the arresting centrality of the dead ones, suggesting their fragility, their movement toward becoming timber. But this is not only a scene of carnage, a sort of eulogy for Forest, British Columbia: the standing trees also draw our attention from the stumps up into the sky, which is swirling and moving with light.61 The stumps reflect that light and, in fact, themselves give off a sense of movement; certainly, they are not painted with dense layers of paint or as static geometric forms, but are actually airy and incomplete. In this way, the stumps in the painting are revealed as part of the same moving nature as the swirling sky. Yes, there is death and yes, there is transformation—these themes are absent from the earlier forest interiors—but these changes connect the viewer with the painting, as s/he is part of the landscape being depicted rather than a witness to something divine existing outside her. Indeed, as Shadbolt has noted, movement itself is the subject of many of Carr’s later paintings;62 the image captures a moment, not a state, and the viewer is drawn into movement with the painting.

Scorned as Timber, Beloved of the Sky (Figure 9.2, and cover) has a similar sense of light and movement, and also shares with Stumps a foreground composed of a clear-cut (although in

**Figure 9.2**

![Emily Carr, Scorned as Timber, Beloved of the Sky, 1935](source: Emily Carr, Scorned as Timber, Beloved of the Sky, 1935, oil on canvas, 112.0 × 68.9 cm, Collection of the Vancouver Art Gallery, Emily Carr Trust, VAG 42.3.15, Photo: Trevor Mills, Vancouver Art Gallery.)
Scorned, that foreground is much smaller). The focal point of the painting is, however, a standing, towering tree. This tree is very different from Carr’s earlier forests: it is (almost) alone; it is spindly and with virtually no canopy; it feels as if it is stretching toward the light in the sky—moving—rather than resting solidly on the ground; and it is, of course, surrounded by stumps, suggesting that this tree is an industrial survivor, scorned as timber, rather than a pillar. Linsley observes the significance of the painting’s title: it clearly anthropomorphizes the tree as an individual both scorned and beloved (one could see it as an autobiographical statement on Carr’s part), and thus offers a deeply subjective portrayal rather than an objective one. It also invokes a specific past, in that the tree has been scorned—the loggers have been there—and yet, at this moment, exists to reach upward to the sky, to the beloved. The painting is intimate rather than abstract; it invites a personal relationship with a singular being in a particular time and place, rather than a conceptual understanding of an external nature. And in its combination of change and intimacy, we see once again an emphasis on relationship rather than distance.

Both of these paintings, then, demonstrate a significant departure from Carr’s earlier work: from a timeless nature to a historical and changing one; from a universal nature to a subjectively experienced one; from an objective, external nature to a personal and intimate one; from a solid nature outside history to a fragile and transient one bearing the scars of industry and death. Whether or not we can call even these latter images “environmental,” it seems clear that they evoke a vastly different set of relationships to nature than do the works with which many viewers of Carr are more familiar. In *Stumps* and *Scorned*, we have a nature in the process of change, the outcome of which is not at all certain; we have a nature that can be clear-cut, and that continues to reach to the sky even with the scars of history. Perhaps most importantly, though, here we have a nature that should be known personally and intimately: “Dear trees, we don’t stop half enough to love and admire them.”

**Conclusion: Emily Carr in Environmental History**

Consider two final passages from Carr’s writing, the first from her journals circa 1934, and the second from a segment called “Silence and Pioneers” from *The Book of Small*:

There’s a torn and splintered ridge across the stumps I call the “screamers.” These are the unsawn last bits, the cry of the tree’s heart, wrenching and tearing apart just before she gives that sway and the dreadful groan of falling, that dreadful pause while her executioners step back with their saws and axes resting and watch. It’s a horrible sight to see a tree felled, even now, though the stumps are grey and rotting. As you pass among them you see their screamers sticking up out of their own tombstones, as it were. They are their own tombstones and their own mourners.

They felled mighty trees with vigour and used blasting powder and sweat to dislodge the monster roots. The harder they worked with the land, the more they loved these rooty little brown patches among the overwhelming green. The pioneer walked round his new field, pointing with hardened, twisted fingers to this and that which he had accomplished while the woman wrestled
with the inconveniences of her crude home, planning the smart, modern house her children would have by and by, but the children would never have that intense joy of creating from nothing which their parents had enjoyed; they would never enjoy the secret wrapped in the virgin land.67

There is an interesting tension between these passages that, with *Stumps and Sky*, offers a good resting place for these thoughts on Emily Carr as a figure in environmental history. In the first passage, we see Carr apparently displaying overtly environmental sentiments: trees “screaming” at their demise at the hands of loggers. In the second passage, we see what seems to be the opposite: Carr lauding the virtues of the pioneer taming the wilderness, and loving it in its domestication. Which is the “real” Emily?

The preceding analysis suggests that Carr developed, in the last decade or so of her life, a much more intimate and personal relationship with the nature she sought to represent. Old age and failing health probably played a role in this process, as did her acquisition of a trailer that she fondly called “The Elephant.” Carr did not travel as widely as she had in the past, but chose instead to visit relatively local sites repeatedly; *Stumps and Sky*, for example, is probably based on a sketch she made in relatively nearby Metchosin. Her growing intimacy with the landscape was a product of familiarity. This transformation is clearly apparent in her painting, which moves from monumental, dense landscapes that impose on the viewer a sense of the impenetrability and ineffability of the forest, to a view emphasizing fragility, transience and motion in “cleared” landscapes, in the moving, individual relationships between and among natural elements like sky and stump, and also between the landscape and painting itself. It is apparent in her journals, which—particularly after Carr’s disillusionment with theosophy—become increasingly focused on the details of the particular landscapes that she was attempting to paint rather than sweeping statements about the nature of painting landscapes in general. And it is most apparent in the *Book of Small*, which offers highly polished and detailed reflections that are crafted to reveal the beauty and sacredness of the local natures of Carr’s childhood through absolutely personal and intimate stories—stories, incidentally, about a world long past.

Is this later emphasis on transience, intimacy, and particularity somehow more “environmental” than one emphasizing monumentality and permanence? There is certainly an argument to be made that Carr, in her increasing late-life focus on altered, humanized landscapes and intensely personal experiences of the natural world, made a move away from the kind of colonial “wilderness” discourse that privileges and romanticizes primordial landscapes over recognizing responsibility for human interaction with altered ones. But that move is not completely unambiguous.68 In any case, it would still be awkward to claim Carr as a “proto-ecofeminist,” as if she were somehow prescient to late-20th-century developments in environmental thought that challenge the politics of an environmental emphasis on wilderness. What is interesting, however, is to take this “other” Emily back to her critics. Specifically, if one focuses, as this paper has, on Carr’s movement away from the Group of Seven rather than toward it, and on portions of her writing that treat questions of childhood memory and personal experience of landscape, rather than the more direct depictions of the first peoples of the West Coast, one gets a somewhat different view of Carr than the one often highlighted by her critics. Although it is not possible to separate the one Emily from the other, the colonial from the maverick, the Victorian
from the spiritual rebel, it is possible to argue that Carr’s thinking about the environment is more complex and nuanced than previously imagined. Although Braun, for example, is correct to point out that there are very troubling issues in Carr’s depictions of absolutely human-less forests, it is also necessary to consider that Carr was a complex individual, whose ideas, images, writings, relationships, and social positions changed over time: some of her most interesting forests were clearly not wildernesses.

It is no accident that the Carr most widely known from her presence on T-shirts, posters, and environmentalist websites—the Carr I remember from my childhood—is the one of Forest, British Columbia and not Stumps and Sky. Where the former image is easily borrowed to the marketing of tourist destinations, to the development of environmental campaigns against clear-cutting, and to the promotion of a national or regional identity (not to mention one that manages to erase the constitutive presence of first peoples), the latter demands a more complex mode of thinking that doesn’t make for easy T-shirt material. What does it mean to find the kind of light and beauty Carr depicts—in a clear-cut? What kind of spiritual or ethical relationship with the natural world is Carr alluding to when she paints a single, possibly autobiographical tree, “beloved of sky,” in the midst of a canvas emphasizing death and change? What kind of relationship does Carr suggest among art, God, and nature when the major subject of the artwork is stumps? One might ask similar questions about Carr’s writing, perhaps especially about the contradictions she seems to present between the pleasures of “creating from nothing” in the act of building a home among the trees, and the screams of the trees themselves being clear-cut. There is an ethical complexity to these works that defies easy categorization, and demands that we remember that although Carr could never transcend the colonial relationships to nature in which she was immersed, she did have more than one thought about them.

**DISCUSSION QUESTIONS**

1. What role does (or should) art play in shaping environmental awareness?
2. Should environmental artists be environmental activists, or is art about something other than politics?
3. What are some of the key differences between text and image as sources for environmental history?
4. What does it mean that writing history is a process of interpretation? Are there dangers in recognizing the subjective qualities of writing environmental history?
5. What does it mean that biography says as much about the biographer as the subject? What does this chapter tell you about its author?
6. Focusing in particular on the section on The Book of Small, discuss the ways in which literary criticism might be an important part of environmental history.
7. Focusing in particular on the section on Carr’s later-life paintings, discuss the ways in which art criticism might be an important part of environmental history.
8. Was Emily Carr an environmentalist? Was she a racist?
NOTES

1. My thanks to Niiti Simmonds for her invaluable research assistance in the preparation of this chapter. The term “modernism” generally refers to a collection of aesthetic, literary, and political movements that, beginning in the late 19th century, but especially in the years around the First World War, emphasized the need to sweep aside “traditional” forms in order to reveal radically new truths about the world, and in art in particular, to reveal elements of essential experiences and substance that lie “below” the realm of realist appearances. For example, Fauvism, one of many schools of modernism (and one that had a particular impact on Carr’s 1920s forest landscapes), used simplified lines, bold colours, and exaggerated perspectives to emphasize the lightness and delight of the generally ordinary scenes represented (think Matisse). Although we may now see paintings by Carr and her contemporaries as aesthetically relatively conservative—say, in comparison to abstraction or minimalism—at the time many audiences found them literally repulsive.


3. All quotations in this paper from Carr’s published writings are taken from Doris Shadbolt, ed., The Complete Writings of Emily Carr (Vancouver and Toronto: Douglas & McIntyre, 1993). The individual works are: Klee Wyck (1941), The Book of Small (1942), The House of All Sorts (1942), Growing Pains (1946), Pause (1953), The Heart of a Peacock (1953), and Hundreds and Thousands: The Journals of An Artist (1966). These works are all thoroughly edited, including her journals.

4. One of the largest regrets I have of this chapter is not having room to address Carr’s relationship with her animals. Her stories about Woo and the bobtail sheepdogs are not only an interesting example of animal literature, but also reveal aspects of Carr’s relationship with the natural world.

5. There are far too many examples to list them all. The following list suggests a different range of recent, more creative responses: Kate Braid, To This Cedar Fountain (Vancouver: Polestar, 1995), poetry; Susan Crean, The Laughing One: A Journey to Emily Carr (Toronto: HarperCollins, 2001), memoir; Veda Hille, Here is a Picture—Songs For . . . (1998), music; Jennifer Mascall, choreographer, The Brutal Telling: A Portrait of Emily Carr (Vancouver, 1998), multimedia dance production; Eileen Whitfield, Alice and Emily, Citadel Theatre (16–24 November 1992), play; Jin-me Yoon, A Group of Sixty Seven (Vancouver Art Gallery, 1996), art installation.


10. This controversy was at the heart of a recent travelling exhibition of Carr’s art, “Emily Carr: New Perspectives,” co-curated by Vancouver Art Gallery senior curator Ian Thom, Université de Montréal art history professor Johanne Lamoureux, and National Gallery curator of Canadian art Charlie Hill. The exhibition was accompanied by an excellent catalogue, which I include in the list of recommended readings, along with Gerta Moray’s exhaustive and rigorous treatment on Carr’s relationships with aboriginal peoples. My one criticism of the exhibition is that the curators almost completely ignored Carr’s own complex literary voice from the discussion; Moray’s work goes out of its way to include it.

11. Carr, Complete Writings, p. 27.


15. As Cole also writes, while admitting Carr’s participation in colonial relations is not wrong, it is anachronistic: “to a degree it condemns her for not sharing the contemporary political views of her critics.” A critical perspective on Carr’s work necessarily includes a careful analysis of colonial relations, as they were both influential to and influenced by Carr’s art and writing, but “to expect Carr to have been a crusading social and political reformer is to ask her to have assumed a role to which she was intellectually and temperamentally unsuited and uninterested,” p. 161.

16. Walker, This Woman in Particular, p. 2. This excellent book is a history of the biographical image of Carr, and emphasizes the fact that biographical writing is a relationship between subject and biographer in which the biographer organizes a narrative account that can “grant particular lives significance within larger contexts of meaning,” p. 2. One other “metabiographical” discussion of Carr worth mentioning is Nancy Pagh, “Passing Through the Jungle: Emily Carr and Theories of Women’s Autobiography,” Essays on Canadian Writing 60 (1996): pp. 166–87.

17. Walker, This Woman in Particular, p. 116.

18. This position, I think, also indicated by Cole: our imagination of Carr as “colonial” may be correct, but that imagination is as much the creation of the position of the interpreter as it is inherent to the world that Carr actually inhabited and the particular character of Carr herself. A careful and nuanced account must also pay attention to the latter elements.

19. Crean’s The Laughing One is, in my view, one of the most successful biographies of Carr, largely because it self-consciously explores the author’s own relationship with Carr at the same time as it is based on a very careful and detailed reading of Carr’s archive, as well as subsequent scholarship about and response to her.

20. In looking at literature for environmental themes, I rest on a body of scholarship known as “ecocriticism” or “environmental literary criticism”; several sources are listed in the recommended readings to give further detail on this body of work.


22. Crean, Opposite Contraries, p. 5.

23. Clearly, there are many other sources upon which I could draw in this chapter, including several of Carr’s other published works (especially Klee Wyck, which documents her early artistic forays into the BC
landscape, in addition to several stories about her relationships to aboriginal peoples). The British Columbia Archives holds a significant collection of Carr’s later-life letters, and there are published editions of particular correspondences such as Doreen Walker, ed., Dear Nan: Letters of Emily Carr, Nan Cheney, and Humphrey Toms (Vancouver: UBC, 1990). The BC Archives also contains an excellent collection of photographs pertaining to Carr, in addition to the original manuscripts of all her books; a wide range of her paintings, studies, and sketches; and several manuscripts for secondary research on Carr (see http://www.bcarchives.gov.bc.ca/index.htm).

28. Carr, Complete Writings, p. 123.
29. That is, the white, middle-class adult world. Carr’s memories of childhood include romanticizations of aboriginal peoples, as consistent with many critiques of her, and also of members of the Chinese community of Victoria. She considers both as “closer to nature”; particularly given that the voice of Small is so childlike, this connection to nature, in Small’s pro-nature world, is also childlike.
30. The question of gender is, of course, a crucial one for environmental history, and it is certainly worth asking, in this case, how Carr’s sex influenced both her life circumstances and her perceptions of the natural world. (In the recommended readings, I have listed several works that ask interesting and related questions on gender and environmental history.)
31. “Time” is told in the first person.
32. Carr, Complete Writings, p. 133.
33. Carr, Complete Writings, p. 133.
34. Carr, Complete Writings, p. 133.
35. Carr, Complete Writings, p. 134.
36. Carr, Complete Writings, p. 133.
37. Carr, Complete Writings, p. 893.
38. Carr, Complete Writings, p. 893.
40. It is interesting to note that Carr talked about the search for divinity only through her painting, and not through her writing. Although her journals record questions of authorial style, there is nothing in Hundreds and Thousands on writing to equal the intensity of her thinking about painting. This difference could indicate that writing and painting played very different roles in Carr’s life. I think this is the case, but there is not space in this chapter to explore the possibility. It could also reflect that Carr came to writing much later in life, at which point some of her spiritual angst was already worked out.
41. Carr, Complete Writings, p. 697.
42. Carr, Complete Writings, p. 697.
43. Carr, Complete Writings, p. 701.
44. Carr, Complete Writings, p. 675.
45. Fred Housser introduced Emily Carr to the work of Walt Whitman. Copied sections of Whitman's poetry are scattered throughout Carr's journals, and his voice had a definite literary and spiritual influence on her.

46. Carr, Complete Writings, p. 716.

47. Carr, Complete Writings, p. 716, emphasis in original.

48. Carr, Complete Writings, p. 766.

49. Despite their disagreements, Carr continued to correspond with Harris, and he remained a strong influence on her work for some time despite his increasing focus, after the mid-1930s, on abstraction.

50. Carr, Complete Writings, p. 745.

51. Shadbolt, Art of Emily Carr, p. 146.

52. Carr, Complete Writings, p. 790.

53. Carr, Complete Writings, p. 824.

54. Carr was especially affected by Fauvism and Cubism. Carr trained in San Francisco, the United Kingdom, and France, experiences documented in Growing Pains (1946). This one of Carr’s sets of memoirs is particularly interesting in its depiction of Carr as a woman in the midst of a profoundly sexist art culture (including modern art), and as a western Canadian in the midst of a profoundly Eurocentric one. Her experiences of exclusion—and ill health—throughout her artistic training no doubt contributed to Carr’s idiosyncratic painting style, which as I suggest includes strong differences even from her more significant influence, the Group of Seven.

55. As Lizbeth Goodman and Stephan Regan emphasize, the influence was two way. See “‘Scorned as Timber, Beloved of the Sky’: Emily Carr’s Double Approach to First Nations Canadian Landscapes and Images in Her Paintings and Writing,” Journal of Gender Studies 7 no. 2 (1998): pp. 157–79.

56. Emily Carr, “Modern and Indian Art of the West Coast,” Supplement to The McGill News (June 1929): pp. 18–22.

57. Braun notes that Carr’s is actually a tourist gaze enabled by the coastal routes of the B.C. Steamship Co., and not at all the intimate, long-term relationship that people interpret in her paintings—and that she more than intimates this in parts of such writings as Klee Wyck. See The Intemperate Rainforest, pp. 182–83. Carr’s actual intimacy was with Victoria and its surrounds: Goldstream Flats, Metchosin, MacDonald Park. These were not wildernesses, even at the time.


59. It is worth noting that one of the actual Group of Seven members, Fred Varley, also turned away from a project of overt aesthetic nationalism, and that he did so after moving to Vancouver.


61. Vincent Van Gogh’s influence is palpable here, and Carr documents it in her journals.


63. Readers familiar with the Group of Seven will note the thematic similarity between Carr’s lone tree and such works as Varley’s (1921) Stormy Weather, Georgian Bay. As Linsley notes, however, there are also
striking differences between their treatments: Varley’s tree is the “universal” man, standing against the storm, where Carr’s is “scorned as timber”—a reject.

64. One could also explore the deeply Christian overtones of this image of rejection and salvation. This interpretation is quite plausible given Carr’s religiosity.

65. Carr, Complete Writings, p. 745.

66. Carr, Complete Writings, p. 750.

67. Carr, Complete Writings, p. 140.

68. It must be remembered that Klee Wyck, The Book of Small, and The House of All Sorts were all written in segments over the same general time period. Carr’s childhood reflections on nature are not temporally separate from her thinking about aboriginal peoples, and Klee Wyck is problematic for its assertion of cross-cultural intimacy where it didn’t really exist (except, perhaps, in Carr’s much-debated relationship with Sophie Frank).

**FURTHER READING**


Finding the Nation in Nature

John F. Varty

“Trust in Bread and Bologna: Promoting Prairie Wheat in the Twentieth Century”

Alan MacEachern

“Lost in Shipping: Canadian National Parks and the International Donation of Wildlife”
There is a story about an exchange, which may or may not have actually taken place, between a prairie farmer and one from Ontario. The prairie farmer asked his counterpart what he thought of the Canadian Prairie landscape—with all its open vistas, fascinating palette, and, of course, its big, never-ending sky. The Ontarian replied, “Well, it’s nice enough, but I really can’t see anything.” The Ontarian asked in return for a report on the Ontario landscape—with its rolling hills, towering deciduous trees, and sheer, rocky outcroppings. The prairie farmer replied, “Well, it’s nice enough, but I really can’t see anything.” These two were clearly on opposite sides of an issue that was, as we say, a matter of perspective: the prairie farmer perceived an open expanse of space as, in itself, something to see, while the Ontarian perceived that same space as nothing but emptiness.

Without overstating its importance, I like this story because it provides an apt parable for historians seeking creative ways of thinking and writing about prairie environmental history. I will proceed by making a few general points concerning this story’s relevance for environmental historians of the prairies. In doing so, I will introduce the core interpretive concept of this paper, trust, and suggest how thinking slightly differently about this sociocultural phenomenon might influence historians’ source selection, and how trust engenders new insights into connections between science and technology, on one hand, and environmental history, on the other. This brief discussion will set the basic methodological and theoretical stage on which my sustained empirical example is set. The example, a narrative about bread, flour, and Canadian cereal scientists’ roles in marketing Canadian wheat, takes us across the Atlantic Ocean, to Bologna, Italy, and back. Finally, I will return to some experiences that I have had while writing environmental histories of a place
that is viewed by many to be utterly empty, and explore some ironies that emerge from the narrative, especially vis-à-vis the theoretical and methodological angle I present. Having visited the empirical example we can then (dare I say it?) knead the theoretical and methodological considerations into the real-world story about marketing Canadian wheat.

Introducing the Prairies

A brief description of the Canadian Prairies is in order. For many Canadians, the word “prairie” itself generally refers to a vast expanse of relatively flat land, like that which lies along either side of the Trans-Canada Highway between Winnipeg, Manitoba, and Calgary, Alberta. To outsiders it seems flat, expansive, vast, endless, and even monotonous. The stretch between Winnipeg and Calgary is but a relatively small subsection of a much vaster central plain that bisects the continental United States and Canada—spanning nearly 40 degrees of latitude, and running in a north-northwesterly direction from the Gulf of Mexico in the south to the Arctic Ocean in Canada’s north. In Canadian territory this long central plain is hemmed on its western boundary by the Cordilleran region, and on its northeasterly margin by the Precambrian Canadian Shield.

The prairies are underlain by flat layers of sedimented rock, ranging in origin from Cambrian to Tertiary times (anywhere from 500 to 1 million years ago). The present-day Rocky Mountains were forced skyward approximately 85 million years ago, thus creating a steep eastern slope, down which masses of sand and gravel flowed over the ensuing millennia, fanning out to form a vast alluvial plain—part of the basis of today’s prairie soils. Also integral to the Plains’ landscape formation have been more recent episodes of glaciation, which arrived cyclically within the Pleistocene Epoch. For the most part, the Plains’ pre-Pleistocene relief features were not altered significantly in the sense of being “scoured,” or carved, as might be expected when a one-kilometre-thick ice sheet moves across uneven terrain. Pleistocene ice sheets did, however, deposit across the Plains’ Tertiary landscape massive amounts of gravel, sand, and “rock flour,” carried within the advancing ice sheets from exposed rock formations much farther north. By the same token, retreating ice sheets left behind a legacy of outwash plains, spillways, meltwater channels, and large glacial lake basins—all in evidence to varying degrees across the southern regions of today’s Prairie Provinces: Manitoba, Saskatchewan, and Alberta. The largest and best known example of a glacial lake basin is that of Lake Agassiz, which, at its maximum extent, covered over 800,000 square kilometres. Far and away the largest body of fresh water on the planet at the time (around 8,400 years ago), Lake Agassiz contained vastly more fresh water than is available in all the world’s lakes today combined. It encompassed large tracts of present-day Manitoba and northwestern Ontario, and smaller fingers of the lake reached into Saskatchewan. The future site of the city of Winnipeg lay an incredible 200 metres beneath the lake’s icy surface.

The land eventually surfaced from Agassiz’s depths and, shortly thereafter, humans arrived to take up permanent occupancy of the area. Since then, cereal grains, minerals, animal skins, and petrochemicals have, at different times, flowed out. Such interactions have been visible to historians, and the subjects of history. However, there have been other, less-obvious interactions that also deserve attention. Just as the prairie farmer in our story was able to do, prairie environmental historians must learn to appreciate apparently empty spaces—that is, to interrogate some of the harder-to-see kinds of interaction between the prairies and other parts of the world.
Trust and Bologna

The most important of these spaces, I suggest, is the conceptual space that still persists in many historians’ minds, between science and technology, on the one hand, and environment, on the other. The relatively abstract concept of trust sheds helpful light on this conceptual space. I am not referring here to the confidence or faith we might have in another person, but rather to the eminently impersonal experience we face in the modern world. We are all reliant to an unprecedented degree on other people, often (usually) operating at considerable distance from ourselves, whom we are unlikely ever to meet. The streetcar driver whisking office workers along bustling streets; the elevator operator, launching workers skyward in newly erected skyscrapers; indeed, the structural designers of those skyscrapers are examples of the many, many figures in whom we have tacitly placed our trust over the past century or so. In an ironic sort of way, the putatively impersonal and cold modern world is entirely dependent on a deep and abiding kind of trust.

Despite its ubiquity in the modern world, trust does not appear organically, as if out of nowhere. Like everything else, it develops in deeply contingent social, political, and environmental contexts. In the story that follows we witness an instance of trust in the making. Here, Canadian scientists attempting to promote Canadian wheat struggled to elicit (albeit implicitly) a sense of trust abroad in Canadian systems of wheat-quality testing. However, despite having the appearance of objectivity that is generally conferred by science, the systems they employed tended to downplay certain properties of Canadian wheat that were potentially troubling, and emphasized others that were favourable. These properties were determined by and in prairie soils, of course, making this an abidingly environmental story.

By the early 1920s, Canada was a global force in the exportation of cereal grains such as barley, oats, and, mostly importantly, wheat. A mere 1.2 million acres of wheat were planted in the prairie region in 1896, but this had risen to 10 million acres in 1913 (thanks to the work of an unprecedented wave of immigrants), and 23 million acres by 1928. The technological complexities of moving so much grain from the continental interior to ports in the East were significant. The most complex task of all fell to the Canadian government, which through its Department of Trade and Commerce (DTC) held responsibility for determining grain quality, and assigning quality designations, called “grades,” to all export shipments. Government grain graders worked at local, regional, and terminal grain-receiving points (known as “elevators”) in order to take samples of incoming grain, and assign grades according to federal grading statutes.

Working at a slightly removed though no less important level of the process were employees of the Department of Trade and Commerce’s main scientific laboratory, the Grain Research Laboratory (GRL), located in Winnipeg, Manitoba. In the Laboratory, which opened in 1913, scientists conducted experiments on the grain samples taken from export shipments. For GRL scientists, experimentation largely entailed milling wheat samples into flour, and then baking that flour into bread. This “scientific” bread baking was geared toward two mutually reinforcing purposes. On one hand, scientists compared their experimental results—i.e., loaves of bread—with the quality designation given to the wheat sample from which the loaf had been baked—a high grade given to the wheat presumably presaged a top-quality loaf of bread. The idea here was to check and, if necessary, recalibrate the quality assessment skills of graders working on the ground. In other words, if graders’ quality designations were found to overstate the wheat’s ability to perform in baking practice, then alterations had to
be made, lest the reputation of Canadian wheat suffer in foreign markets. On the other hand, their experiments also rendered results (again, loaves of bread) that were commonly used themselves as marketing devices by DTC representatives travelling abroad. What better way to market Canadian wheat to prospective customers than to travel with delicious, beautifully shaped loaves of bread?

While both sides of the GRL’s activities were integral to the smooth functioning of the wheat economy, marketing grew in relative importance throughout the 1930s, thanks in very large measure to plunging world wheat prices and chronic oversupply, which even a horrific period of drought on North America’s Plains did not offset. In 1932, the GRL’s first chief chemist, Dr. F. J. Birchard, took the first of what would turn out to be many trips abroad to endorse the quality of Canadian wheat. That year, Dr. Birchard represented Canada at two international, bread-related events—the first International Bread Congress in Rome, and the International Exhibition of Breadmaking Machinery and Accessories, held in Bologna, under the auspices of the “National Fascist Federation of the Baking and Kindred Trades.”

In preparation for the Italian events, which were opened officially on June 21 by Premier Benito Mussolini, the chief chemist and his staff produced hundreds of loaves of bread and other baked goods for exhibition and demonstration. Although everything was carefully packed and handled cautiously, Birchard’s report of the trip reveals that many of the loaves of bread and dinner rolls had become less visually pleasing during the long trans-Atlantic journey. This surely caused Birchard some concern, for imperfect bread products portended a marketing disaster in two ways. In the immediate and explicit sense, unpleasant looking loaves were, by definition, unlikely to attract the attention of foreign wheat buyers. But more than that, misshapen loaves seriously threatened to derail a key opportunity for Canadian cereal scientists to establish trust abroad in their ability, through standardized and carefully devised science, to control and guarantee the highest quality wheat and flour in the world. By the time of the Italian visit, there had been at least a decade of developments in techniques by which Canadian wheat had to be handled in order for its optimal baking capabilities to be shown. Thus the implicit function of Birchard’s trip was to forge trust in (read, acceptance of) the procedures that his lab had developed to make Canadian bread appear as impressive as possible. Birchard was bearing not just bread, but symbols of both Canadian nature and science—and it was as symbols that the bread had more important, enduring consequences.

There were very good reasons, having to do with the environmental conditions in which Canadian wheat grew at the time, why Canadian scientists were actively engaged in creating trust among potential buyers, as opposed to leaving it to chance and hoping it would emerge naturally. The largest proportion of prairie wheat offered for sale on international markets grew in the long rain shadow cast by the Western Cordillera, in the relatively dry, medium-grass prairie zone, and in either Brown or Dark Brown Chernozemic soils (see Figure 10.1). Though this zone does not qualify as arid by strict definition, it is drier than most wheat-growing areas in other exporting nations such as the United States, Australia, and Argentina.

Relative dryness meant, in turn, that Canadian wheat tended to be lower in starch content, and higher (often considerably higher) in protein content than that from competing nations. The relationship between dryness and protein content has two significant dimensions. First, wheat protein, known as gluten, is formed when the wheat plant takes up available, soluble nitrogen stores in the soil. In slightly wetter climes, or even in especially wet years on the prairies themselves, wheat
plants will produce more seed-holding heads, which means that the available nitrogen is spread across a greater number of seeds, resulting in lower proportionate protein content per seed. As for the availability of soluble nitrogen in the first place, relatively dry soils will be richer for two reasons. First, lower levels of rainfall mean that smaller quantities of nitrogen, a highly water-soluble compound, will be washed out of the soil, or down into unreach­able depths or nearby watercourses. Second, dry soil nitrogen is less susceptible to a bacterial decomposition process known as “denitri­fication”—through which soluble nitrogen is returned to a gaseous form, unavailable for use by the wheat plant. Dryness equals high proportionate levels of protein in wheat seeds.

What has any of this to do with promoting bread and dinner rolls at international conferences? There are two related answers. First, by and large, high-protein wheat had been considered a premium product for the purposes of making bread for decades leading up to the 1930s. With the advent of economic depression and corresponding wheat surpluses, however, large buyers (milling and baking firms) were less and less interested in paying premium prices for high-protein wheat. Canada’s top­grade wheat sold for between five and ten cents per bushel more than its leading competitors. From a Canadian point of view, this in itself was a difficult problem in wheat marketing.
More complicated, but still related, is the fact that high-protein wheat produces high-protein flour, and high-protein flour can be unusually difficult to manipulate for the purposes of getting bread dough to leaven, or “rise,” sufficiently. If especially abundant, flour proteins must receive an especially rigorous “beating” in the kneading process. Too little kneading and the flour fails to perform, at least where performance means that the bread rises to the most voluminous point possible, a preference widely shared among North Americans, but not, for the most part, by European consumers. Thus, Birchard had to demonstrate at once the quality of actual bread loaves while simultaneously fixing in the minds of congress attendees a link between the loaves he showed and the presumably unvarying experimental procedures his lab employed. The two—loaves and procedures—worked in tandem to confirm the “naturalness” of each: fine loaves seemed to trumpet “careful, fastidious procedures,” while, in turn, those precise procedures promised never-ending reliability in terms of quality control.

Selling Consumers on Science

This story about naturalness and science augured perfectly with trends, also relating to trust, in consumer purchases of all manner of baking-related items. The rise of consumer activity in the 20th century, which essentially entailed the replacement of home-produced goods with industrially produced ones, was utterly reliant on forms of trust, however banal they may seem. An emergent and increasingly prominent theme in flour advertisements throughout the 1920s and 1930s was, certainly, that of trust: “you no longer need the ‘knack’ of making cakes . . . you don’t need good luck,” an ad for Swans Down Flour assured prospective customers in 1928. The consumer was being told that she, perhaps a city woman living a great distance from wheat fields and having no intimate knowledge of the flour’s environmental provenance, could trust that the contents would perform as the packaging promised, and that successive packages of the same kind could be counted upon to do the same, in exactly the same way. Yet another ad celebrated the end of “magic” as a feature of baking with flour of uniform chemical make-up. Again, consumers could trust in the reliability of products produced and standardized by others, elsewhere.

Figure 10.2  Grain Research Laboratory Display at the International Exhibition of Breading Machinery and Accessories, Bologna, Italy

The GRL’s Bologna display featured contrasting images of Canada’s ultramodern wheat science facilities and sheaves of actual wheat. On the wall, photos of lab facilities, protein maps, and experimental bread are displayed under images of the Rocky Mountains.

Turning to Birchard’s Bologna display, we can appreciate how three things interact and become co-determining factors in this story: an apparently ideal loaf, the environment, and trust. In Figure 10.2, a photograph of the GRL’s Bologna exhibit, we see featured front and centre on the exhibit’s backdrop three large photographs of Canada’s mountainous west. There is no photograph depicting the prairie wheat fields, which were obviously more relevant to the substance of the exhibit. As the row of photographs below those of Canada’s Western Cordilleran region suggest, it was considered more important to situate Canadian wheat in its laboratory context than it was to depict it in a realistic ecological/environmental setting. From left to right are photographs of baking-test results conducted over the years by Birchard and his laboratory assistants. These photos depict loaves baked from “foreign” and Canadian wheat, and from combinations thereof (Figure 10.3). Foreign wheat produced smaller loaves than Canadian wheat did. Admixtures of Canadian and foreign flours, however, produced larger loaves than were rendered by foreign flour alone—the common phrase being that Canadian flour tended to “carry” others.

Beneath these highly rhetorical images were four depictions of laboratory facilities, apparatus, and procedure in action. In the next lower row, Canada’s wheat-producing region is, at last, depicted, but only in the form of brightly coloured maps that plotted the Prairies’ “protein zones” for prospective buyers to see for themselves. (For more about the rhetorical properties of maps, see Matthew Evenden’s chapter in this volume.) Exhibit visitors were hereby invited to assume the elevated gaze of the scientific manager and, to a degree, perceive Canadian wheat as being handled within a highly rationalized, controlled, and therefore trustworthy system. The modus operandi of this aggressive marketing strategy was to bake the ecological complexities of a vast bioregion (to say nothing of the social and political exigencies of life within it) into a North-American-centred image of good bread. This Canadian vignette helped witnesses peer behind the curtain into a process of industrial-style precision, where a rigid scientific enterprise ensured the accuracy of brightly coloured maps that marked precise wheat-quality divisions.13 Further, the photographed line of bread loaves offered strong rhetorical support for the ultimate legitimacy—precision, accuracy—of the GRL’s entire scientific enterprise. Consumers could be confident that from farmers’ fields (although there are no actual fields in this vignette) through laboratory practice and procedural stringency, to the finished, mechanically produced bread loaf, the loop was closed.

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Figure 10.3 EXPERIMENTAL BREAD LOAVES

One of the photos featured in the Grain Research Laboratory’s display. The loaf on the far left was produced with Canadian flour. The others, from left to right, reflect the “strength” of Canadian flour, when blended in increasing amounts with “foreign” (in this case, German) flour.

Source: Photo courtesy of Canadian Grain Commission.

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188 John F. Varty
To the extent that the GRL’s exhibit sought to engender trust in Canadian wheat by showing how scientists were in control of the complicated reality of wheat production, it surely fit well with the Exhibition’s expressed purpose: “to diffuse among members of the bakery trade in all parts of the world a knowledge of breadmaking machines and their methods of working, and also to encourage Italian bakers to modernize their plants in accordance with sound principles of management.” Furthermore, the Canadian display’s location in that section of the Exhibition occupied primarily by manufacturers of baking ovens and “macaroni equipment” was also a matter of rhetorical significance. The world’s far-flung wheat exporting nations were now embroiled in a market competition that differed qualitatively from any they had known before—one in which the muscle-bound image of abundance, of wheat fields as far as the eye could see, was of less importance than the implication that wheat, flour, and bread were all produced in a seamless, scientific system, the complexity of which could be handled by experts alone. Thus, by contrast to other kinds of Canadian marketing campaigns, which invoked themes of nostalgia and romance as reasons for purchasing Canadian wheat, here was a decidedly different conviction rooted in the chemical properties of raw materials, and their links to industry abroad.

There were two mutually related problems with the Canadian program in Bologna, however. On one hand, trust in the Canadian process of rendering consistent, standardized wheat quality was linked to a specific kind of bread that Europeans did not necessarily like. Whereas Canadian chemists conflated voluminous bread with good bread, neither European bakers nor consumers made the same inherent connection. Whereas Birchard may have been impressed by his scientific results, it is highly likely that images of towering Canadian loaves next to diminutive Italian loaves offended Italian bakers, not least owing to the vaguely racial and ethnic messages implied by the improving power of a Canadian input.

Italian bakers were also troubled by the experimental inflexibility on the part of Canadian scientists. Thus, the second, related problem: European bakers could make much more effective use of European wheat than Birchard and his assistants had done in their test-baking procedures. By subjecting flour from Italian wheat to their slow-speed mixers, by employing high-sided pans, and by using a short fermentation process, bakers in many European countries, not just Italy, were “able to make fairly good bread with the baking systems they employ[ed].” In other words, Canadian experimental practices not only favoured Canadian wheat, but also were prejudiced against European wheat. Canadian wheat was not as indispensable to European bakers as Canadians tried to suggest.

All the same, successful marketing of Canadian wheat, with its particular properties and distinctive baking qualities, depended on the impression that a single, invariant procedure ought to be used for testing flour—all flour, ideally. The Canadian vignette in Bologna implied that while there is nothing wrong with differential baking practices in and of themselves, they did set an effective limit on just how thoroughly the world’s wheat fields, flour mills, and bread factories might be integrated into a seamless process. There was no way Canadians could brook, let alone show respect for, Italian bakers’ artistic skill if Canada was to have any serious hope of promoting its wheat.

Such was the paradox of the Canadian position in Depression-era wheat marketing. Small-scale bakers in Europe and the United States confounded Canadian efforts with their continued application of adaptive skill in pursuit of their own specific ends: they had the skill to make perfectly desirable bread with cheaper, low-protein wheat. Ironically, even if Italian bakers did find themselves
wanting to use costly, Canadian wheat, they would have had great difficulty in doing so. For one thing, using Canadian wheat to achieve the effects created by Birchard (assuming that such a goal was of interest) required capital investment in the same high-speed mixers employed by the well-equipped GRL. Few, if any, commercial mixers being used in Europe at the time would have worked this high-gluten flour tenaciously enough to permit its use in commercial baking. In other words, the unspoken but self-evident proposition of Canadian wheat marketing was that European buyers should invest not only in high-priced Canadian wheat, but also in the expensive mechanical devices necessary to use this wheat to optimal effect. It was an absurd proposition, perhaps, but it was essential to the process of establishing trust in the methods by which Canadian Prairie wheat was produced and offered for sale on the world market.

Trust and Environmental History

The research, writing, and interpretation of this story were influenced by a few distinct bodies of literature, which warrant brief discussion here. First, literature dealing with the ever-increasing circulation and exchange of goods in the world has been an implicit influence throughout.17 Whereas economists have always tended to focus on the material and logistical aspects of circulation (encompassing transportation systems, storage facilities, standardization of quality, and so forth), many others have struggled to understand circulation and the exchange of goods in a more inclusive way, one that accounts for social, cultural, political, and even spiritual dimensions of the exchange process. From the 1920s onward, anthropologists such as Marcel Mauss and Bronislaw Malinowski led the charge toward more inclusive views of exchange. Claude Lévi-Strauss, another influential anthropologist of the 1960s and 1970s, set about studying what he called the “total social fact” of exchange, a term that gestures at his desire to understand how exchange processes are woven deeply into forms of social structure and organization. Clearly, the story I have told here about wheat promotion is consonant with the interpretive concerns of these pioneering anthropologists, insofar as it deals with circulating goods (wheat and flour, but also knowledge and trust), and to the extent that it does not treat goods-exchange as a material phenomenon isolated from social, cultural, and political factors.

Modernity theorists, especially those who have considered the status of science and technology in modern societies, exerted more explicit influence in the early stages of conceptualizing this research. Among the many key figures in this category—including Jacques Ellul, Jürgen Habermas, Max Weber, Karl Marx—the most important for this paper is Anthony Giddens. Giddens’s work reminds us that technologically mediated societies are profoundly, if tacitly, trusting ones—a point that guided my pursuit of wheat science all the way down to the most apparently mundane of practices, such as experimental baking. But besides pointing out this central irony of modernity, what makes Giddens’ work evocative is his emphasis on the mutually related matters of trust and the actual mechanisms by which social meaning is “lifted out” of local contexts and, in his words, “stretched” across space and time. Standardized currency is a prime example of such a mechanism for Giddens. Young historians wishing to deal with the movement and circulation of goods in modern societies must be aware of these two bodies of literature, as I have been through my research and writing process.
Nevertheless, the interpretive limitations of both become apparent after a certain point, and must be circumvented through the use of other helpful sources. For instance, although Giddens does an excellent job of identifying trust, his work bears the troubling implication that the phenomenon is a finished and/or obvious outcome of modern existence—it just appears. As one delves deeper and deeper into a topic like wheat promotion and cereal science, however, it becomes clear, as it did to me, that historians have little choice but to approach the word “trust” itself, and the concept it signifies, as being open in the sense of evolving and developing in contingent historical circumstances. This is not easy to do because the word, like “love” or “goodness”, seems to describe something mutually agreed upon by—and self-evidently positive to—the parties involved. On the contrary, trust is forged intentionally rather than won deservedly or born organically.

Giddens and many other modernity theorists take a similar, *a priori* attitude when it comes to technologies, especially those that might be easily dismissed as banal, such as experimental baking. Like trust itself, technoscience seems simply to appear; social processes themselves are considered complex and contingent, but the technologies that emerge from such processes are not often treated with the same nuance.

Although I arrived at this topic as an environmental historian, I found that the best antidote to these and other shortcomings is the important work of historians of technology and science. This subfield of history is far too large and varied to discuss in any detail here, but suffice to say that it steered me toward sources and subjects that I surely would have overlooked had I approached the topic strictly as an environmental historian. In any case, there certainly was an initial temptation to castigate such things as dough-testing machines and experimental baking ovens for being part of the 20th century’s muscle-bound rationalization of nature. On first glance, it is easy to consider such things as complicit in the process by which nature is said, by environmental historians and modernity theorists alike, to have been “demystified,” conquered, or otherwise “killed.”

Reading the history of science and technology gradually helped me avoid this conclusion. Armed with a sense of contingency, I grew more and more curious about things like dough-testing machines, experimental baking ovens, and, for that matter, bread, which itself started to seem like a technology within this context. Given contingency, I wondered what on earth might be involved in the conceptualization and shaping of such peculiar apparatus. One phenomenon definitely involved in the shaping of these and other technologies was trust. F. J. Birchard’s constant construction of his lab’s technoscientific practices had, as its implicit goal and undeniable reward, the trust of others in Canadian wheat and flour. Technoscience and trust went hand in hand. Birchard’s trip to Bologna, and the experimental work leading up to it, shows that neither trust nor technoscience preceded the other. They were shaped and forged in tandem; both were subject to historically situated circumstances. The bottom line is that a willingness to think about trust and technoscience as mutually contingent helps to clarify the historical significance of what seem to be obscure technologies.

Also important to bear in mind are the different scales of interpretation represented by technoscience, on the one hand, and trust, on the other. Laboratories and bread conferences tend to operate on the micro scale, whereas trust is a broader social phenomenon, mostly operating on the...
macro scale (see Ruth Sandwell’s chapter in this volume for a more sustained discussion of scale). Nevertheless, these scales intersect and interact constantly. If trust, operating on the macro-social level, breaks down or is otherwise compromised, then discrete technologies are sure to undergo alteration, and vice versa. This realization has methodological implications, for seemingly insignificant sources relevant to the micro scale, such as experimental testing recipes, can hold secrets to machinations on the macro level.

Finally, and most importantly for would-be environmental historians, one can routinely expect to find a significant environmental story where trust and technoscience intersect. In the case presented here, the interaction of trust and technoscience had significant implications for how (and how much of) the resources of the non-human world were made manifest in the lives of humans. Birchard’s role (and rolls) had serious implications for the disposition of wheat that covered anywhere from 15 to 25 million acres of Canadian Prairie.

But the non-human world was more than merely implicated in the development of trust and bread science. We have seen how environmental exigencies were determinative in the conceptualization, design, and sociopolitical functioning of the GRL’s technoscientific apparatus, including Birchard’s bread—and simultaneously in his tacit quest for trust. He had something to show, but he also had something to hide, the latter stemming from the environmental conditions of wheat growth in the prairies. Birchard had to suppress some dimensions of prairie agriculture, which he and others accomplished by sequestering certain realities in machines and procedures. The task of suppressing these realities was handled through control and manipulation of technologies and procedures, with trust acting as a legitimating force between the two. Thus, far from being “killed” or utterly “demystified” in modern societies, the non-human world becomes embedded deep in the design and application of the very technoscientific practices of modernity. In other words, the non-human world is very much “alive” in many of the machines (experimental baking machines, in this case) that might otherwise be considered complicit in the “killing” of nature in the first place. Moreover, here we see an instance of how the forging, acceptance, and contestation of trust can feature important, if hard to detect, environmental determinants. Trust is often, and perhaps always, an important element in environmental stories.

My experience suggests two basic, related things. First, consider that what initially seems mundane in your research can turn out to be very significant. White bread may be a contemporary metaphor for banality, but the environmental dimensions of its manipulation in the hands of scientists are anything but simple. Best to assume that what appears mundane is perhaps very important, and risk discovering otherwise. Second, when you pursue matters of trust in the making, you will invariably encounter and rely upon sources that might not strike other historians as interesting. Insofar as winning trust is often self-serving (and here “self” will include social groups, cultural groups, and political movements, among others), evidence proving its creation is sure to be correspondingly subtle, possibly even deliberately misleading. Like the prairie farmer in my opening parable, would-be environmental historians of the Canadian Prairies have to undertake their own process of seeing substance in spaces that appear, at first glance, to be empty.
DISCUSSION QUESTIONS

1. What role does the environment play in this story?
2. What analytical status does the author seem to grant the environment: active agent or subjugate of human activity?
3. Why, according to the author, does the prairie environment not feature prominently in the Grain Research Laboratory’s Bologna display?
4. What does the author mean by the word “trust”? Does this differ from other possible uses of the word?
5. What complications did Birchard encounter in his quest to engender trust?
6. The author analyzes trust. Does this seem paradoxical? (Should we simply “trust trust”?) Is a “history of trust” possible? Does everything have a history?
7. The author identifies interpretive shortcomings in the work of modernity theorists. What are they, and do you think the author redresses them effectively?
8. What ironies are made evident in this paper?

NOTES

5. The transition was not always seamless. See the opening pages of Keith Walden’s Becoming Modern in Toronto: The Industrial Exhibition and the Shaping of Late Victorian Culture (Toronto: University of Toronto Press, 1997).
8. The event’s Italian location was especially auspicious, for nowhere else in Europe were efforts aimed at food self-sufficiency quite so intense. Mussolini’s famed “Battle of Wheat” was seven years old in 1932.


10. A rain shadow is created when an especially high-relief barrier (mountains) causes rain-laden clouds (such as those off the Pacific Ocean, in this case) to rise in altitude, at which point they cool, and their moisture content condenses and falls either as rain or snow in the mountains themselves. The adjacent region, lying in the lees of the mountain barrier, is thus cut off from significant rainfall.


12. This appeal to the scientifically guaranteed precision of ingredients was not confined to flour. “[W]hat woman is going to continue the old-fashioned, risky methods” of jam making when “Certo never fails,” Canadian Grocer asked on April 21, 1922. And consider the ironic use of magic in Magic Baking Powder—the product’s “magical” qualities created by scientists and attested to by “cookery experts” from the Provincial School of Domestic Science, the Chatelaine Institute, and Canadian Home Journal: See Canadian Grocer 9 (February 1934).

13. The industrial analogy had been very powerful since the advent of Frederick Winslow Taylor’s 1911 work on “scientific management”: Principles of Scientific Management (New York and London: Harper, 1911) was a leading influence in ideas about the importance of rationalizing and systematizing all productive processes. Taylor’s work argued for the breakdown of whole processes into discrete, repeatable tasks; and although his work normally refers to smaller production facilities such as factories, its sensibilities were transferred to all manner of productive activity, including large-scale agriculture.


15. Throughout the late 1930s the Canadian Wheat Board’s advertising campaigns played on genetic lineage metaphors, including those emphasizing Canadian wheat’s putatively aristocratic parentage. Booklets with titles such as The Aristocracy of Canadian Wheat and The Kinsmen were conceived. See Canada, Department of Trade and Commerce, Canadian Wheat Board, Report of the Canadian Wheat Board, 1937–1938 (Ottawa: King’s Printer, 1939): pp. 5–7.


17. The exchange of goods, even on a large scale, is not a new phenomenon. It is apparent, however, that the 19th century witnessed a considerable spike both in terms of the sheer quantity of goods moving about, and in terms of the economic phenomenon known as “convergence”—the merging of prices and costs across great distances. For reading on the antiquity of large-scale trade, see Andre Gunder Frank, The World System: Five Hundred or Five Thousand Years? (London and New York: Routledge, 1993). For informative reading about aspects of the 19th-century economy see Kevin O’Rourke and Jeffrey Williamson, Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy (Cambridge, MA: MIT Press, 1999).


FURTHER READINGS


Lost in Shipping: Canadian National Parks and the International Donation of Wildlife

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If you ever find yourself in the Parliament buildings in Ottawa, leave. Head west down Wellington Street, past the Supreme Court, and to the building that I always think of as the nation’s supremer (supremest?) court: Library and Archives Canada. This is the central warehouse of Canadian history, where individuals, groups, and government departments deposit their archival papers and records, and where researchers like me, you, and flocks of genealogists can access these materials. A walk down Wellington Street—from legislature, to court, to archives—is like a walk into the past.

One of the many archival collections at Library and Archives Canada is that of Parks Canada, the agency that oversees the country’s national parks.1 When in the 1990s I wrote a Ph.D. on the parks, the collection ran to 500 metres of archival material, like a filing cabinet pulled out the length of five football fields.2 There is much more now. There are more parks; they are producing ever-more paper; and there is always more past than there used to be. And, surprisingly, old material is still being discovered. Boxes of files from the late 1800s occasionally get pulled out of places like the Banff National Park administrative headquarters, having been held onto for more than a century because they were thought still useful or alternatively were deemed useless and completely forgotten about.3

The value of such an archival collection to a Canadian environmental historian should be obvious. Our national parks system began with the creation of Banff in 1885, so for almost all of our history as a nation, the government has been establishing and developing parks, and the people responsible for these parks—politicians, civil servants, wardens, scientists—have been writing about them. The parks have also been toured, reviewed, filmed, painted, photographed,
and mapped countless times. As a result, national parks are some of the most documented places in Canada. More than that, parks represent explicit attempts to define what elements of Canadian nature are deemed most precious and worth saving. All this means that researchers and students of environmental history have, in the parks, a wonderful opportunity to see how Canadians have thought about and acted toward nature. What sorts of landscapes have been considered unusually beautiful and yet typical of Canadian beauty, and how has that opinion changed over time? Why have we favoured unpeopled wilderness, attempting to remove all human presence—whether Stoney Indians from Banff or farmers from Cape Breton Highlands—when establishing parks, and then sought to attract as many people as possible? How did knowledge and belief evolve so that forest fires, once completely outlawed, are now ignited by parks staff? Or predators, once systematically killed, now protected? Parks are important to environmental history because, paradoxically, they represent a society’s ideal for nature and document the society’s actual relationship with nature.

Having a strong source base like the Parks Canada papers is essential when doing history, environmental or otherwise. You might have a good topic, you might have questions to ask, but unless there are sources to examine you won’t have the evidence necessary to find answers and make your case. In my experience, some students when researching essays (and some professors when assigning them) gravitate to the relative safety of secondary sources, the after-the-fact interpretation of historical events. And who can blame them? It is natural that they seek the expertise of people who have learned enough about a historical topic to write knowledgeably about it in a journal or book or website. But to focus on secondary sources may mean underutilizing primary sources, the material produced by the participants or witnesses of history: diaries, newspapers, correspondence, census data, legal documents, oral testimony, and much more. That is a great loss—the difference between a movie and a movie review, between English lit and English crit. Listening to people of the past speak and figuring out what they are saying—what happened and why—is what history is all about. Professors are increasingly incorporating primary sources into undergraduate history courses. These sources can be intimidating: they appear in the language and often the penmanship of the day, they are without the explanations, signposts, and context that an after-the-fact interpreter would know were necessary, they may not be in the place you want, they may not have what you hope to find, and they are inevitably incomplete. But they are still worth diving into. I have never had trouble finding material of interest when reading primary sources. And in this world, if you don’t decide what you’re interested in, someone will decide for you.

Of course, the sheer size of the Parks Canada archival holdings is what makes them daunting as well as valuable. How can you make sense of such a vast collection of sources? How can you locate and determine which sources are necessary in teasing out a history? How do you decide which sources not to write about, and which sources to avoid altogether? And how can you tell the story of a collectivity—whether a government agency, a business, a people, or a nation—when your sources are not written by that impersonal entity but by a collection of individuals over a long period of time?

While working on my dissertation I came across another story amid the miles of files, the story of Parks Canada donating wildlife around the world in the 20th century, to zoos, heads of state, museums, scientists, and Walt Disney. This story seems a particularly apt examination of such a source base, because the donations program was never formalized to become part of parks
regulations, and references to donations are scattered throughout the Parks Canada collection. Again, what is most challenging is also most rewarding: the historian has the opportunity to piece together the history—to learn more about the past, in some ways, than did the participants themselves.

Most of the Parks Canada holdings at Library and Archives Canada have been reproduced on microfilm, one advantage of which is that people across Canada can borrow the material via inter-library loan. Unfortunately, microfilm makes me nauseous. Winding the reel of film and seeing it glide across the screen, which should offer the pleasant sense of travelling deeper into the past, instead most resembles sitting in the back of my parents’ car as a child, watching trees rush by out the window, and getting carsick. It’s a common reaction, I’m told. So I got a doctor’s note. If there is one thing a government bureaucracy fears, it’s a doctor’s note. As a result, a day or so after requesting Parks Canada material, I would go to the Archives’ third-floor reading room and be given a banker’s box with the actual documents inside. I would carry the box back to a large table by the wall of windows that look out over the Ottawa River and, in the distance, to the offices of Parks Canada itself. I would open the box, inhale the smell of old paper, and begin reading.

Perhaps I should define “reading.” The files mostly consisted of letters back and forth within the agency’s headquarters, and from the headquarters to staff at the individual parks. The correspondence was chronologically arranged and then bound or stapled together, and I spent many days just skimming through these packets for material of interest, like a witness flipping through mug shots. There was some logic to the search—I had requested files that seemed most directly on my topic—but I was also just relying on my growing knowledge of the general field to sniff out other things that might prove significant. It was as unsystematic as that, and there was undoubtedly much that I missed. A historian reading a microfilmed newspaper might decide to systematically sample records, scanning only every third issue, or every tenth, knowing full well that much is being missed. As William Turkel discusses in his chapter of this volume, researchers always have finite time and resources, and so must weigh the likely usefulness of a source and budget their investment in it accordingly.

Applications for Animals

Researching as I was, a letter with Mickey Mouse letterhead stood out. It was 1965, and Walt Disney studios was wondering if the Canadian parks could spare some grizzly bears for the making of the film Biography of a Grizzly. A Disney executive wrote, Oh, and if you have a “remarkably tame and tractable” mountain lion, we’ll take that, too.

Actually, we could potentially use a big old male with rheumatism and a definite lack of pep and fire, and possibly, blind, whose coat nevertheless, developed into an attractive one and whose size is as formidable as when he was in his prime. . . . For this project, it may even be necessary to somehow obtain cubs before their eyes are open, or, at least, before their mother is able to teach them the fear or hatred of man.

The Canadian parks chief wrote back that the proposal sounded fine, and he was sure the agency would be able to help.8
This all seemed strange, at odds with the Parks Branch’s stated philosophy that all nature within the parks was to be protected. And the tone of the letters made it clear such arrangements had happened before. True, at varying times such natural phenomena as wolves, fire, and spruce budworm have been outlawed in the parks. But the agency’s preservation principle is determined first and foremost not by utility or beauty but simple location: by virtue of being inside a park, nature is subject to protection. Parks Canada is responsible for selecting the most beautiful of Canadian landscapes, turning them into parks, and maintaining them forever. This means removing from the park’s nature all taint of commerce, placing it beyond the pale of economic reality that governs the rest of the physical world. Ordinary trees, rocks, and chipmunks become sanctified as symbols of Canadian nature. Whatever prestige, power, and budget Parks Canada possesses, it has because of its ability to effect this transformation. So why surrender this? What was to be gained?

Having found this one letter, I kept my eyes out for more, and soon started to find scattered letters in files on individual kinds of wildlife, and then a set of files innocuously entitled, “Applications for animals.” Some requests referenced earlier letters with other file numbers, and in this way I began piecing together a history that went all the way back to the 1910s. It became evident that though the National Parks Branch donated (and traded, and even sold) wildlife for more than half a century, it did so without ever making it a true “program” by making it part of the organization’s official regulations. It was almost as ad hoc in the 1960s as it had been in the 1910s, with the staff members responsible for dealing with wildlife requests often unaware of their agency’s decades of experience. This was a history that largely existed only in these files.

I learned that the parks system began as an importer of wildlife. At the turn of the 20th century, the first half-dozen parks, all in the mountains of Alberta and British Columbia, were new, and it was thought necessary to fill them with wildlife. Indigenous species such as elk and buffalo were reintroduced and exotics such as Karakule sheep were introduced. By the early 1910s, the Parks Branch felt some responsibility to return the favour. Having helped bring buffalo back from near-extinction and having established sizable buffalo populations in the parks, the agency took to donating buffalo to restocking programs and zoos. The numbers given were small, but the practice seems to have allowed staff to imagine that the parks’ preservationist ethic could and should be bent if the reasons were justified. In 1914, the London Zoological Society asked to trade two of its polar bear cubs for a pair of mountain goats. The Parks Branch happily agreed, having been told “on high authority” that the zoo in the town of Banff was the perfect habitat for polar bears.9 In the same year, the agency gave a Saskatchewan sheep breeder Persian rams from Banff, and discussed selling him more.10

Even in these first cases, the three main issues that would surround the donation of parks wildlife for the next half century are already evident. First, there was the animals’ symbolic value. The London Zoo came to the National Parks Branch for mountain goats because the animals were symbols of Canada and because the agency was a likely source of them. The very thing, then, that made the agency the guardian of Canada’s wildlife made it the Canadian agency to which international groups would turn to acquire wildlife. This would be increasingly difficult for parks staff to reconcile over time, in that they internalized the belief that Canadian parks wildlife really were superior to those outside Canada and outside parks. Even during the Persian ram transfer, Banff warden B. F. Woodworth told the breeder “that I did not like these foreign animals as well as our Canadian animals, and if I had my way I would feed them to the animals in the Zoo.”11
Woodworth’s comment earned him a reprimand—but in 1922, Banff’s exotic sheep were indeed killed and fed to the zoo animals.\textsuperscript{12} The second issue, tied to the animals’ symbolic value, was their economic value. Like the Parliament Buildings or Niagara Falls, all parks wildlife were to be beyond commoditization: they were to be literally priceless. In theory, a Banff beetle was as valuable as a Banff bear. But parks staff could not really accommodate such thinking, particularly when the wildlife were deemed surplus or were being traded for equally priceless animals from elsewhere. For example, in discussing the proposed sale of the Persian rams in 1914, parks staff discovered that a purebred would sell commercially for $1,000 (alas, theirs had no papers). How could one from a national park possibly be worth less than that? Rather than going further down the path of determining the worth of wildlife, staff in this instance chose to trade breeding sheep now for young sheep later. But the question of what value, if any, to place on parks wildlife remained, tied to the third issue surrounding donations: the logistics of actually capturing, holding, and shipping wildlife. If it was impossible to put a price on wildlife, there were nonetheless real costs—financial and otherwise—in donating them. Mountain goats were particularly troublesome to transport. Of the two to be given to the London Zoo in 1914, one died immediately upon capture, a victim of “worry and fretting.”\textsuperscript{13} The National Parks Branch’s experience in donating wildlife would see much more of this.

Requests for wildlife were made sporadically through the 1910s and early 1920s, but rose sharply in the second half of the decade. Perhaps the Parks Branch’s generosity was becoming better known.\textsuperscript{14} Parks staff did what they could to accommodate those who asked. Six Rocky Mountain sheep for a zoo in Milwaukee. Two timber wolves to the Calgary Zoo. Forty-nine sheep and 25 wapiti to the B.C. Games Branch. Two buffalo to the city of Johannesburg. And many, many more. The parks took to assembling lists of “outstanding orders” to be filled, most of which eventually were.\textsuperscript{15} The number of animals involved certainly climbed into the hundreds, and in a letter from the early 1930s a Banff employee boasted that “the Game Department at Banff have caught and shipped to all parts of the world, thousands of head of big game, including sheep, goat, elk, moose, etc.”\textsuperscript{16}

Rarely did I find the Parks Branch actively seeking credit or publicity for its actions. When donating Rocky Mountain sheep to the San Diego Zoo in 1931, the Branch sent along a bronze plaque reading “These animals from National Parks of Canada” that it requested be fixed permanently to the sheep’s cage.\textsuperscript{17} Perhaps such requests for acknowledgement were commonplace and just did not usually make it into the written record; historians are well aware of the difference between what happened and what happened to be recorded, kept, and preserved. Still, I would have expected to find more such evidence if it existed. So, if the National Parks Branch was not seeking publicity for donating wildlife, what did it hope to gain? I believe the answer relates to whom the agency agreed to give wildlife, and whom it refused. The Branch typically accepted requests made by public, non-commercial institutions. Municipal zoos and provincial and state game agencies were granted wildlife. The American Museum of Natural History was permitted to shoot and stuff the largest bull moose it could find in Banff. (In its petition, the museum had explained that Canadian moose were larger and more impressive than American ones. A compliment to Canadian wildlife in general, but an insult to the specific moose.)\textsuperscript{18} Parks wildlife were also presented directly to foreign countries on behalf of the nation. In such cases they served very
directly as symbols of Canada. Poland was presented with four buffalo, Hungary two. The donation of elk and buffalo to the Berlin Zoological Society in 1936 led Reichsjägermeister (Master of the Hunt) Hermann Goering to ask Prime Minister William Lyon Mackenzie King for more information about the national parks and conservation in Canada. King rejected the Parks Branch’s first response—a foot-high stack of pamphlets—as insufficient, and had staff instead write a report amalgamating all available federal and provincial material. It may well be that the most comprehensive document to that point on Canadian environmental policy was one commissioned for Nazi Germany. I have yet to find evidence that Canada kept a copy.19

The Parks Branch also accommodated the requests of scientists, and justified donations in the name of science. Scientists were given permits to trap birds, fish, amphibians, and rodents in the parks.20 Marten were transported to an Albertan fur farming project “for experimental purposes,” and a bighorn sheep, replacing one killed in an earlier shipment, was sent to a Texas A&M University lab “for the sake of science.”21 The respect accorded science was in keeping with the Parks Branch’s broader attempt of the day to make its management of wildlife more scientific. In the 1930s, staff came to interpret the ecological concept of carrying capacity, that there is a maximum population of a species that a given area can sustain, to mean that there is always a right number for all species in all places.22 Parks managers soon talked of wildlife “slums” and of “surplus” wildlife. Such thinking did not simply result in two categories of wildlife, wanted and unwanted: since the “surplus” animals were whichever ones wandered into paddocks or crosshairs, all park animals were effectively reconceptualized. Beginning in the 1940s, the Parks Branch developed much more extensive programs to donate breeding stock to the Canadian North, while establishing slaughter programs of species believed to be overpopulating.23

The great majority of requests for wildlife came from individuals and private businesses, and were almost always refused. The Parks Branch quite reasonably feared that if it permitted some, it would be swamped with more. Also, businesses and individuals who wanted these animals usually had plans to charge for their breeding or display, and the Parks Branch did not want its wildlife cheapened by becoming associated with money. The agency’s standard rejection letter of the era read in part, “There are no surplus animals in the Parks, except bison, for disposal to private interests. . . . Commercialization of the Park animals except bison is not encouraged by this Branch in any way.”24 (However, for a brief time during the Depression, the Parks Branch—needing funds and deciding that if animals were surplus, why not give them away, and if giving them away, why not sell them—actually did put prices on surplus wildlife: $100 for moose, $150 for Rocky Mountain goat, and so on.25 This policy was quickly reversed.)

The fact that the National Parks Branch was willing to donate wildlife to public zoos but not private ones, to scientists but not businessmen, and to government agencies, universities, and heads of state suggests to me what the agency was getting out of the arrangement: cultural power. Donating wildlife was a way to demonstrate the wealth of nature at the Branch’s control, demonstrate the Branch’s generosity, raise the Branch to the same plane as the recipients (who also had cultural power), and forge alliances with them. It also flattered both donor and recipient, reinforcing their cultural positions and setting them apart from the mass of humanity obliged to follow park regulations. And for the exceptional, exceptions to policy could always be made. So, for example, publishing magnate William Randolph Hearst, a private breeder, was allowed to buy buffalo for his San Simeon estate.26
Yet other requests we might expect to see approved were not. In 1929, for example, Commissioner James B. Harkin himself rejected the appeal of His Royal Highness the Duke of Gloucester (uncle to Elizabeth) to shoot a grizzly bear as a memento of a trip to Banff. Harkin referred to the “likelihood [of a] public reaction against any violation of sanctuary.”27 The Parks Branch was in a tricky spot. On the one hand, it would have liked acknowledgement and credit when handing over wildlife. The agency occasionally even wrote press releases about its very largest donations projects. On the other hand, it was understood that to receive attention might lead to criticism from politicians, wildlife groups, and the general public. The agency seems to have recognized that donating wildlife did not fit well with the overall parks philosophy. (Having said that, I found not a single letter in more than a half-century of parks correspondence of a staff person philosophically opposed to the practice.) It was also understood that publicizing the donations would likely lead to more requests. I believe that is why the agency never formalized its donations work, and that the work never became official policy discussed in its regulations or annual reports. This succeeded in keeping the practice quiet, but it also meant that staff in the Parks Branch largely invented and reinvented procedures as they went along. The lack of regulations did not protect the wildlife involved and eventually led to some groups exploiting the Branch’s generosity.

Favourable Publicity

After 1945, many zoos of continental Europe were desperate for wildlife, their stock having been bombed or barbecued during the war. The Parks Branch initially promised three buffalo to Dutch zoos, but expressed reservations when asked for a dozen more. Canada’s military mission to Germany likewise asked the parks for buffalo, though External Affairs stepped in and made the legitimate point that, for the moment, “aid” should be limited to the more traditional food and shelter.28 Other curious diplomatic moments occurred. In 1946, the Prague Zoo asked Canada for beaver and otter. Parks Branch staff was unsure what to do: Czechoslovakia had been liberated by the Russians, who were now supporting the Communist Party of Czechoslovakia. Did a gift of wildlife constitute providing comfort to the enemy? While parks staff debated the zoo’s request, in 1948 the Communists (in an apparently unrelated development) staged a coup. Undersecretary of State for External Affairs Lester B. Pearson, who a decade later would win the Nobel Peace Prize and become Prime Minister of Canada, wisely counselled parks staff that if for some reason they could not catch the animals—hint, hint—they could not be blamed for being unaccommodating. Pearson concluded, “Could you tell Mr. Klima [the Czech chargé d’affaires in Canada] that the otters which you have already earmarked are social democrats in tendency, and are now unwilling to join communist animals in the Prague Zoo, where, no doubt, a purge has already taken place!”29 Nonetheless, after another plea from the Czechs, two Canadian beaver defected.

Though kidding, Pearson was right to recognize the wildlife as symbols of Canada. If they weren’t, there was no reason to donate them, and no reason for anyone to ask for them. When zoos, governments, and heads of state sought animals from Canada, they tended to seek ones associated with Canada, like the beaver. I found no requests for frogs, or snakes, or fish. Requests sometimes even arrived simply for “typical” Canadian animals, and parks staff knew that the petitioners did not want dogs or cats: they wanted wild mammals native to Canada and, if possible,
only Canada. In the immediate postwar period, buffalo, raccoons, chipmunks, and skunks travelled from Canada to Ireland as four-footed ambassadors; two buffalo flew first class to Chile, at a cost to the Chilean government of $16,000. And in the single largest shipment I have found, 3 elk, 3 buffalo, 10 wolves, 1 wolverine, 2 pumas, 8 raccoons, 12 marmots, 6 beaver, 2 skunks, and 24 chipmunks were sent to the Edinburgh Zoo.\(^{30}\) (The inclusion of chipmunks is especially strange. In 1913 North American grey squirrels escaped from the Edinburgh Zoo, and in time drove native red squirrels out of the city and surrounding counties. One wonders why the zoo needed—or wanted—more.\(^{31}\))

Calls for Canadian parks wildlife rose dramatically in the 1950s.\(^{32}\) Baby-booming North American families wanted to see wildlife, so zoos and wildlife agencies needed more animals. Every donation, especially the well-publicized ones, in turn made the parks seem more like giant pet stores. The Branch instituted some changes, first in declaring that only some specific animals could be donated: “elk, bear, beaver, raccoon, chipmunks, and possibly deer,” according to its standard letter of the day. “Buffalo could be lent.”\(^{33}\) To save the park costs, petitioners were for a time allowed to catch specimens on their own, though “Trapping and shooting is to be done in such a manner as not to attract public attention.”\(^{34}\) Other conditions were periodically added, such that scenery could not be destroyed, that the Branch reserved the right to repossession, and so on.

But dealings with two parties, Al Oeming and Walt Disney, suggested that control of the donations process was slipping away from the national parks agency. Oeming was both President of the Edmonton Zoological Society and operator of a small game farm; he first received permits from the parks for wildlife in 1956 after being vague about whether the animals were for his own business. He was always careful to couch his requests in scientific terms. Wolverines were needed for “behaviour and breeding studies,” donated muskox could “advance our knowledge of such little studied animals,” and on his letterhead his game farm was a “Research Centre for Cold Climate Animals/Public Education and Conservation/Supply Base for Zoological Gardens.”\(^{35}\) But he was also an entertainer. Three paragraphs after describing the scientific value of a muskox program, he declared, “Wrestling promotions are still my bread and butter.”\(^{36}\) Oeming quickly became the Parks Branch’s worst-case scenario. First, he seemed ready to continue requesting animals indefinitely, using the parks as a breeding ground for valuable animals. Second, he threatened to actually compete with the Branch, particularly in the raising of buffalo. Third, there was indication that he was taking park animals and flipping them: he sold eight mule deer in the United States shortly after receiving four from Waterton Lakes National Park, though he swore they weren’t the same ones. Yet his requests for parks wildlife continued to be approved. He was always careful to outline precedent, refer to the scientific benefit, and ask for a relatively small number—never more than eight—of only a few species in any given year. In 1962, having been given a permit for 24 animals the previous year (six mountain goat, six caribou, six mule deer, six bighorn sheep) and catching only 15, Oeming asked for another 24. The minister in charge of the parks wrote Oeming personally, explaining that the agency was concerned about the public’s reaction if they got wind of this apparent breach in the parks philosophy, and asking him to accept just four of each animal. Oeming still groused: would the public see a philosophical distinction between 16 animals and 24? Oeming was given what he wanted.\(^{37}\)
It would be a mistake, however, to see the Parks Branch simply as a put-upon body, forced into animal donations by devious opportunists. When the agency felt in control of the process, when it believed it stood to benefit from giving wildlife away, it was quite happy to. This is evident in its relationship with Walt Disney. In 1954, the Disney studios asked to film some wolverine footage in Banff. Parks Director J. R. B. Coleman wrote Banff that everything possible should be done to oblige, “since favourable publicity will be given the wildlife resources of the National Parks and to the Parks staff.” When the film crew arrived, wardens trapped two wolverines—the first of many that would eventually be used. The filmmakers then started violating park regulations. They trapped and fattened park rodents to feed the wolverines. The crew tired of this, and imported lemmings obtained from labs (and so probably containing the disease listeriosis). They drugged the wolverines to make filming easier. The Parks Branch felt obliged to act: the animals were moved just outside the park, where regulations did not apply. Could there be a more cynical way to demonstrate that wildlife within the park were being accorded protection? A year after the Banff wolverine population had been estimated at 23, were extradited to a five-acre compound enclosed with electrified fence. The wolverines were very aggressive at first and would throw themselves against the wire, injuring their faces. But they were soon tamed by the Disney crew, and would eat from their caretakers’ hands. As a result, they could not be returned to the wild afterward. A few were given to zoos, others to scientists, and the rest were presumably destroyed.

The Parks Branch continued to assist Uncle Walt in the following years, supplying black bears in 1958 and more wolverines in 1964. But the agency grew less starry-eyed in these dealings. When a mountain lion was trapped for Disney in 1965, the park contacted the filmmakers to pick it up and never heard back; much the same happened with two wolverines caught for them. When Disney wrote asking for grizzly and cougar—the letter that started my research into the donations program—the Parks Branch was still willing to help, but not so excited by the opportunity. One administrator suggested that Disney should be directed to get all the wildlife it needed at Al Oeming’s game farm.

Shipping Fever

In 1966, the Manitoba Museum of Man and Nature petitioned the Parks Branch for a bison specimen, which it hoped to stuff and display alongside horse and rider to illustrate the great buffalo hunts of the past. Assistant Parks Director John Nicol replied that bison should be no problem, and “I may even be able to assist you with the horse, however, the subject of the rider is a problem. No one from this Branch seems prepared to volunteer to become a museum specimen for such a worthy cause.” A joke, but perhaps hiding a larger truth, that the parks staff felt they were sacrificing enough. The parks system in the 1960s was receiving more petitions for wildlife than ever, even as more restrictions on the process were being established. I believe that three factors gradually moved the Parks Branch away from donating wildlife in this era. First, the budding environmental movement, predicated on the growing awareness of how humans were affecting nature, likely led visitors and staff alike to believe more strongly that, in parks, nature should be granted complete protection. Staff consequently saw far less publicity value—and far greater
potential of harm—in giving animals away. But even in this period, there are no memos or letters within the parks files opposing the donation of animals on philosophical grounds.

The second—and, I would argue, the most important—reason the Parks Branch grew disaffected with wildlife donations was the sheer cost of time, money, and energy that had to be devoted to it. Park wardens, scientists, and managers were involved; crates had to be custom built at considerable cost; trucks were driven to inaccessible corners of the park; and even helicopters were flown in. One administrator suggested that since wildlife capture was becoming a full-time job, why not actually train a few wardens to do it exclusively? This might have been a sensible idea, but the Branch did not wish to institutionalize the process to that degree. In 1966 the Director worried that the parks would soon be inundated with requests from new zoos created as Centennial projects, and asked whether there was some way to avoid “subsidizing the consignees.” Leaving wildlife alone, besides being consistent with the parks mandate, tended to be easier and cheaper than donating them.

The third factor, and the most unrelenting and difficult-to-ignore problem throughout this entire history, was the injuries and deaths to wildlife sustained in the process of trapping, holding, shipping, and releasing them. Two beaver on the way to London Zoo were killed by a third, in conditions a warden later compared to “Chinese coolies in the hold of a ship.” A “centennial beaver” being flown to the Paris Zoo in 1967 gave birth on the airplane, and in the excitement ate her young. A beaver heading to New Zealand starved. Many animals died mysteriously just after arrival in their new homes: a moose in the Pittsburgh Zoo, four of 22 marten relocated for restocking purposes, a beaver at the Channel Islands Zoo, and a bighorn sheep sent to Texas A&M. It took decades for such cases of “nerves” to be understood as “shipping fever” pneumonia, which results when animals are brought together from diverse geographies and genetic backgrounds. From my reading of hundreds of cases where the Parks Branch donated wildlife, I would estimate that 25 percent of the animals died during the process—and that figure was surprisingly consistent over time.

Rocky Mountain goats were especially fragile creatures. Parks staff dreaded requests for them. There was a long stream of reports throughout the decades of these animals dying from scours, fractures (resulting in their having to be put down), “fright,” shipping fever, and other diagnoses. In a 1965 case, one goat captured in Banff was dead before the truck was out of the park. The Superintendent who reported this incident guessed that, over time, more than half of all Rocky Mountain goats being donated were “lost in shipping.” He urged his superiors in Ottawa to put an end to the practice of donating them. He was told that under existing guidelines, requests for them were still legitimate and would continue to be approved.

The 1960s are an odd decade for any historian of the Canadian state to research, because bureaucrats suddenly seemed to circulate a great deal more paper and say a whole lot less—as if they realized, for the first time, that what they put to print might be retained and they might be asked to defend it. For the longest time, I believed simply because I stopped seeing references to wildlife donations beyond the mid-1960s that the program had petered out around then. But years later I came across a few letters that said otherwise. In 1967, the Parks Director wrote of receiving “an ever increasing number” of inquiries for animals, and highlighted new conditions that would be put on all requests. Publicly owned organizations now had to provide written approval from their province; assure all health requirements were met; indemnify the government
This policy—an administrative measure designed to solve what was seen as an administrative problem—was notably directed at small, publicly run zoos. Having long before instituted policy that justified refusing individuals, the parks were now essentially weeding out another group with which they saw no value in being associated. More surprising to me was the discovery of a 1970 “price list.” The Parks Branch had recently introduced a cost recovery practice when donating wildlife, and was already raising its prices. Turtles, for example, would cost $1, grizzly bears $500. At $400, mountain goats were the second most costly animals, presumably because of their fragility. Though the Branch was not actually selling wildlife, but rather defining the expenses incurred in donating them, its willingness to put a dollar figure on them—the first time it was willing to do so since the Great Depression—is still surprising. The parks system had been around for more than 80 years, the Parks Branch for 60, but even the people in charge of parks still found it difficult to conceive of there being nature beyond all economic calculation.

In 1973, Director Nicol drafted a policy document entitled “Control and Disposal of Surplus Animals in National Parks.” Over the decades, parks scientists and managers had grown confident that they knew how many of each animal population should be in each park, and therefore what numbers were “surplus.” Nicol’s innovation was in arguing that all management questions related to surplus—should wildlife be given away? to whom? should they be killed? how should the meat be distributed?—were in fact related, and that too often in the past, “A response to demand has been the order of the day.” The parks’ own needs must instead be paramount. In respect to donating wildlife, Nicol described how the parks would hereafter keep on hand lists of accredited institutions, ask them yearly if they had any wildlife needs, and supply them, with the Director’s approval, only in the process of fulfilling park management objectives. What is striking is that Nicol’s document, the most comprehensive and purposeful statement the Parks Branch ever made about donating wildlife, was written in an era when actual requests were all but disappearing. Maybe these things are related, of course: maybe tightening up the process sufficiently discouraged groups from asking for wildlife, thus drawing to a close a practice that had no place in modern parks management. Or maybe by the 1970s people simply assumed that the Canadian national parks system would certainly not be giving wildlife away.

Conclusion

“The cook . . . peels the potatoes but he does not do it on the dining room table,” an early 20th century Canadian historian cautioned. He meant that historians should write history, not about how history is written. But the textbook you are reading is about exactly that, or that as well. As much as I want you to see the parks system’s history of donating wildlife exactly as I do, with the same trends, the same larger meanings, I also want you to think about how that history was conceived and presented here.

Consider how I told the story. For one thing, I knew when I began that, come hell or high water, this would be a history of 7,500 words, not 750 or 75,000. The medium—an essay of a length an undergraduate student could conceivably read the night before class—defined the message. This necessitated wearing away the rough edges, streamlining the story down to what
I took to be important turning points and interesting moments. More intrusively, I used the writings of a whole group of people spread across the country, working a broad range of jobs over more than a half-century, to create the history of a single protagonist, “the Parks Branch.” But of course there was no “Parks Branch,” just a series of people in its employ, making individual decisions in very specific contexts. True they presumably acted as representatives of existing or hoped-for Parks Branch policies—but this is still problematic when one of my arguments is that there often was no explicit policy and only limited institutional memory, so staff did not act consistently. In much the same way I simplified matters by writing as if this were a history of only the Parks Branch, as if the agency was entirely free to act as it wished. The walk-on roles by Mackenzie King and Lester B. Pearson show this isn’t really true: the Parks Branch was always under some pressure from politicians, government bodies, the public, and other actors to behave in certain ways—and staff self-imposed such pressure, too. But simplifications like the ones I employed are necessary to tell stories of groups of people, and there are good reasons for telling such stories.

Consider also what stories I didn’t tell. There are the stories internal to the parks system that shaped decisions relating to donations: for example, the story of First Nations prohibited from hunting in the parks, and wildlife populations increasing as a result to the point that park staffers culled their numbers . . . and gave the meat to First Nations. There are also stories external to the parks system that affected the donations program markedly, like the Great Depression or the development of the tranquilizer gun. I regret not being able to describe the lives of the many animals involved, or their deaths. I regret ignoring all the work done every day by countless Canadian Parks Branch staff members in saving and preserving wildlife. Beyond all this, many stories are untold because their elements were never properly understood, never written down, never held onto, never archived, never accessed. The history I have written is a very, very small subset of the past it describes. And that is true of all history.

What does the history told here tell us about Canadian environmental history? I hope at least four things. First, it demonstrates the association between nation and nature. Canada the political space defines itself largely by Canada the physical space and the natural elements within it. Climate, foliage, seasons, landscapes, and wildlife are given larger meaning: they stand in for the nation. In some cases, as with internationally donated wildlife, nature sometimes even acts as our ambassador when abroad. Second (and related to the first), it demonstrates that we find much to value in nature—but that modernity makes it difficult to think of value in terms entirely divorced from economic value. Even staff at the Canadian Parks Branch, responsible for keeping parcels of nature above commerce, could not help themselves and at times thought of the parks and their contents in the same terms as everywhere else. Third (and related to the second), it demonstrates that parks are good places to see nature, but also culture. Perhaps because parks are supposed to be, but aren’t, the antithesis of how nature is treated in the rest of a society, they end up being very clear expressions of that society. Fourth (and related to the third), it demonstrates how useful the study of governments can be to environmental history: they are both reflections and determinants of our thoughts about and actions toward nature. And, of course, governments save and store more stuff than other groups do.
There were times when researching at Library and Archives Canada that I wished the Parks Branch had thrown out more. I would find myself mired in a back-and-forth Ottawa-and-Jasper correspondence about the shipment of an otter, and question my career choice. I wasn’t saving these animals; I wasn’t even influencing present-day parks policy. I would gaze out the window at civil servants hustling across the Portage Bridge—some on their way to work at Parks Canada—and wonder if I should be joining them. I convinced myself otherwise. Looking out the window, I came to believe that though a healthy society spends most of its energies trained on the present and the future, a healthy society also devotes some of its energies to remembering and understanding its past. The historian’s job is to tell or remind people today about the lives of people—and other animals—in the past. That’s it. Doing so goes a small way to fulfilling the obligation that (admittedly, some of) the people of (admittedly, some of) the past are not forgotten. And it holds a promise and a threat to people of today, that they won’t be forgotten either. Getting people to read such history requires that it be written; that it be written requires that it be researched thoroughly. So I would turn away from the window, open another box of files, and get back to work.

**DISCUSSION QUESTIONS**

1. How does the nature of the Parks Canada archival collection—mostly correspondence written between the head office and staff in individual parks—shape what history can be told from it?
2. Are primary sources more trustworthy than secondary sources because they were written during the time in question, or are they less trustworthy for the same reason?
3. Why do many Canadians (and others) prefer nature to be “wild” and unpeopled?
4. Parks managers are often placed in situations where they have to value some lives above others. Deer, for example, prefer to feed on agricultural crops when they can find them, may host parasites like lungworm, and serve as food for carnivores like wolves. Managers can find themselves trying to keep the deer from farmers’ fields, dosing them to kill parasites, and shooting wolves to limit predation. How do you think managers make these decisions about which animals to protect? How should they?
5. Why do animals serve as such good symbols for a nation? Which animal makes the best symbol of Canada: goose, beaver, moose, or muskox? Why?
6. Does wildlife seem a more “natural” topic for environmental history than other animals do? Can there be an environmental history of livestock? Of pets?
7. What makes something a gift? How is an exchange of gifts different from trade? Why is it important that the animals discussed in this chapter were “donated”?
8. Is historical research in large paper archival collections like the one discussed here still relevant in the digital age? How might technology change such research?
AUTHOR’S NOTE

This research was supported by grants from the Social Sciences and Humanities Research Council of Canada and the University of Western Ontario’s Agnes Cole Dark Fund. Thanks to Francine McKenzie and Jeannie Prinsen for generously providing comments on this chapter.

NOTES

1. The federal agency in charge of national parks in Canada has gone by a number of names since its 1911 founding. In this chapter I will refer to it in historical contexts as the National Parks Branch, and in present-day terms by the name it took in 1973, Parks Canada.

2. This was only in RG (Record Group) 84, Parks Canada’s own holdings. There was perhaps an equal amount of parks-related material in the collections of Indian and Northern Affairs (RG22), Interior (RG15), Canadian Wildlife Service (RG109), and others. National Archives of Canada: Government Archives Division, compiled by Cynthia Lovering (Ottawa: National Archives of Canada, 1991).

3. The case study that follows suggests that though bureaucracies keep files to create an institutional memory, they are often institutionally incapable of using the files to remember.

4. I do recognize the irony: this chapter is largely a secondary source, interpreting Parks Canada in the 20th century. (Though it is also a primary source, if you are studying historians’ experiences in early 21st-century Canada.)

5. For discussion of this evolution, see Chad Gaffield, “Primary Sources, Historical Thinking, and the Emerging Redefinition of the B.A. as a Research Degree,” Facsimile nos. 23–35 (2000–2001): pp. 12–17. The Great Unsolved Mysteries in Canadian History project—www.canadianmysteries.ca is a fine example of how teachers are bringing the study of primary sources to students.


7. Research at Library and Archives Canada (LAC) eventually led me to the LAC Western Regional Centre, a warehouse in an industrial section on the outskirts of Edmonton. As the notes to this chapter will attest, the Parks Canada material there also proved very useful.


9. See James Harkin, National Parks commissioner, to W. W. Cory, deputy minister of the Interior, February 1, 1914, RG84 vol. 137, file B239, LAC.

10. RG84 vol. 137, file B238, LAC.

11. As reported by Woodworth to Banff Superintendent S. J. Clarke, September 1917, ibid.

12. Ibid.

13. Woodworth to Clarke, 8 June 1914, ibid.

14. The parks’ policy of donating buffalo to museums and zoological gardens was mentioned in the House of Commons in 1928, and picked up by the Toronto Star, with a resultant rush of requests by individuals wanting their own buffalo.
15. See, for example, RG84 vol. 34, file U210 vol. 2, LAC; and RG84 acc. E1985-86/147, box 2 file A10 pt. 1, LAC Edmonton.


17. See Harkin to O.H. Patrick, president, Calgary Zoological Society, June 29, 1931, RG84 acc. E1985-86/147, box 2 file A10 pt. 3, LAC Edmonton. Years later, the Calgary Zoological Society asked permission to credit the parks as the origin of some exhibited animals; the Branch approved on the condition that the sign be simple and brief. See J. R. B. Coleman to superintendent, Banff National Park, June 25, 1954, RG84 acc. E1997-98/160, box 114 file 295 pt. 3, LAC Edmonton.


19. The previous prime minister, R. B. Bennett, had apparently approved the transfer of animals prior to King taking power. See King papers, pp. 185490–1 and 187908, LAC. On Goering's environmental interests, see, for example, Simon Schama, Landscape and Memory (Toronto: Vintage Canada, 1996): pp. 67–69. On King and Nazi Germany, see Brian Nolan, King's War: Mackenzie King and the Politics of War, 1939–1945 (Toronto: Fawcett Crest, 1988): p. 15. On the parks document, see King to T. A. Crerar, Minister of the Interior, July 10 and July 24, 1937, King papers, pp. 200164 and 200184, LAC; and “E.A.P.” to King, July 1937, King papers, p. 200186, LAC.


21. Parks Controller F. H. H. Williamson to superintendent, Banff, March 5, 1940, RG 84 vol. 137, file B77, LAC; and Parks Controller James Smart to W. D. Taylor, March 24, 1941, RG84 vol. 34, U210 vol. 4, LAC.

22. R. Y. Edwards and C. David Fowle, “The Concept of Carrying Capacity,” Transactions of the Twentieth North American Wildlife Conference (Washington, DC: Wildlife Management Institute, 1955): pp. 589–602, discusses how a supposedly scientific term such as this can lose precise meaning due to its popularity and apparent universal applicability. In 1955, the authors were already writing that “most definitions of carrying capacity are vague and that some are almost meaningless.” (589)


24. Harkin to Col. E. E. Johnson, Canton, Illinois, January 17, 1928, RG84 vol. 34, U210 vol. 2, LAC.

25. Hoyes Lloyd to Harkin, September 16, 1932, ibid. In a remarkable footnote to this episode, the assistant director of the Branch, F. H. H. Williamson, handwrote a warning to Harkin: “Do not tell Superintendent of policy or prices fixed.” The Branch had recently banned its wardens from selling the furs of animals accidentally caught in traps meant to catch predators: it was feared that some wardens had been operating their own private fur trade in the parks. Having just barred staff on the ground from profiting by the sale of animals, the head office wanted to hide the fact that it would be doing the same thing. Williamson to Harkin, April 1934, RG84 vol. 34, file U210 vol. 3, LAC.

26. See RG84 vol. 34, U210 vol. 3, LAC.

27. Harkin to Banff Superintendent Stronach, May 28, 1929, RG84 vol. 137, file B212, LAC. The Superintendent had recommended approval, since “They are plentiful in the park and if one [sic] shot would be less possibility of danger to tourists from them.”

29. “Mike” (Pearson) to Hugh Keenleyside, deputy minister, Department of Mines and Resources, May 19, 1948, RG22 vol. 134, file 32-2-8 pt. 1, LAC.

30. See ibid, and RG84 vol. 34, file U210 vol. 5, LAC.


32. See James Hutchison, director, National Parks Branch, to F. H. Collins, commissioner, Yukon, February 4, 1957, RG84, vol. 49, file U210 vol. 6, LAC.

33. For example, James Smart to Germain Bourassa, Department of Agriculture, Quebec, January 10, 1952, RG84 vol. 34, file U210 vol. 5, LAC. But in practice, many more requests were approved. In a single file from the 1950s, the following requests from zoos and fish and game clubs were approved: beaver to Windemere, British Columbia; marmots, gophers, and ptarmigan to Moose Jaw; mule deer to Charlesbourg, Quebec; elk and Rocky Mountain sheep to Calgary; Rocky Mountain sheep and wolverine to Winnipeg; Rocky Mountain sheep and goats, and otter to Rapid City, South Dakota; black bear to Toronto; lynx to London, England; Rocky Mountain sheep and elk to Quebec; wolverine, elk, Rocky mountain sheep, and goats to Granby, Quebec; lynx and wolverine to Edinburgh; Rocky Mountain sheep to Catskills, New York; and Rocky Mountain sheep to Prof. Ian McTaggart-Cowan of UBC. RG84 acc. E1997-98/160, box 114 file 295 pt. 3, LAC Edmonton.

34. Permit, January 9, 1956, RG84 vol. 445, file WLU302 pt. 1, LAC.

35. Cited in J. R. B. Coleman, chief, National Parks Division, to W. F. Lothian, April 1956, RG84 vol. 49, file U210 vol. 6, LAC; Oeming to F. J. G. Cunningham, assistant to deputy minister, January 10, 1958, RG22 vol. 368, file 370-5 pt. 1, LAC; and, for example, Oeming to Atkinson, superintendent, Jasper National Park, September 27, 1961, RG84 vol. 2128, file U210 vol. 7, LAC.

36. Oeming to F. J. G. Cunningham, assistant to deputy minister, January 10, 1958, RG22 vol. 368, file 370-5 pt. 1, LAC.

37. See RG84 vol. 2128, file U210 vol. 7, LAC; and RG84 vol. 477, file U210 vol. 8, LAC for the entire Oeming correspondence. The minister was Walter Dinsdale, minister of Northern Affairs and National Resources from 1960–63, and a friend of Oeming’s. Through Dinsdale rarely interceded directly on Oeming’s behalf (and was not minister in the early years of his relationship with the Branch), it may well be that the Branch acted on what it believed would be its minister’s wishes.

38. Coleman to Superintendent, Banff National Park, February 1, 1954, RG84 vol. 512, file B283 pt. 1, LAC. The remainder of the episode is in this file.

39. Hutchison to John C. Anderson, February 18, 1954, RG 84 vol. 181, file U300, LAC.

40. One wolverine escaped. Disney’s Erwin Verity reported to the Branch, “We are darned sorry to have lost this animal and, believe me, the boys feel badly. . . . [E]vidently, this animal’s cunning exceeded the intelligence of his human captors.” Verity to B. I. M. Strong, superintendent, Banff National Park, September 9, 1954, RG84 acc. E1997-98/160, box 113 file 283, LAC Edmonton. We know so much about the entire wolverine episode because Banff warden H. U. Green was greatly interested in the scientific value of parks, and afterward wrote a report on what lessons the affair offered on wolverine biology and behaviour. “Notes on the Trapping, Biology, and Behaviour of the Wolverine,” May 12, 1956, RG84 vol. 512, file B283 pt. 1, LAC.

41. See W. E. Stevens, regional superintendent, to B. I. M. Strong, chief, National Parks Division, June 29, 1965, RG84 vol. 2128, file U210 pt. 10, LAC.


46. H. U. Green, Special Warden, Banff National Park, February 6, 1946, RG84 vol. 137, file B277, LAC; F. H. H. Williamson to Gibson, June 30, 1938, RG84 vol. 34, file U210 vol. 3, LAC; and James Smart to W. D. Taylor, March 24, 1941, RG84 vol. 34, file U210 vol. 4, LAC. Buffalo sent to Newfoundland were allegedly eaten by Newfoundlanders, but that is another story. Alex. J. Reeve, assistant director, to Charron, October 17, 1967, RG84 vol. 2128, file U210 pt. 11, LAC.


48. The rate may well have been higher. If an animal died in the process of being trapped, wardens had little motivation to report the death to anyone.

49. The Parks Branch asked the Canadian Wildlife Service’s Donald A. Flook to study the matter in 1958, but he declined, saying that, as the only full-time biologist overseeing 10 parks, he could not possibly. Besides, he said, there was the question of whether “this disposal of park animals is in keeping with park ideals.” No parks staffer replied. This was the closest there ever came to an internal debate of whether donating wildlife was a legitimate practice for the Canadian parks system to be involved in. Flook to chief, Canadian Wildlife Service, August 19, 1958, RG84 acc. E1997-98/160, box 114 file 295 pt. 3, LAC Edmonton.

50. Dempster to Coleman correspondence, June 1965, RG84 vol. 477, file U210 vol. 9, LAC. Removal of animals also had broader ecological effects. For example, mountain goat bands do not tend to intermingle, so capture of just a few members of the band could spell the end for the entire band.


**FURTHER READING**


Reading Cities

Michèle Dagenais
“The Urbanization of Nature: Water Networks and Green Spaces in Montreal”

Joanna Dean
“Seeing Trees, Thinking Forests: Urban Forestry at the University of Toronto in the 1960s”
The Urbanization of Nature: Water Networks and Green Spaces in Montreal

Michèle Dagenais

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Urban environments and natural environments: two worlds generally considered fundamentally opposed to one another. Made of concrete, asphalt, stone, bricks, and mortar; organized according to plans drawn toward economic, political, and town-planning ends; shaped by human and social relations, cities seem to exemplify the very antithesis of nature. And yet, cities have always developed and transformed themselves in close and constant interaction with natural milieus. Depending on the period, this relationship between cities and nature has taken very different forms. Indeed, if the transformation of cities stems primarily from changes made to the urban fabric and to the built environment—in sum, to their material layout—these processes could not occur without corresponding modifications to cities’ relationship to their surrounding natural environment.

This chapter reflects on the historical importance of cities in the transformation of natural environments in Canada, and explores how this urban development itself relied on certain aspects of nature. While the relationship with nature may appear less direct in urban areas, constructed and transformed as they are, than in rural settings, it is nonetheless of fundamental importance. Because cities are built by human beings, they are perceived as “artificial” environments, but this does not preclude them from being connected to the natural world. The city is a hybrid space. As with all types of environments, cities are the product of the interweaving of natural and social processes that have marked the human occupation and transformation of the landscape. (Joanna Dean’s chapter, which follows this one, reinforces this point by looking at urban forests in Toronto.)
By examining stages in the creation of water networks and green spaces in Montreal from the 1850s to the 1910s, we will see changes in how natural elements were used in people's surroundings, and, ultimately, in how people and nature related.

By underscoring the relationship between people and their environment, this chapter seeks to shed light on the role played by the physical and natural context in the configuration of social and power relations, as well as on the fact that these relations were rooted in the material reality of the urban environment. We will see that Montrealers' relationship with the world, our daily experience, is today still profoundly influenced by the way the physical environment was restructured during the period under study.

Understanding the History of the Urban Environment

Studies of cities have long shown that their histories cannot be understood without accounting for their hinterlands. So much urban development has been based on close interaction with the countryside, both for the purpose of feeding urbanites, and for the numerous resources—such as wood, earth, water, plants—that served in the construction and heating of buildings or in the production of goods. Studying cities, then, requires that we also consider this broader environment.

It is precisely by considering the relationship between cities and their natural surroundings that environmental history has come to focus on urban areas. But unlike the more classic urban studies undertaken by historians, geographers, or economists, an environmental approach is not concerned solely with examining how human beings have used or exploited the resources found around cities. Critical of an instrumentalist conception of nature that is simply committed to uncovering its uses, environmental approaches to urban research also focus on the diverse milieux themselves as well as on the relationships that form among them. As historian Geneviève Massard-Guilbaud explains, environmental history refutes the paradigm according to which human beings are in a situation of exteriority with regards to nature, and accepts the idea that they are integrated into the biosphere, from societies to ecosystems. Such a perception requires that not only the constraints of natural milieux be accounted for (something historians have done, at least in part, for a long time), but also the upheavals brought (even inflicted) by human beings unto their environment (which has essentially been forgotten).1

Studying the history of cities from an environmental perspective thus requires a questioning of the relationship between human beings and natural elements, with the objective of uncovering the ways in which both sides of this equation evolve, and of viewing them in a dynamic way.

In environmental history, however, cities constitute a rather marginal object of study. North American environmental historians in particular have focused on spaces considered to be more “natural,” such as forests, waterways, northern and rural settings—in other words, areas that are not urbanized.2 Because researchers who first began to take interest in the environment during the 1960s and 1970s hoped to end the degradation of natural milieux and sought to denounce the intensive exploitation of resources for the needs of the market economy, they perceived cities as...
the cause of such problems. For these activist researchers, cities represented nature’s enemy and were seen only as places that harmed the environment. As many of these scholars were primarily interested in natural ecosystems rather than human environments, cities did not strike them as valid subjects of inquiry. Since then, ideas about the relationship between society and natural milieus have deepened, moving beyond their activist and political origins. Historians in particular have demonstrated that there exists no place on the planet that has not been shaped by humans in one way or another. While the relationship between social and natural milieus is now at the heart of environmental historians’ preoccupations, cities remain relatively neglected. What has been written has focused on the impact of industrialization on cities (notably through pollution), urban catastrophes and the way they are managed, environmental justice, waste and recycling, animals in the city, and the formation of urban technical networks (water, electricity, gas, telegraph, telephone) and their role in shaping the layout of cities.³

To study such matters, historians work with sources widely used in urban history. Many of these are found in municipal archives. Cities, especially larger ones, have generally preserved documents that allow historians to see the way they were managed and organized. Municipal departments of public works, fire prevention, and public health have left numerous traces of the activities and works undertaken to build communication networks in the city, clean up public spaces, limit the presence of polluting smoke, and improve the living conditions of urban populations. Reports by bureaucrats, debates between elected officials, letters from citizens demanding improvements to their living environment, as well as maps and plans all constitute sources from which it is possible to observe how populations viewed their environment in the past, and understand the way they shaped it in response to the problems and needs of their time. Historians of the urban environment also rely on photographs taken at inauguration ceremonies for parks, boulevards, public baths, waterworks stations, or garbage incinerators. Although these accomplishments may not seem spectacular today, they were a source of pride for municipal councillors and bureaucrats who, for this reason, wished to immortalize them on film. Disasters such as fires, storms, or floods were especially prominent subjects for photography, the results often published in newspapers of the day. Finally, cities still contain physical traces of their past. Simply by strolling through the streets of Montreal and paying close attention to the landscape, one can see evidence of the urban planning projects undertaken during the industrial period and discussed in this chapter.

**Figure 12.1** MONTREAL SEEN FROM SAINTE-HÉLÈNE ISLAND, JAMES DUNCAN, 1852

Montreal, painted in grey, is framed here in richly coloured pastoral scenery. This is a painting of the city, but a celebration of nature.

Source: Ville de Montréal, Division de la gestion de documents et des archives, VM1, S14, D12
Ordering and Sanitizing the Industrial City

The rise of industrial cities in Canada in the mid-19th century would drastically change the organization of urban areas. Until then, the boundaries between the places in which people lived, worked, and socialized were not well defined, and were intermingled throughout urban space. Similarly, city and countryside were more intimately connected. Indeed, the countryside was more readily accessible as cities were smaller and less widespread. This situation would change when, through the development of public transit and—above all—the increased use of the automobile, vast suburbs began to develop around urban cores. The growing concentration of the Canadian population and the increasing development of industrial activity radically transformed cities and modified the ways in which they were conceived. Coming about simultaneously, urbanization and industrialization caused the disintegration of older frameworks and a widening of city boundaries. The construction of factories in cities, the increase of traffic, and the mixing of people resulting from international immigration and the arrival of residents from the surrounding countryside all took place in urban areas that were not adapted to these new activities. This resulted in a deterioration of living spaces and conditions characterized by a high rate of mortality, overcrowding in insalubrious homes, and neighbourhoods polluted by industrial activities.

There is no shortage of accounts of these conditions, which, in the manner of reformer Sir H. B. Ames's famous 1897 investigative report about Montreal, *The City Below the Hill,* dramatically depict the degradation of urban areas and the dangers, real or imagined, associated with it. The alarmist tone and apocalyptic images used to describe 19th-century cities and their difficult living conditions attest to the extent of the changes caused by the arrival of an urban and industrial society. The unyielding criticisms formulated by observers during this period were also intended to pressure municipal authorities into bringing order to these ravaged areas.

Historians must critique the validity of such comments in the process of research. They must become familiar with those who offered these opinions, and ask why the remarks were made and to whom. This allows historians to distinguish between how much of what an individual said reflected reality, and how much was a rhetorical strategy, perhaps intended to sensitize public opinion and bring about improvements to a particular situation. Historians must also keep in mind that such discourses projected the values of the historical actors who produced them, values that must also be determined. It is the same critical approach we must adopt to all the discourses that surround us today, with the difference that in the case of discourses from the past, special attention must be paid to the context of the period, as it is far less directly perceptible than that of our own time. All discourses are revealing in terms of what they say not only about reality, but also about their author's way of representing the world. *The City Below the Hill,* for example, may say as much about a particular conception of the world at the end of the 19th century as it does about Montreal's material condition. For this reason, my objective in this chapter is to not only document Montreal's real situation, but also shed light on how this reality was interpreted and conveyed. I am interested in what is revealed accordingly of the climate of disorder and anxiety that reigned in Canadian cities during this era. The rupture of city boundaries, the broadening of their activities, and the growth of their populations gave rise to problems of a new scale that called for original solutions to resolve them. An analysis of the debates provoked by urbanization, as well as of the plans and means put
forth to attempt to resolve these problems, offers an indication of the extent of these challenges, and elucidates the ways in which individuals conceived of the world surrounding them.

The solutions devised in attempting to resolve these problems were grounded primarily in a functional conception of space. Accordingly, efforts were geared toward organizing the various parts of the city in relation to their specific uses. This stemmed from a desire for order, aimed at assigning each set of activities—industrial, commercial, or residential—to a specific place. This philosophy of spatial separation affected not only the city but also the lands beyond it. The city developed and defined itself against the countryside, clearly distinguishing what belonged to each world. To be sure, the actual distinctions were never as sharply drawn as in the discourses defining them. But these discourses nonetheless served to structure ways of thinking about and experimenting with the world.

There also emerged in the 19th century a generalized separation between people, their activities (especially those connected with the production of food and waste), and their repercussions on the environment. This reorganization of the relationship between physical and social milieus took its “purest” form in the increasingly rigid organization of spaces reserved for human waste and its disposal, far from places destined for production, commerce, sociability, and family life. However, as we will see, while this reconfiguration was founded on principles of separation and order, it instead resulted in new forms of interaction between natural elements and society. The discourse advocating this separation must be understood as a means of making sense of the development of this world, and of structuring social and political relations.

The desire to bring about this new order, moreover, was accompanied by an obsession for public hygiene. Whether it came from the thick, black smoke erupting from the new factories, the trash produced by an ever-growing population, or effluents accumulating in stagnant waters, this “dirtiness” (as it was called) provoked serious anxieties and was perceived as a major scourge with which municipal authorities had to contend. Coupled to this crusade for the sanitization of urban areas was the pursuit of order. Dirtiness was often perceived in this period as a sign of disorder. Measures geared at sanitizing the city were thus tied to the efforts deployed to facilitate circulation and trade, as well as improve urban security. Between the 1850s and the 1910s, plans were adopted to organize the roads, allowing for rapid movement of people and goods; to restructure the markets in order to supply consumers and businesses; and to develop firefighting and

**Figure 12.2** Market Day, Champs-de-Mars, E. L. Giroux, 1920

Market days were ideal opportunities for obtaining food. They attest to the close interdependence of city and countryside.

*Source:* Ville de Montréal, Division de la gestion de documents et des archives, Marché temporaire sur le Champ-de-Mars/E. L. Giroux, 192-, VM94, Z-1884
police services to ensure security. A new relationship between cities and nature was elaborated. At the same time as the discourses of the day conveyed the fears provoked by the changes underway and the problems that resulted from them, they also attested to a belief in the superiority of humans over nature, and celebrated the capacity to profit from nature in order to improve living conditions.

Urbanizing Water and Green Spaces in Montreal

Montreal serves as an apt case study for examining attempts to shape nature during this period, in particular by looking at the networks developed for its drinking and wastewater, as well as its green spaces. As the economic metropolis of Canada, it was the largest and most industrialized city in the country. Often portrayed as the “city of wealth and death,” Montreal was characterized by the striking contrast between the enviable living conditions of its economic elites, primarily of British origin, and the particularly difficult conditions in which its large working-class population lived. Reputed to be a dangerous city, Montreal was infamous in the 19th century for its high rate of infant mortality, particularly among the Francophone population. The ethnic and social cleavages in the population were also reflected in the city’s municipal politics. As per the mandate conferred upon them at their inception in the 1840s and 1850s, municipal institutions were entrusted with the physical organization and security of the areas under their control. It was through such institutions that Montreal was initially transformed and nature urbanized. To reconstruct this process, I consulted the minutes of the municipal council; reports and memos by professionals employed in the departments of public works, health, and parks; correspondence between citizens and the Montreal administration; and newspapers, which followed local developments closely. These documents outline the series of operations undertaken to resolve the problems associated with supplying water in Montreal, as well as with the growing presence of wastewater in the city. They also show the steps leading to the creation of a network of green spaces aimed at sanitizing both the city and its residents’ lifestyles. These transformations took place over a 60-year span, itself divided into two relatively distinct periods corresponding to different conceptions of the city and characterized by specific modes of intervention. During the first period, from the 1850s to the 1880s, the defining metaphor for the city was an organic one. Montreal was said to function like a natural system—and a sickly one at that, which had to be treated. Many diseases were believed to be caused by miasmas, noxious vapours in the air, so priorities included sanitizing the air and improving its circulation. But as much as the city was represented discursively as a sick body, at a practical level municipal authorities had difficulty treating the city as a whole—all the more so because the city’s boundaries were continually expanding in this era. Modifications to the urban fabric were undertaken with irregularity and in a piecemeal fashion. Stretch of road by stretch of road, length of piping by length of piping, park after park, the city was reorganized and furnished with infrastructures designed to sanitize it. During the second period, stretching from the 1890s to the end of the 1910s, perception of the city became more comprehensive. Following the renovations of the previous decades, it was possible to think of the city as a whole not only conceptually, but also materially. As a result, works undertaken on green spaces and water circulation stemmed from a greater, integrated concern for rationalization. Once the city was seen in its entirety, modifications were brought to it with the aim of reforming and modernizing it, rather than healing it as had previously been the case.
“Safeguarding Against the Dangers of Fire, Encouraging the Construction of New Buildings [. . .] Assisting with the Establishment and Functioning of Manufactories”

Water has been a fundamental preoccupation in all periods of history and in all places. As Montreal is situated in the heart of a rich hydrographical basin, its water supply is abundant. Nevertheless, as the city continued to develop into the 19th century, maintaining the drinking-water supply became increasingly complicated. Indeed, the supply point, in the city’s harbour, was also a place of intense activity, causing the deterioration of water quality in the area. In the face of steady population growth, and especially of the increasing needs of Montreal’s industries, the quality of this reserve left more and more to be desired. It was in this context that the creation of a new system of supplying drinking water began.

In 1801, a private venture, the Compagnie des propriétaires de l’eau de Montréal, sought to supply the city by collecting water on Mount Royal. But the amount of water available was insufficient, and a new supply point had to be found quickly. In 1816, another company decided to supply its clients by drawing from the vast basin of water surrounding Montreal, especially on its southern side. The company installed pumps in the harbour that transferred the water into cisterns, from where it was transported and sold in various parts of the city. In 1845, the City of Montreal acquired this system and set about to improve it. However, the water in the port, already of dubious quality, continued to deteriorate, leading the city to push the supply point further up the St. Lawrence, near the Lachine rapids. For much of the second half of the 19th century, the heavy flow of these waters seemed in itself sufficient to ensure the quality of the resource.

To this day, water is drawn from these rapids—situated several dozen metres above the river’s level in the port of Montreal—stored in a canal, and carried to filtration and treatment plants. The water is then pumped into reservoirs on the slopes of Mount Royal from where it is distributed to the various parts of the city.

In the middle of the 19th century, the distribution of water in the city was carried out by fontainiers—“fountain men” or “hydrant men”—who walked the streets opening and closing the water valves located on the outside of buildings as directed.

As plumbing fixtures were not yet fully developed, it was not possible to

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Figure 12.3  Montreal Harbour, John Henry Barton, ca. 1864

Montreal’s freshwater supply source, the St. Lawrence River, was also heavily used as a navigation route.

Source: Ville de Montréal, Division de la gestion de documents et des archives, Port de Montréal à la Place du marché/John Henry Barton, ca. 1864, P90.SY.P1
connect all the individual homes directly to the aqueduct. This method also reflected the way in which the water supply was conceived: it was built to supply the city itself and to meet, above all, the water needs of industrial and commercial interests. It was also designed to protect buildings from frequent fire risks, as a majority of them were still built of wood. Thus the priority was not citizens’ well-being, but rather the city’s economic activities and security. In keeping with liberal thought, elected officials did not address the problems posed by the city’s physical layout or its management from a social angle but rather from an economic one. Water was essentially conceived as being for the city rather than for its inhabitants, and so it seemed perfectly logical to make households obtain water from city taps rather than have homes actually be connected to the system itself.¹¹

However, once the water began to flow, the problem of its increasing circulation and the need to evacuate it quickly arose. The rising consumption of water, and the refuse it brought with it, aggravated the problems caused by vast quantities of wastewater stagnating in the city’s streets. Montreal had always relied on the many streams flowing through it to carry accumulations of waste and rainwater to the St. Lawrence.¹² Use of these waterways as evacuation channels had the effect of transforming them into nothing short of sewer mains. As long as the amount of water in circulation remained relatively limited, this “natural” system of drainage sufficed. But once water began to circulate in greater quantities, this equilibrium collapsed. Montreal’s administrators responded gradually by installing pipes to drain this wastewater. As these works were funded in part by landowners, their neighbourhoods were the first to be equipped with sewers, before those communities inhabited by the working class and by tenants. These secondary sewers were connected to the natural watercourses, which then drained into the St. Lawrence. As of the 1860s, however, these natural streams no longer sufficed, and the municipal administration began construction of three sewer mains leading to the river.¹³ While these piecemeal solutions awkwardly allowed some wastewater drainage, they were unable to liberate the city of the refuse it produced in ever-increasing quantities. Meanwhile, the population of Montreal continued to grow, and with it increased both the consumption of water and the amount of waste generated, along with the accumulation of trash, the spread of epidemics, and problems of public health. There was little indication that the city was prepared to deal with these conditions.

**Beautifying the City: The First Parks**

Partly because living conditions were deteriorating, and partly because of the growing density of the urban fabric, a desire was increasingly expressed for the creation of spaces that favoured both a greater proximity to nature and its enhancement. While this desire was not new, it acquired an unprecedented importance in the 19th century, in a context in which cities were heavily criticized for being unsightly and unhealthy. Nourishing the Romantic ideal, nature was also glorified, associated as it was with well-being, purity, and beauty. Nature began to be conceived as a means to heal the sickly urban body. In keeping with the prevailing organic vision of the city, the creation of green spaces was advocated as a way to restore the city’s lungs, to help it breathe. Such thinking corresponded to improving the city’s circulation, by improving the water...
system. This was best expressed by the mayor Charles-Joseph Coursol as he took office in the early 1870s:

By the side of the great utilitarian necessities and vast undertakings of which I have just spoken, I place the establishment of ornamental public grounds, where the workman and the laborer may daily send his children to shake off the dust of the factories and the streets, and to restore to their lungs new vigour—where, too, the entire family may go with him to repose from the fatigues of the day’s work, and to recover strength for the struggle of the morrow. You understand me gentlemen, to speak of one or more public parks, whose plans have been so often discussed before you, but whose adoption has been always deferred. Nature herself seems to have placed at our doors fine sites adapted for this purpose, especially that which crowns them all—Mount Royal. The vaster that these works appear to be, the more we should labour to effect their construction, on conditions, nevertheless, of a well regulated economy.14

Although the first green spaces had started to appear in Montreal as of the early 19th century, enthusiasm for them began in earnest during the second half of the century. Squares, public plazas, and large parks came onto the scene here and there in the city, including Dalhousie, Chaboillez, Viger, and Saint-Louis Squares, and Mount Royal, La Fontaine, and Île Sainte-Hélène parks.15 Although parks were natural spaces, with their trees, lawns, flowers, and water, they were also, and perhaps above all, cultural spaces in the way they expressed a number of values and responded to myriad ideals. Created with the intention of beautifying cities and promoting their image, parks were milestones that bore witness to the economic progress of the locality in which they were found, as well as to its financial health and its sound management. The elites who lobbied in favour of their development further believed that the improvement of the appearance of cities, by means of the construction of aesthetically pleasing places, would favour a harmonious social order and the moral and spiritual betterment of urban dwellers.16 The landscaping of green spaces was thus undertaken with the objective of transforming them into pleasant and restful places, designed for strolls, rest, and contemplation. Trees were planted, lawns were sowed, ponds were dug, benches and lights were installed; all of these elements were intended to turn these presumably wild sites into spaces of culture and civilization.17

To this process of urbanizing nature, there corresponded a desire to urbanize the new residents of the city, to instill in them the behavioural norms of urban sociability, in particular as applied to public space. Hence all of the prohibitions inscribed into the municipal bylaws and aimed at park users. Parks were to be ordered, controlled, and watched over by the municipal administration. They could be visited at specific hours, as long as both nature and the facilities were respected. Consuming inebriating beverages, making use of firearms, setting off firecrackers, harming animals, posting bills, soothsaying, yelling or swearing, sleeping, disposing of animal carcasses and garbage, etc., were all prohibited. Walking on the lawns was also disallowed, along with riding horses, vehicles, or bicycle outside designated roads or paths.18 These rules are interesting in and of themselves as they inform us about some of the presumably common practices of urban dwellers.
Their declaration helped affirm municipal power in these places. Through both the creation of these green spaces and their regulation, Montreal’s authorities appropriated not just sections of urban space, but of nature as well. The project of urbanizing nature took shape and was materialized through the physical layout of parks and the elaboration of norms and regulations for their users.

The Networking of Water

Totalling fewer than 60,000 inhabitants in 1852, the population of Montreal nearly quintupled over the following 50 years to reach 268,000 by 1901. During this period, the city’s boundaries were bursting at the seams, and the population rise resulted in the formation of numerous smaller municipalities around Montreal. Sooner or later, each of them was faced with the need to urbanize its territory and offer residents services that were increasingly considered essential. At different paces and with varying means, these suburban municipalities established water distribution services and found ways to eliminate wastewater. The rapid growth in the number of consumers increased tenfold the problems relating to water distribution and drainage in Montreal and its suburbs.

Although the structuring of drinking and wastewater networks within city limits was influenced above all by technical constraints and the paths of natural watercourses, this was not the case in the suburbs located on the Island of Montreal. Here, power relations played a significant role in the way that water was managed. The western part of the island, primarily comprising wealthy suburbs populated by Anglophone majorities, was able to maintain its autonomy from the central city and the metropolitan region in the management of drinking water. But in the eastern part of the island, home to the less well off, largely francophone suburb of Pointe-aux-Trembles, polluted wastewater from the city accumulated. (This relationship between wealth and topography was not coincidental: uphill and upstream land was more valuable in part precisely because it offloaded such problems.) As a result, the eastern part of the island was forced to connect itself to the Montreal aqueduct, in a position of increased subordination to the central city.19

In Montreal, the system connecting homes to the municipal aqueduct was replaced by the connection of individual housing units, made possible through recent technological innovations. This development was also spurred by financial considerations. Over the years, Montreal’s administration had taken note of the economic shortfall resulting from the distribution of water by building rather than by individual unit:

This state of affairs deprives the municipality of part of the revenue it should receive from the water tax. Indeed, in most cases where this arrangement of one pipe common to several units exists, the tenants agree to pay a contribution so that the tax is only applied to one of them . . . To end this abuse and to recover a significant proportion of the treasury’s revenues, it would be necessary to establish . . . separate faucets in each apartment.20

Every housing unit would henceforth be connected to the municipal distribution network. The rates for the service were calculated either in function of the property value of each house or as a fixed amount for each unit, rather than according to the quantity of water consumed.21 This type of
connection significantly changed the way in which the water service was conceived, and especially the way responsibility for it was shared. Through this systematic and generalized connection of the private sphere to the public sphere, the municipality gave both meaning and content to the idea of collective responsibility for water: since everyone would from now on benefit from this system, each would have to contribute to its costs. This connection would also result in an increase of the municipality's power over its residents. As it offered a public service and strived to do it as cost effectively as possible, the municipality also gave itself the right to regulate plumbing works both inside and outside the home. It thus granted itself the power to manage certain aspects of people's private lives.

In sum, while the establishment of a public water distribution network in Montreal had tremendous practical consequences, allowing for the development of the uses of water and constituting a central factor in the improvement of living conditions, it also had a major political impact. It contributed to the emergence of the idea of a specific political space within Montreal, resting not only on the discourse or desires of elected officials but rather on the actual physical network that connected individuals to one another. Moreover, the municipality linked this public service to suffrage: only the taxpayers who paid their water tax each year were granted the right to vote in municipal elections.22

But with the growing availability of water, resulting from residents' new connection to the aqueduct, the amount of wastewater in the city and on its shores also increased. The Bulletin sanitaire, a journal founded in this period for the purpose of discussing public health matters, as well as the numerous inspection reports of the Board of Hygiene of the Province of Quebec, overflowed with articles minutely detailing the problems related to water consumption and drainage. It used an alarmist tone, published startling images, and evoked unspeakable afflictions in its efforts to sensitize public opinion and convince the political authorities to furnish the means with which to sanitize urban areas. Public health problems did exist and major rectifications were indeed wanting. The hundreds of lives lost to typhoid were definitely very real,23 as were the problems caused by the clogging and overflowing of inadequate sewage systems and the frequent flooding of neighbourhoods bordering the St. Lawrence. Too many studies, however, have taken these doom-laden commentaries at face value, seeing them as an accurate rendition of the realities of the day. There is cause to wonder about the ways in which the problems and their solutions were presented and constructed. A look beyond the caricatured nature of this language reveals the contours of a specific reading of reality that must be analyzed as such.24 Although the bacteriological discoveries of the late 19th century allowed for significant advances in comprehending the factors causing the transmission of diseases, many scientists still believed in the theory of miasmas. They considered that diseases spread through the emanations in the air, called miasmas, generated by decomposing matter. Swamps, ponds, and places where trash accumulated were thus considered to be centres of infection and of propagation of disease:

In many places [. . . there are] pits filled with liquid and putrid substances. Most of these pits have no draining and are almost never cleaned. The liquids and substances they contain [. . .] remain stagnant, forming ponds that are veritable cesspits. [. . .] Aside from these pits, there are ponds of stagnant water here and there in various parts of the territory [. . .] they are further centres of infection.25
The proposed solution consisted of simply making these sources of infection “disappear” by concealing them or by extending the sewage network, the only tool considered suitable for bringing waste “outside the city”: “there is no other way to provide for the sanitization of the territory and to maintain it in a constant state of salubriousness than to establish a drainage system built according to the norms and concepts of modern hygiene,” wrote one inspector. A system of tout à l’égout was advocated, one “comprised of various sections: the drainage of houses, including water closets, general or municipal drainage, and the destination of wastewater.” From the turn of the 1890s, Montreal’s administration began encouraging the installation of private sanitary facilities within houses, and proceeded to systematically connect them to the municipal sewer system, the various branches of which were gradually spreading through the entire city.

This solution amounted to isolating the waste produced by human beings from their living environment and concealing it as much as possible, while at the same time connecting housing units to one another by means of sewers. Although this system indeed allowed for the sanitization of the city, it nonetheless failed to resolve the problem of wastewater drainage. The problem was simply shifted along the shores of the island of Montreal, where waste was accumulating—and from where the water supply, fundamental to meeting the population’s needs, originated. Obviously, draining wastewater into basins that also supplied drinking water engendered problems of contamination of the resource. For a long period, however, Montreal’s authorities continued to believe that it was be impossible to pollute such a vast body of water as the St. Lawrence, “one of the largest and purest rivers.” To avoid contact between drinking water and wastewater, they would simply draw water destined for human consumption somewhat further away from the shore. At the time, pride in the St. Lawrence River, celebrated for its capacity to sweep waste away, was immense, as was confidence in its enormous power of dilution.

However, the continually rising number of typhoid deaths beginning at the end of the 19th century, the anxieties of the population, the pressure brought to bear by engineers, as well as the expert reports based on progressively more reliable bacteriological tests to evaluate water quality, gradually changed opinions. The typhoid epidemic of 1909–10 quelled any remaining objections, such that Montreal’s elected officials decided to proceed with the chlorination of water and adopted plans to construct the Atwater filtration plant, functional as of 1918. From then on, filtration became the most widely adopted solution to ensure that water was safe for drinking. The idea of treating...
wastewater before releasing it into the St. Lawrence, a course of action envisaged for a time as a public health protection measure, was abandoned. During this period, the problem was considered to be more the contamination of sources of drinking water than the pollution of rivers, and it was not thought that these needed to be protected. In fact, it was only after the Second World War, when the pollution of bodies of water in urban areas became an acute problem, that correctives were implemented in this matter. In the meantime, this process of integrating water to the urban environment allowed Montreal to become a cleaner place, healthy and more secure in terms of hygiene.

Structuring the Territory through Green Spaces

The relationship with nature, then, was elaborated through the creation of networks that allowed it to be used, commercialized, and consumed, as illustrated above by the case of water. It was also through the development of a network that the relationship with nature was structured in the case of parks and public leisure spaces. The desire to establish green spaces as expressed in the 19th century gave way to a more systematic planning policy such that over the course of only a few decades, Montreal acquired a whole network of green spaces throughout its territory. Nature served the interests of municipal authorities that used it to increase their presence in the expanding city by means of the dozens of parks and playgrounds they established. In a city that was constantly developing and growing, green spaces were a way for municipal leaders to brand their presence on the territory and to literally extend the municipal sphere.31

As of the 1890s, and especially the 1900s, public debates in favour of the development of parks and green spaces intensified. Conceived in earlier decades in terms of the ornamentation of the city, the question of parks now evolved into a social issue. Without completely leaving aside the willingness to beautify urban areas, requests for the creation of parks addressed to the municipality were more and more aimed at widening access to green spaces and leisure grounds. This coincided with the rise of an urban reform movement across the western world preoccupied by the quality of life in industrial cities. This movement placed sustained pressure on municipal administrations, in Montreal as in other cities, to continue developing networks of leisure spaces, particularly in working-class neighbourhoods.32

Parks were considered vectors of virtue, so the strategy of spreading green spaces systematically throughout the urban landscape was intended to extend their benefits everywhere. It must be admitted, of course, that creating more parks within reach of poor communities also meant that the residents of richer communities would not be troubled by the poor’s presence in their local parks.

The very notion of green spaces also evolved during these years. Initially conceived in terms of essentially aesthetic considerations and designed for predominantly passive uses, such as promenades and contemplation, parks were more and more thought of in terms of varied leisure activities and practices, and geared to more diverse groups of users. Montreal’s authorities began furnishing parks with more cultural elements—playground apparatuses, picnic tables, pavilions, etc.—to augment the natural ones. Greater emphasis was henceforth placed on this recreational equipment and its uses than on the parks' formal character and the natural elements they contained, revealing the adoption of a more functional conception of urban space.

The increasingly systematic implantation of green spaces in the city also attested to the fact that Montreal’s authorities were now more able to think of the urban territory in a comprehensive way.
The organic vision of the city and the concomitant ways of organizing the urban fabric, characterized by piecemeal and fragmented interventions, would gradually be replaced by a more rational and abstract conception, one that saw the city as a whole, constituted of several parts embodied by the different neighbourhoods. The gradual stabilizing of Montreal’s boundaries after the subsequent annexing of several surrounding suburbs also contributed to this. This new representation of the city allowed the complexities of its realities to be addressed from a certain distance. Urban space therefore became a totality on which more systematic interventions were carried out in the name of reform and rationality.

The progressively more coherent method of distributing parks throughout each Montreal neighbourhood at the beginning of the 20th century reveals the extent of this comprehensive vision of urban space. As the map of parks and playgrounds in Montreal illustrates, their presence

**Figure 12.5** **Map of Parks and Playgrounds in Montreal, 1940**

Greyed areas indicate the prevalence of leisure spaces in Montreal by 1940.

*Source: Map adapted from one by Julie Benoit, 2002*
in each neighbourhood offers a balanced view of the city, in which each neighbourhood came to life, from the perspective of the municipal authorities, through the presence of municipal green spaces. These parks also allowed the administration to increase its visibility and to make more tangible the authority it wished to exercise.

In sum, it was through the networking of nature, through the creation of green spaces on the entire urban territory, that the authorities of Montreal increasingly came to conceive of the city’s layout. We can say that Montreal managed to municipalize its territory by resorting directly to nature, which took the shape, in this instance, of green spaces designed for leisure activities. As in the case of water, parks were used as an instrument to urbanize not only space, but also the population.

Conclusion

The laying out of cities like Montreal in the second half of the 19th century—profoundly affected by industrialization and the growing concentrations of people on their territory—implied the transformation of natural milieus leading to a redefinition of their relationship with social milieus. People’s capacity to tame nature, to use all of its potential to promote progress and the advancement of civilization, contributed to these efforts of establishing a modern and urban Canadian society. The ordering of urban space, through the construction and paving of streets, the development of infrastructures such as water networks and other public services, or the construction of parks, was hailed as a testament to mastery over the physical environment and to the ability to profit from elements of nature in order to favour economic growth. The urbanization of nature, as this chapter has illustrated, took different paths according to the problems posed by this process and the specific characteristics of the elements in question. Although sanitation was the priority when it came to water and parks, the issues were not quite the same in the two cases. The problems posed by the need to provide drinking water and drain wastewater proved to be complex. They raised the question of the population’s very survival and required the construction of sophisticated technical networks. In comparison, the debates surrounding the creation of parks, and the stages in their implementation, were simpler. And

Figure 12.6  Rachel Street and La Fontaine Park, 1930s

The layout of the park and street offer a good example of urbanized nature, with natural elements well ordered, having been placed firmly under control.

Source: Ville de Montréal, Division de la gestion de documents et des archives, Rachel Est du coin Parc Lafontaine, 193-, 1 photographie, Z-10, VM94/Y1,17,9
Despite all of the benefits attributed to them by their promoters, their presence was never framed in terms of people’s basic survival.

More numerous and significant are the parallels that can be traced between the building of water and green space networks in illustrating the way nature was utilized in the process of urbanization. In both cases, the urbanization of nature occurred through the separation of milieus and elements, by means of conduits and pipes for water, fenced-in space for parks. It must nevertheless be noted that this separation did not lead to a complete disconnect between natural elements and living environments. Rather, it led to a new interconnection, embodied by the redefinition of the links between the public and private spheres. In the case of water, its networking gave rise to the systematic and physical joining of the private space of the home to the public space of the city, on both the supply and drainage ends of the network. In so doing, the municipality was able to impose its own hygienic norms, if only insofar as the new plumbing system implied a new way of using water.

In the case of green spaces, the impact, though perhaps less obvious, was no less real. Their presence contributed to the development of leisure activities for the urban population, a matter until then primarily tied to personal or family life. Parks allowed for the protection of certain spaces dedicated to nature and to free time, henceforth associating the activities undertaken in these places to the public sphere, even to political power. Behavioural norms, also intended to urbanize city dwellers’ conduct, were spread through these spaces. As in the case of water, these norms, set forth through discourses, were communicated through the materiality in which they were grounded. In terms of parks, it was not only the well-kept lawns, the gardens and lanes, but also the specialization of uses with the advent of playgrounds that constituted the media through which these norms were communicated. The transformation and urbanization of natural elements thus reached individuals by leading them to change their practices.

In both cases, the urbanization of nature also favoured the growing presence of municipal authority within the city, and contributed to structuring social relations. Urbanization created a certain distance from nature, even while making it more accessible. Water was made available in all of the city’s homes, while green spaces were present in every neighbourhood, but this rapport to nature was constructed on a new basis, in relation to more elaborate modes of regulation. It was in this way that the remodelling of the conditions of collective life, and through it the relationship with nature, also transformed political relations.

**Author’s Note**

I would like to thank the co-editors for their careful reading of this chapter and their constructive comments. This text also benefited from the rigorous reading of Christian Laville, to whom I am grateful. Many thanks to Nicolas Kenny, who translated the text from French to English. The research on which this chapter is based was carried out with the support of the Fonds québécois de la recherche sur la société la culture and the Social Sciences and Humanities Research Council of Canada.
DISCUSSION QUESTIONS

1. In what ways do cities constitute an interesting object of study from the point of view of environmental history? Can you make an argument that they are less natural than their hinterlands? Would you want to?

2. How did the advent of industrialization transform the relationships between cities and their hinterlands, between cities and nature? Compare the two conceptions of the city that followed one another from the 1850s to the 1910s.

3. How did Montreal’s municipal administration intervene in the organization of its territory in order to adapt to the new context surrounding the advent of the industrial city? Why did political elites perceive unhealthy conditions as a threat?

4. Why can we say that parks were spaces of culture? Are there landscapes that are not spaces of culture?

5. What were the social and political consequences of the development of drinking water and wastewater networks in Montreal?

6. What does the expression “urbanization of nature” mean? What about “municipalization”? In what ways did the urbanization of nature lead to the municipalization of the Montreal territory?

NOTES


6. Petition submitted to the municipal council of the town of Pointe-Claire, September 13, 1900, Archives of the City of Pointe-Claire.


8. Water, especially running water, has long been counted upon for the disposal of waste. Its power to dilute human waste has long been believed in.

9. Over the years, this system has undergone numerous transformations, including the construction of jetties at the entrance of the aqueduct canal in order to prevent the accumulation of ice in the winter, the deepening of this canal, the installation of ever-more powerful pumps, the construction of new reservoirs in other parts of the city, etc. These major improvements all resulted from investigations undertaken to analyze recurring problems with the city’s water supply. Among these was the difficulty of maintaining a constant supply due to the variations in the river’s level caused by the change of seasons. For additional details, see Michèle Dagenais and Claire Poitras, “Une resource abondante et inépuisable? Urbanisation et gestion de l’eau dans le Montréal métropolitain aux 19e et 20e siècles,” *Histoire urbaine* 18 (April 2007), pp. 97–123.

10. “The idea was first to supply the city, as a collective entity, rather than each resident’s home or other non-residential establishments,” Dany Fougères, *L’approvisionnement en eau*, p. 93.

11. During this period, “the number of pipes was thus equal to the number of connections, rather than to the number of consumers,” ibid, p. 89.


17. A parks superintendent in Toronto—in a passage that could easily have been written by his Montreal equal, so similar were the motivations for and conceptions of urban green spaces in the two cities—enumerated the improvements carried out to urbanize a recently acquired property: “Bellevue Square . . . has been transformed from a wild state to one of the prettiest places in the City. Work was only commenced in May, and before the expiration of six weeks the place was graded, levelled and nicely sodded throughout, flower beds were planted and a post and iron fence erected around the square. A number of young trees were also planted which, in addition of the old forest trees, make this Park a pleasant resort for the citizens living in that vicinity.” City Council Minutes, January 12, 1888, Appendix 1887, Report No. 267, Final Report for the year 1887, Superintendent of Parks, City of Toronto Archives (CTA), pp. 1629–30.

18. Bylaw no. 275 “Règlement pour l’administration des parcs et des squares,” April 24, 1902, DGDA. See also the rules governing parks in Toronto: Bylaw no. 2460 “A By-Law for the Management of the Parks and Exhibition Grounds and Buildings,” 1890, CTA.
Michèle Dagenais and Claire Poitras, “Une resource abondante et inépuisable?”

“Cet état de choses prive d’une partie du revenu qu’elle (la municipalité) devrait recevoir par la taxe d’eau. En effet, dans la plupart des cas où existe cette disposition d’un tuyau commun à plusieurs logements, les locataires s’entendent et se cotisent ensemble afin de faire payer seulement la taxe imposée à un seul d’entre eux . . . Pour faire cesser cet abus et recouvrer au trésor une importante portion de son revenu, il serait nécessaire d’établir . . . des services et des robinets d’arrêt distincts pour chaque logement,” Rapport annuel du surintendant de l’aqueduc de Montréal pour l’année finissant le 31 décembre 1897 (Montreal: The Montreal Printing and Publishing Company, 1899), DGDA, pp. XXII–III.

Dany Fougères, L’approvisionnement en eau à Montréal, p. 98 onward.


Dozens of lives were claimed by typhoid each year. Although the number of typhoid cases began to decrease as of 1890–91, there were nevertheless three periods of particularly marked increases: 1900–01 (684 cases), 1906–1907 (738 cases) and 1909–10 (1,473 cases); Ginette Gagnon, “L’aqueduc de Montréal au tournant du siècle (1890–1914): l’établissement de la purification de l’eau potable,” M.A. thesis Department of History, Université de Montréal, 1988, p. 144.

As Ted Steinberg explains it, “When urban issues are discussed—such as water pollution and toxic waste—the tendency among most environmental historians is to embrace ‘the stance of engineers and managers contemplating a problem to be solved.’ In other words, rather than exploring how power has shaped the approach taken toward pollution and waste, many environmental historians are simply replicating the interpretive frameworks and skewed assumptions of their subjects.” Steinberg, “Down to Earth: Nature, Agency, and Power in History,” American Historical Review (June 2002): p. 804.


“Rapport d’inspection au sujet d’une nuisance causée par des égouts privés,” February 16, 1907, fonds E 88, ANQ.


Robert Gagnon, Questions d’égouts, p. 195 onward.


For a detailed analysis of the creation of a network of parks in Montreal during this period, see Michèle Dagenais, Faire et fuir la ville, Chapter 2.


33. On the process of annexation, see Paul-André Linteau, Histoire de Montréal depuis la Confédération, (Montreal: Boréal, 1992), Chapter 8.

**FURTHER READING**


Seeing Trees, Thinking Forests: Urban Forestry at the University of Toronto in the 1960s

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“We look at the present through a rear-view mirror. We march backwards into the future.”

—Marshall McLuhan

The ice storm of January 1998 started like any other ice storm. A mass of warm moist air from the Gulf of Mexico was wedged between two layers of Arctic air hugging the St. Lawrence and Ottawa River valleys. Snow fell, turned to rain in the warm layer of air, and was superchilled—still liquid but a few degrees below zero—as it passed through the lower Arctic layer. It froze immediately where it landed. Ice storms are not unusual in eastern Canada; they normally last only a few hours and leave a delicate gloss on tree branches and a more deadly layer of ice on highways. But this storm did not stop. A high-pressure system in the Atlantic kept the moist Gulf air rolling into Canada for five days. Freezing rain encased trees in a brittle casing of ice that thickened with each passing day until, after a total of 80 hours of intermittent freezing rain and drizzle, the weight of the ice brought branches and whole trees crashing down on roads, hydro wires, and houses. The storm cut off power to more than four million Canadians, and, as life came to a standstill in Montreal and Ottawa, and farmers struggled to care for livestock, it served as a sharp reminder of our dependence upon electricity. Seven hundred thousand people were still without power two weeks after the onset of the storm, and the Canadian Forces were called in to supply emergency services to rural communities.

Once candles were lit and generators hooked up, many of us turned our attention to the heavily burdened trees. Sugar bush owners listened to the crashing of massive limbs from the interior of their bush. Those of us who lived among old trees in the city became newly aware of the branches...
overhead, their size, and also their vulnerability. We kept anxious watch as the storm progressed
and ice built up, and flinched every time the wind blew. In my neighbourhood, in the heart of
Ottawa, 100-year-old trees bent under the weight of the ice, and the wiser among us wore hard
hats when venturing out under the branches. Fallen limbs blocked driveways and sidewalks. One
remaining American elm, a tall survivor of Dutch elm disease in the 1960s, creaked in the wind, a
thing of terrible and dangerous beauty.

Immediately after the storm, a number of fundraising campaigns were launched to replace
fallen trees. City trees matter to people; in a built environment of concrete and asphalt, trees are
evidence of the beauty and power of the natural world. The mayor of Ottawa quickly raised
$120,000 for tree planting, and my own neighbours responded generously to a smaller commu-
nity drive. Dozens of volunteers planted new trees the following spring along the highway. But as
the drama of the ice storm faded, I became aware of a more complex politics. We might agree in
principle that trees are very important, but in practice we often decide that a tree will not fit on
this particular block, in this yard, or on that corner. Open space in a city is valuable, and the places
available for trees are often contested spaces, wanted for driveways, soccer fields, or signage. As
trees grow, they compete with paving, overhead wires, and sidewalks. And city budgets are tight:
city councillors might agree with their constituents that trees matter, but many balk at the cost of
planting, watering, and pruning them. One city councillor refused to support a tree-planting ini-
tiative in 2006 saying, “We should let nature take its course. The squirrels of Ottawa probably help
plant millions of trees every year.”

As a historian I naturally turn to the past to understand the present, so after the ice storm I
turned to the archives to understand the politics of the urban forest. In the city archives I learned
that street trees were planted by residents at the end of the 19th century. Street tree planting was
part of the same civic beautification that led to city parks. Avenues of trees lent some grace to the
raw young city, and, in the days before air conditioning, shade trees provided a very practical
benefit. The city of Ottawa offered a subsidy to homeowners who planted and protected them.
These trees have not always been well cared for; documents in Library and Archives Canada show
that the Ottawa Horticultural Society launched a campaign for professional management of
street trees in the 1920s, and thousands of trees were cut down and trimmed in the 1930s and
1940s. And far from being “natural,” city trees have been subject to the fickle winds of fashion and
the grandiose ambitions of politicians: the records of the National Capital Commission show that
Ottawa planted pink crab apple trees in the 1960s in saccharine imitation of Washington’s cherry
blossoms.

My research has proven useful in arguments with penny-pinching politicians, but like much
historical research, it has now taken on a life and purpose of its own. I have come to think that the
way that we think about city trees says a lot about our relationship with the natural world. The vast
majority of Canadians live in cities, and while we might dream of pristine forests in Clayoquot
Sound, most of us live in a compromised urban forest made up of Norway maples, Japanese lilacs,
cedar hedges, Kentucky bluegrass, black squirrels, and starlings. We know this ecosystem inti-
mately: the bright green of new leaves in the spring, their cool shade in midsummer and the
dampness underfoot as they decay in the fall. It is not always pleasant: we sneeze when we breathe
in tree pollen and leaf mould, and we have to make hard decisions when roots find their way into
basements, and squirrels find their way into attics. It can be harder to love the tree next door, especially when it blocks our view or makes us sneeze, than it is to care about more distant forests, and over time I have come to think that it is the way that we live with the urban forest—those trees, shrubs, and animals just outside our front door—that best reveals our underlying attitudes toward the natural world. The history of our shifting attitudes to this ecosystem, what might be called the social and cultural history of the urban forest, has become the focus of my work.

This chapter focuses on an important transition in this history: the period when we started talking about the urban forest rather than the individual tree. In the 19th and early 20th centuries, city trees had been variously called street trees, shade trees, or ornamental trees, and they were cared for by arborists. In the 1960s a Canadian forester coined the term “urban forest,” and over the following decades the term caught on among professionals across Europe and North America, until in 2006, the eminent Journal of Arboriculture was renamed the Journal of Arboriculture and Urban Forestry. This was more than just a linguistic shift; it signified an entirely new way of conceptualizing the place of trees, and, one might argue, the place of nature, in a city. When we move from seeing one tree, in its individual identity, to a whole forest of such trees, something has changed in our understanding of these trees, or this forest, and our place in the midst of them. Street trees, shade trees, and ornamental trees are individual trees subordinated to the needs of the city; the urban forest is an ecological community connected with the larger natural world.

Erik Jorgensen, a professor of forest pathology at the University of Toronto, is widely acknowledged as the author of the term “urban forest.” Willem (Bill) Morsink, a young forestry student starting graduate studies in September 1965, recalled the moment the term was coined: “I went into Erik’s office and suggested that my master’s in forest pathology would be modified to be on tree diseases in municipal settings. He agreed and after tossing the idea around for five minutes Erik concluded that the new direction must have forest in it because I was doing a forestry masters, and that my focus would be on tree diseases in urban settings. Hence the oxymoron: urban forestry.”

The Power of the Oxymoron

Research into the University of Toronto Archives shows that the term grew out of a lively counterculture (what Jorgensen recalls as the “happening scene” at the university during the sixties), a traumatic environmental disaster (the decimation of urban elm trees by Dutch elm disease), and the intellectual ferment created by media guru Marshall McLuhan. The sixties are now iconic as the decade of hippies, drugs, and rock and roll. The record left by the University of Toronto’s student newspaper, The Varsity, is by comparison a little disappointing, at least in the early years of the 1960s: until 1965 most of the news stories in the student paper are as dull as the accompanying advertisements for business suits. There are hints of an emerging student activism in articles on the war in Vietnam and news of student protests in Berkeley, but it was only in the second half of the decade that the campus erupted in a series of protests, teach-ins, and sit-ins. As Graeme Wynn recalls in his chapter of this volume, it was not until 1969 that environmental concerns began to find real expression in Pollution Probe meetings in the basement of Sidney Smith Hall.

A flood of new faculty members were, however, shaking up the sleepy academic halls in the early 1960s; the best known was media analyst Marshall McLuhan. In the 1950s and 1960s,
McLuhan catapulted into international celebrity with a series of iconoclastic studies of popular culture: *The Mechanical Bride* (1951), *The Gutenberg Galaxy* (1962), and *Understanding Media* (1964). He was hailed by writer Tom Wolfe in 1965 as “the most important thinker since Newton, Darwin, Freud, Einstein and Pavlov.” The quote later appeared in a *Playboy* profile, “Marshall McLuhan—A Candid Conversation with the High Priest of Popculture and Metaphysician of Media.” It was typical of McLuhan, a conservative Catholic professor, to be profiled in *Playboy*. McLuhan's catchphrases were on everybody's lips: everybody—or at least everybody who was at all hip—agreed that “the medium is the message,” even if they were not entirely sure what that meant. This was McLuhan's intent: his metaphors were richly contradictory, intended to provoke and disarm, but with a kind of basic truth at the core. “The medium is the message” was a flip phrase for a profound idea: conventional wisdom held that the medium, such as print or television, was simply the vehicle for content, but McLuhan argued that the medium itself had a subliminal impact. The content, he said, was like a piece of meat thrown by a burglar to distract the watchdog of the mind, while the medium itself worked upon our psyche. His central point, that media have an influence on thought and behaviour independent of their content, intrigued a generation coming to terms with television. Not everyone was dazzled by McLuhan; one academic said, “He is swinging, switched on, with it, and now. And he is wrong.” Many were perplexed by McLuhan's rhetoric and many were annoyed. But it was fashionable to be perplexed in the sixties, and McLuhan forced even those who disagreed with him to consider the impact of television, radio, and advertising. His work reverberates once again today as we come to terms with the power of the Internet. As William Turkel's chapter in this volume shows, digital media are altering the practice of history.

To ensure that the University of Toronto did not lose its star, the president created the Centre for Culture and Technology as a place for McLuhan to hold court. Students either loved or hated him. His lectures roamed far from any stated theme, and he delighted in unsettling his audience with “probes,” witty aphorisms intended to unsettle received wisdom. As his assistant at the centre, Tom Cooper recalled, “He often challenged students to see their own pedantry, their own conventional wisdom, their own mediocrity of thinking and often he’d return papers saying, ‘One idea’ or ‘Two ideas’ at the top, with no other comment. In other words, he was only interested in good new ideas.” This inspired some students, but it frustrated those who were not keen to have their mediocrity exposed, and preferred a professor who stuck to his course outline.

Trees brought Erik Jorgensen and Marshall McLuhan together: the oak trees around McLuhan's home needed care and Jorgensen was called in to give advice. They got along, and the forester was invited to sit in on the media guru's lectures. McLuhan encouraged fellow academics to break out of the “one thing at a time” of logical thought and out of the confines of their disciplines. His message met fertile ground in the young Danish forester, who was frustrated by the industry orientation of the university's Faculty of Forestry. It had been created in 1907 in the face of declining Ontario timber supplies to provide scientific management for timber production, but had never succeeded in having much impact on government policy or industry practices. Jorgensen, trained in sustainable forest management in Denmark, was frustrated by the Canadian focus on the production of lumber and wood fibre for pulp and paper, the lack of reforestation policies, and
the neglect of the environmental and community benefits of forests. Cross-appointed as a forest pathologist between the Faculty of Forestry and the Department of Botany, he was already straddling two disciplines, and his offices were with the botanists, physically as well as philosophically removed from other foresters. Jorgensen’s students remember him fondly as a “scrapper,” someone willing to shake things up. He was open to new ways of approaching the world and welcomed McLuhan’s iconoclasm. Jorgensen later recalled that McLuhan’s lectures taught him new respect for the arts: “He was the first to open my eyes up to the folly of viewing things in scientific terms, of having to prove everything two times.”

McLuhan was, for his part, intrigued by Jorgensen’s concept of the urban forest. As a master of oxymorons (like “global village”), McLuhan appreciated the simple perversity of the term: urban meant skyscrapers, automobiles, and concrete, while forests were the epitome of the natural and the wild. Tying the two concepts in one phrase was jarring, and so, he told Jorgensen, it was bound to catch on. One evening, Jorgensen was invited to McLuhan’s popular evening seminar at the Centre for Culture and Technology to speak about the urban forest. He recalls with amusement that he said only about three sentences before an enthusiastic McLuhan broke in and took the stage.

**Combating Dutch Elm Disease**

If Marshall McLuhan gave Jorgensen the encouragement to think outside the box, it was an environmental event, the devastation wrought by Dutch elm disease, that set Jorgensen thinking. Dutch elm disease hit Canada in the 1940s; it is thought to have originated in the Himalayas and appeared after the First World War in Europe, where it was named for the Dutch scientists who identified it. The disease crossed the Atlantic in elm veneer and packing crates, and appeared in the United States in the 1930s and Quebec in 1944. It is caused by a fungus, *Ophiostoma ulmi*, passed from tree to tree on the winged bodies of elm bark beetles and underground through natural root grafts. The fungus clogs the sap-conducting vessels under the bark, causing affected parts of the tree to wilt and eventually the entire tree to die.

The impact was devastating. The American elm, *Ulmus americana*, was one of the most popular street trees in the northeastern United States and Canada. Graceful and fast growing, with a tall narrow trunk and high arching branches, elm trees were ideally suited for shading city streets, and long rows of closely planted elm trees lined avenues in most cities. When Dutch elm disease appeared, city trees were already stressed by the expanding urban infrastructure: utility wires cut through their branches and asphalt paving choked their roots. The fashion for long, uniform avenues of elm, while aesthetically pleasing, created an artificial monoculture and laid the conditions for dramatic losses. Beetles skipped easily from tree to similar tree, and the fungus moved between intertwined root systems under the pavement. Some towns lost most of their tree canopy to the disease.

There were more than 100,000 elms in metropolitan Toronto in the 1960s, 10 percent of all street trees. Jorgensen calculated that 90 percent of the trees in the groves on the University of Toronto campus were American elm (Figure 13.1). The disease approached Toronto from two directions. The first wave from the United States crossed the Great Lakes through Windsor and...
Niagara Falls, and moved east along Lake Ontario toward the city. The second wave from Quebec hit Ottawa in 1948 and moved west. In 1951, a few diseased trees were identified in Toronto and removed. In 1956, several more sites were identified. In 1959, the first case appeared on the University of Toronto campus; five trees died in the summer of 1960. Brigadier J. F. Westhead at the Superintendent’s Office sent seven tissue samples to the Forestry Laboratory in Maple to be tested, and in September 1960 received the first positive identification.

As the university’s specialist in forest pathology, Erik Jorgensen was asked by the Dean of Forestry to look into the situation. He reported with alarm:

These findings are of a most serious nature from many different points of view as a large percentage of the trees on campus are elms. If unchecked the disease will no doubt decimate the elms in a very short time. Only one tree was suspected in the summer of 1959 and the spread of the disease to kill five large trees in 1960 is alarming. The loss of the elms will not only alter the many beautiful views on the campus, but the dead trees will present a hazard to pedestrians, cars and buildings which cannot be tolerated.

He recommended a combination of sanitation and chemical spray. Elm trees were to be inspected regularly through the summer, and dead branches and dead trees removed immediately. In addition, all elm trees were to be sprayed in the early spring and possibly also in the late summer with a pesticide: an emulsion of dichloro-diphenyl-trichloroethane (DDT).

Jorgensen’s advice followed accepted practice. Sanitation was crucial. The native elm bark beetle, _Hylurgopinus rufipes_ and the smaller European elm bark beetle, _Scolytus multistriatus_, lay eggs under the bark of diseased elm trees; the larvae mature and, after pupating, covered with fungus spores, they fly to healthy trees which they infect when they begin feeding on bark and twigs. Removal of all dead wood with bark on it, including standing dead trees and firewood, breaks the cycle. Spraying healthy trees with DDT in the early spring (when the trees are still dormant) leaves a residue on the bark and twigs that kills any remaining beetles. DDT was a miracle pesticide of the Second World War, credited with saving the lives of many thousands of soldiers by killing the insects that spread malaria and typhus. It was widely applied in the immediate postwar era against a broad range of insects, and seemed especially well suited for Dutch elm disease.

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_Figure 13.1_ **University of Toronto Campus with Extensive Elm Groves, 1950**

In the 1950s, 90 percent of the trees on the University of Toronto campus were American elm, so the appearance of Dutch elm disease in 1959 was cause for alarm.

Source: University of Toronto Archives, 2005-20-5M6a-1988-0012-(01).
The usual practice was to mix 20 pounds of DDT in 100 gallons of water, and spray about 25 gallons of the mixture on each tree.24

In June 1961 an inspection tour revealed three more infected trees. Jorgensen recommended a more radical removal of all weakened elm trees. Two more infected trees were found in July, and Jorgensen advised against plans to plant a new elm on campus. Two weeks later another two infected trees were identified, but Jorgensen was still optimistic: “Although it still is at least one year too early to claim that the disease has been checked in its spread on campus it is very encouraging to note that only two ‘new’ infections could be found on this inspection tour. The finding may emphasize the importance of continued removal of diseased and weak elm trees. At the present it looks as if we are in time for the preservation of the major part of our elms on the old campus.”25 His optimism was premature, however, and the spread of the disease picked up through the 1960s.

Elm bark beetles do not respect property lines, and Jorgensen and Westhead began to lobby for concerted action with metropolitan Toronto municipalities. They invited politicians as well as representatives from parks, public utilities, conservation authorities, and consulting firms to a meeting on January 17, 1962. As Westhead explained in a general invitation, “Rather than the University of Toronto becoming a small island of elm trees and attempting to fight off all inroads, it is hoped by this meeting that we would be able to arouse interest throughout Toronto and adjacent areas in order that a combined and cooperative effort could be put forward for the common good.”26 About 60 representatives attended the meeting and a fact sheet prepared by Jorgensen was passed out. They established a steering committee, the Dutch Elm Disease Control Committee for Metro Toronto and Region.27

Shade Tree Research at the University of Toronto

With the support of this committee, Jorgensen began to lobby in the fall of 1962 for the creation of a forest pathology laboratory at the University of Toronto, focused on shade-tree diseases. Members of the control committee suggested that funds of $20,000 per year, over three years, might be raised from the public, and they proposed that the university provide space and start-up funding.28 The Dean of Forestry, J. W. B. Sisam, was supportive and space was found in June in an old dairy plant, the Borden Building on Spadina Avenue, for the new Shade Tree Research Laboratory (Figure 13.2).29 The control committee, however, had overestimated its fundraising capacity: over the next few years it raised only a few thousand dollars annually. Although the university provided start-up operating grants, and Jorgensen used grants for his forest pathology work, finances were precarious during the early years. In 1966 the university provided steady funding, and Jorgensen’s laboratory became the first laboratory devoted to shade tree research in Canada.30

The focus upon shade trees was a departure for a faculty of forestry. The first dean, Bernard Fernow, a pioneering figure in North American forestry, had published a book on city trees in 1910, and some University of Toronto forestry graduates had found work managing urban parks, but city trees were generally cared for by arborists, who were trained to prune and manage individual trees. Rather than study forestry, they studied aboriculture, a branch of horticulture, in a college or agricultural school, where the emphasis was upon practical skills.31 The Ontario Agricultural College, for example, affiliated with the University of Toronto until 1964, offered a degree in horticulture. Jorgensen had a great deal of respect for arborists, and was eager to bring arboricultural knowledge...
and skills into the discipline of forestry. He quickly broadened the scope of his forest pathology laboratory to include arboriculture: “It was soon recognized [. . .] that if the program was to be effective, its purpose should be extended to deal with shade tree problems in general, cultural and ecological as well as pathological.” Plans were made to hire an arboriculturalist in addition to an entomologist and pathologist. In October 1962, Dean Sisam suggested to Jorgensen that the Shade Tree Research Laboratory might be a first step to “lead some forestry undergraduates into the area of arboriculture.” Jorgensen replied that the establishment of arboriculture as a field of interest at the university would “prove fertile in future developments of forestry teaching at the University of Toronto.”

In a number of ways, Dutch elm disease facilitated the expansion of the forestry program into what had been arboricultural concerns. The complex etiology of Dutch elm disease demanded the interdisciplinary research science of a university laboratory. The need for municipal involvement in the treatment of the disease called for the management skills of university graduates. The wide public concern about the disease (and not incidentally the potential for future political support and funding) justified university expenditures in this area. As Dean Sisam noted in a letter to Jorgensen in May 1963, “The development of a more comprehensive program of Shade Tree Research was justified, I believe, in view of . . . the recognition of a fairly wide interest in these matters by individuals, government departments, and associations—an interest that might well be mobilized increasingly to support the program as it develops.”

It helped that the university was in an expansionist and interdisciplinary mode in the 1960s, flush with new students and new funding. In 1961 the entire curriculum of the Faculty of Forestry had been placed under review, creating exciting new possibilities. In a 1963 memorandum, Jorgensen made his argument for expansion into arboriculture in two, quite contradictory ways, arguing first that shade trees were different enough to warrant special study, and second that they were similar enough that research into shade trees would yield findings for resource forestry. “Shade tree problems tend to be different from those involved in forestry due mainly to the relatively high individual value of the shade tree, which allows for the application of intensive methods in tree care and in pest and disease control. Furthermore many foreign tree species and native trees species of little commercial value to the forest industries have found a place as important shade tree species.

**Figure 13.2** EXAMINING MAPLE SEEDLINGS

University of Toronto forest pathologist Erik Jorgensen and graduate student Willem Morsink examine maple seedlings. The creation of the Shade Tree Research Laboratory at the University of Toronto made shade trees suitable subjects for scientific research and created the context for a new way of thinking about these trees. City trees were seen as elements of a natural ecosystem rather than decorative components of the built environment.

*Source: Reprinted with permission from The Globe and Mail.*
adding to the variety and number of shade tree problems. A study of these problems may very well lead to findings of importance, not only in arboriculture, but in forestry as well." Jorgensen proposed expansion into graduate research in arboriculture, undergraduate training in arboriculture and parks management, and a one-year diploma course in parks management for forestry or horticulture graduates, as well as the continuation of extension courses offered in the evenings and summers. Sisam was supportive, but letters suggest that Jorgensen's ambition was outpacing the Dean's budget, if not his enthusiasm for the new field.

The Shade Tree Research Laboratory created the context for a new way of thinking about city trees. The close collaboration with the Dutch Elm Disease Control Committee made academics at the lab particularly aware of the managerial and political aspects of urban forest research. Jorgensen's cross-appointment in the Department of Botany and work as a forest pathologist made him sensitive to the interplay of insects, fungae, and microorganisms, and Dutch elm disease was a sharp reminder of the complexity of the urban ecosystem. The interdisciplinary nature of the research created the conditions for a more ecological outlook on city trees.

The Toxic Ecology of DDT

In 1962, Rachel Carson identified much more frightening ecological connections with her best-selling book *Silent Spring*. She explained in chilling detail how humans were poisoning the world with synthetic pesticides that had been so indiscriminately applied, and were so persistent, that they could be found throughout the ecosystem: “They have been found in fish in remote mountain lakes, in earthworms burrowing in soil, in the eggs of birds—and in man himself. . . . They occur in the mother’s milk, and probably the tissues of her unborn child.” Chief among these deadly chemicals was DDT. In a chapter titled “And No Birds Sang,” Carson explained how the application of DDT against Dutch elm disease had decimated songbirds. She quoted a letter written by a housewife to an ornithologist in 1958:

> Here in our village the elm trees have been sprayed for several years. When we moved in here six years ago there was a wealth of bird life . . . After several years of DDT spray the town is almost devoid of robins and starlings; chickadees have not been on my shelf in for two years, and this year the cardinals are gone too . . . It is hard to explain to the children that the birds have been killed off, when they learn in school that a Federal law protects the birds from killing or capture. “Will they ever come back?” they ask; and I do not have the answer. The elms are still dying and so are the birds. *Is* anything being done? *Can* anything be done? Can *I* do anything?

Carson described a natural world that was deeply interconnected. A pesticide that killed the elm bark beetle also worked its way into earthworms, and hence into songbirds. Carson concluded that the elm must be sacrificed: “It would be tragic to lose the elms, but it would be doubly tragic if, in the vain attempts to save them, we plunge vast segments of our bird population into the night of extinction.” She argued that a rigorous program of sanitation would slow the progression of the disease to manageable proportions.
The impact of *Silent Spring* in Canada was immediate. The city arborist in Montreal abandoned spraying in September 1962, citing the impact on birds and other insects. “Spraying should be curative, not preventative,” he argued, “Indiscriminate use of insecticides is as unscientific, and as dangerous, as indiscriminate use of any powerful medicine or drug.” In October, the Toronto Parks Commission’s George T. Bell followed suit. After spending $6 million over five years, he announced that the battle was lost, and focused the commission’s resources on the removal of dead trees. On February 13, 1963, the Metropolitan Toronto Parks Commissioner concurred, and advised that spray sterilizes birds, without effectively protecting the trees.\(^4^2\)

Jorgensen had been publicly recommending the use of DDT prior to the publication of *Silent Spring*, and was initially reluctant to give it up.\(^4^3\) Although he saw the forest as an ecological unit, his primary sympathies appear to have remained with the trees, and it was difficult to abandon them. He felt that the municipal authorities who were abandoning DDT were motivated by the bottom line, rather than ecological concerns. Municipalities had been reeling under the costs of Dutch elm disease control, and fears about DDT provided an excuse to stop spraying. To combat this line of thinking, Jorgensen made calculations showing that a consistent program of sanitation and limited spraying would be cheaper for a municipality in the long run. In an article published in *Canadian Audubon Magazine* in late 1962, he argued for a careful continued use of DDT. He conceded that early indiscriminate spraying caused severe damage to wildlife—and cited *Silent Spring* in his footnotes—but argued that the impact could be reduced with dormant spraying of DDT with carefully directed mist blowers, used only on valuable stands and in preventative sprays. Mist blowers used less DDT and resulted in less runoff. Jorgensen also suggested that another less toxic chemical, methoxychlor, could be used where bird loss occurs. His *Audubon Magazine* article was reprinted by the Shade Tree Research Laboratory for public distribution. On January 3, 1963, when a concerned member of the public asked if he agreed with Rachel Carson, Jorgensen said ambiguously that Carson’s view “is shared by me, provided that the use of chemical sprays has been added to the program until sanitized areas are no longer threatened.”\(^4^4\) He did point to alternatives: “You will have noted that DDT which when used in excess is reported to have killed birds, particularly robins, can now be substituted by methoxychlor which is far less toxic to birds and other wildlife.” He repeated this argument in a symposium held by the control committee on January 28, 1963.\(^4^5\) A presentation by A. W. A. Brown at the same symposium may have given him pause, however. Brown said that even mist blowers had a devastating impact upon bird populations because of the accumulation of DDT:

> DDT is so persistent in the soil that it takes over 10 years to degrade down to 10 per cent of its original level. As robins die, their territories are usually invaded by other robins, most of which are then doomed themselves to be killed in these death traps. And so we have the horrible situation where it is tough on the robins, and the citizenry makes it tough on the public servants, and we are simultaneously faced with the certainty of bird mortality and the uncertainty of obtaining complete protection of the sprayed trees.

Brown concluded that methoxychlor is a less-toxic alternative, allowing trees to be protected while “those responsible can sleep of nights without worrying about a post-spray harvest of dead birds.”\(^4^6\) After the symposium, however, Jorgensen continued to recommend chemical sprays

\(^{245}\) Seeing Trees, Thinking Forests: Urban Forestry at the University of Toronto in the 1960s
without identifying the chemical. As late as 1965, in the first newsletter of the Ontario Shade Tree Council, he recommended the use of a “chemical spray” with a mist blower or hydraulic equipment to protect valuable trees.47

It may seem odd to us that Jorgensen, someone sufficiently environmentally aware to develop urban forestry in the first place, would continue to recommend DDT (or any chemical pesticide, for that matter) in the wake of *Silent Spring*. But he was not alone. It was only after the discovery in the mid-1960s that DDT was dramatically reducing the numbers of bald eagles and other raptors, and after the U.S.–based Environmental Defense Fund in the late sixties began to use legal proceedings to publicize the dangers of DDT to birds and humans, that opposition to the pesticide became universal.48 In 1972, DDT was banned in the United States, and Canada followed suit in 1985. Jorgensen’s loyalty to pesticides reminds us more generally that a commitment to “the environment” does not in itself tell us how we are to respond on environmental issues. Consider DDT itself, and how our thinking about it has changed. Malaria kills one in twenty children in sub-Saharan Africa, and DDT is one of the few effective controls for mosquitoes, the vector for the disease. The incidence of malaria soared in the 1990s when African countries banned DDT; even South Africa, with its advanced health care system, was unable to develop an effective alternative. When the United Nations organized a global treaty against persistent pollutants, malaria experts insisted on the need for DDT for disease-vector control, and the Stockholm Convention on Persistent Organic Pollutants exempted DDT for this use. In September 2006, the World Health Organization endorsed the indoor residual spraying of DDT. This very limited use of DDT—the amount used for indoor residual spraying for an entire country is the same as the amount sprayed on one cotton field in the 1950s—has the cautious support of some environmental organizations, including Environmental Defense, although there is still concern about the long-term consequences.49

The debate shows the moral and political complexity of environmental issues. Even Rachel Carson was reluctantly willing to give up on elm trees in order to save song birds, and most of us, especially in the face of evidence that DDT was not really effective against the elm bark beetle, would agree. But for a forester like Jorgensen, who was passionate about trees and not convinced of the dangers of DDT, the decision to abandon the elm trees to the depredations of the elm bark beetle was a difficult one.

In the face of public concerns, Jorgensen increasingly turned his attention to alternatives. In December 1963, P. J. Ward, chief forester of Great Lakes Paper Company, recommended that he read *Silent Spring* and Jorgensen replied, somewhat testily: “For your information, I am enclosing a reprint of one of my papers on DED [Dutch elm disease] which will confirm that Miss Carson’s *Silent Spring* is already on our bookshelves.”50 He explained that his lab was looking into less-toxic chemicals, and pursuing alternative approaches to the disease, including injections of chemicals, biological control using sterilized beetles, trapping of beetles with sex attractants, and research into beetle parasites. In the spring of 1964, he described the lab’s research for a local newspaper: “Experiments are being carried on to find a substitute for DDT which controls the disease but is not fatal to birds.”51 K. Stewart, a forest entomologist retired from the federal Department of Forestry, joined the laboratory as a research associate, and focused on alternatives to DDT: organochlorines such as methoxychlor and carbaryl (Sevin) and the injection of systemic insecticides such as Bidrin and Metasystox.52 Research conducted by another member of the laboratory,
D. N. Roy, into a systemic fungicide, Lignasan BLP (carbendazim phosphate) injected into the elm roots led to an article co-authored with Jorgensen and a patent registered to the University of Toronto. Dutch elm disease control programs today use sanitation and the injection of a fungicide into the root systems, although the expense of this approach limits application to valuable trees.53

Urban Forestry Goes Global

It was out of this environmental crisis and response that the phrase “urban forest” emerged. The conditions had been set for a rethinking of city trees by the application of forestry skills of scientific research and scientific management to their study, by the interdisciplinary nature of the laboratory research, and by the public debates around DDT. It was in September 1965 that Bill Morsink joined the laboratory as a graduate student interested in municipal trees, and Jorgensen named his course of study “urban forestry.” By 1966, Dean Sisam was using the term: instead of suggesting programs in arboriculture and parks management, he used the term urban forestry.54 The 1967 statement of the Shade Tree Research Laboratory also used the term, equating it to arboriculture. “There is a plan to enlarge the program relating to arboriculture, or what we have called Urban Forestry as personnel and funds become available.”55 The 1968–69 university calendar stated that the Shade Tree Research Laboratory was to provide graduate and undergraduate training in urban forestry. In 1969, the Faculty of Forestry became the first in Canada to offer a course in urban forestry as part of its undergraduate curriculum, as an elective in the fourth year.56 Urban forestry was also offered as a field of study at the graduate level, with one student assistantship provided by Ontario Landscape Contractors Association. Seven students had graduated by 1982.57

Morsink’s M.Sc. Forestry thesis gave urban forestry its first extended explication in 1967. He locates urban forestry between the intensive approach of horticulturalists and the laissez-faire approach of forestry. The first part of his thesis is a broad-ranging discussion of the issues facing the urban forest; he quotes urban theorists such as Lewis Mumford: “the future task of urbanization is the reestablishment in a more complex unity, with full use of resources of modern science and technology, of the ecological balance that originally prevailed between city and country in the primitive stages of urbanization.” The second half of the thesis is a case study of Etobicoke’s urban forest.58

Jorgensen began to give conference papers on the subject, some of which were published by the Shade Tree Research Laboratory, and we can observe the growing stature of the term in his paper titles: “Approaches to Shade Tree Research at the University of Toronto” in 1967, “Urban Forestry in Canada” in 1970, “Towards an Urban Forestry Concept” in 1974, “Urban Forestry in the Rear View Mirror” in 1986, and “The History of Urban Forestry in Canada” for the first Canadian Urban Forest Conference in 1993.59 His work had an evangelical element. Jorgensen was not only defining the urban forest but also proselytizing to a world that needed to understand the importance of trees in the city. In a 1969 newspaper interview Jorgensen defined urban forestry as “a specialized branch that has as its objective the cultivation and management of city trees.” He explained that the urban trees acted as air conditioners, cooling, humidifying, and cleaning the air, and even suggested, with reference to urban unrest plaguing the United States, that long-lived urban trees might create a sense of stability.60
The term became international in June 1968 when Jorgensen gave a paper in India, following which the Commonwealth Forestry Association endorsed research into tree planting in urban areas. The United States Secretary of State for Agriculture requested a copy of Jorgensen’s paper for the President’s Advisory Committee, and a National Urban Forestry Council was created in the United States.\(^{51}\) The term was later adopted by the European Union.\(^{62}\) Ironically, the term nearly disappeared at the University of Toronto. In 1971, Dean Sisam, who had supported Jorgensen in his funding battles, retired. Jorgensen left the university two years later for the Canadian Forestry Service, and although he was replaced by another professor of urban forestry, John Andresen, the Shade Tree Research Laboratory lost its independent identity when it was transferred to a location in the Faculty of Forestry. When Andresen left in 1987, budget cuts meant that his position was not filled.\(^{63}\)

**Conclusion**

Jorgensen’s role in the creation of urban forestry is widely acknowledged and his definitions are widely cited. But the power of the term is such that definitions are almost unnecessary. As Marshall McLuhan realized, the term “urban forest” contained its own internal dynamic. One associate at the Centre in Culture and Technology explained the power of an oxymoron:

> McLuhan was very fond of Dada, of absurdism, fond of the interplay of things that were not meant to be connected at first. He was fond of cutting loose the connections in systems. He often said that you had to have a certain play between one part and the other parts of whatever it is that you’re playing with. It has to give. If you don’t have enough distance between the two objects of your attention, then there is no play, no place for the mind to make a discovery. It’s so vacuous, there’s nothing to play about.\(^{64}\)

The power of the urban forest lay in the disjuncture between the urban and the forest. The term confronts us with the yawning perceptual divide between the urban built world and the forested natural world. As McLuhan told Jorgensen, this disjuncture would rub people the wrong way, and by doing so it would force them to think again. It continues to shake up our thinking about cities and forests, and the wider world. The forest growing between sidewalk and street, between telephone wire and sewer line, offers a better metaphor than we might care to realize for the modern environment.

**DISCUSSION QUESTIONS**

1. When did people start referring to city trees as the urban forest? How did this new term reflect changing attitudes to trees in the city?
2. Is an urban forest the same as other forests?
3. The author states: “it is the way that we live with the urban forest—those trees, shrubs, and animals just outside our front door—that best reveals our underlying attitudes toward the natural world.” Do you agree?
4. How did attitudes toward the urban forest shift in the 1960s in light of Dutch elm disease and *Silent Spring*?

5. How can we reconcile the detrimental and beneficial aspects of DDT? Are there any circumstances in which we should consider using it?

6. Why did Marshall McLuhan think that oxymorons were powerful? Compare the oxymorons “global village” and “urban forest.”

7. How is a science, such as forestry, influenced by the social, intellectual, and economic climate?

**Notes**


3. Councillor Gordon Hunter, quoted in “City to Consider Environment Committee Plan to Plant 100,000 Trees over Four Years,” *Ottawa Citizen*, December 2, 2006.


10. Amherst College professor Benjamin McMott, quoted in “Marshal McLuhan,” *Playboy*.


21. Erik Jorgensen, “Dutch Elm Disease on the Campus at the University of Toronto,” September 30, 1960, UTA, A2004-0025/13 (07) “Professor Jorgensen, Chair, Forest Pathology.”


27. The control committee expanded into the Ontario Shade Tree Council three years later with a broader mandate, and is still active as the Ontario Urban Forest Council.

28. Memorandum to Erik Jorgensen from J. W. B. Sisam, October 1, 1962, UTA A200-0025/13 (03).

29. The title of Sisam’s book, *Forestry and Forestry Education in a Developing Country: A Canadian Dilemma*, suggests that he was uncomfortable with the resource emphasis of Canadian forestry.
Bill Morsink confirmed that Sisam was a conservationist, and sympathetic to Jorgensen’s aims.


30. See the correspondence, especially between J. W. B. Sisam, F. R. Stone, VP Administration, and Erik Jorgensen in UTA A2004-0025/013 (03) “Shade Tree Research Laboratory, 1963–.”


He defined 19 institutions offering programs in horticulture; some of those affiliated with a university offered degrees.

32. Shade Tree Research Laboratory, undated, unsigned three-page document, in UTA A2004-0025/013 (03).

33. “This [shade tree research program] implies a long-term development and as such could definitely have positive values, as for example, i) creating a greater interest in forestry problems among large urban populations, and ii) providing a research environment that might well lead some forestry undergraduates into the area of arboriculture and park management, as well, of course, as solving the many shade tree problems.” Memorandum to Erik Jorgensen from J. W. B. Sisam, October 1, 1962. Jorgensen’s comments are in his reply to Sisam in a memorandum dated October 12, 1962, UTA A2004-0025/013 (07).


35. Enrolment at the Faculty of Forestry had to be capped after 1969 because growth had been so rapid, from 103 students in the faculty in 1966 to 200 in 1969.

36. J. W. B. Sisam and Erik Jorgensen, January 1963, UTA A2004-0025/13 (07) “Professor Jorgensen, Chair, Forest Pathology.”

37. Memorandum to J. W. B. Sisam from Erik Jorgensen, February 18, 1963, UTA A2004-0025/013 (03). It appears that nothing came from this proposal.


44. Erik Jorgensen to Ruth Thompson, January 3, 1963, UTA A2004-0025/013 (07) “Professor Jorgensen, Chair Forest Pathology.”

46. “Problems in Chemical Control,” by A. W. A. Brown, UTA A2004-0025/013 (07) “Professor Jorgensen, Chair, Forest Pathology.”


52. “The Shade Tree Research Laboratory, Present Research and Program, October 1, 1963,” UTA A2004-0025/013 (03) “Shade Tree Research Laboratory, 1963–.” Although the laboratory declined industry funding in 1964, (see “The Shade Tree Research Laboratory, A Short Progress Report, May 1964,” UTA A200-0025/013 (03) “Shade Tree Research Laboratory, 1963–.”) arcan-1@mailman.srv.ualberta.ca. Records in subsequent years show funding from industry (see UTA A200-0025/013 (03) “Shade Tree Research Laboratory, 1966–”). Bidrin proved a disappointment, toxic to trees and people, and ineffective against the beetle. See “Experts Differ on Chemical’s Effectiveness,” *Peterborough Examiner*, November 22, 1965, clipping in UTA A200-0025/013 (03) “Shade Tree Research Laboratory, 1963–.”


54. Draft announcement, “The Shade Tree Research Laboratory,” attached to J. W. B. Sisam to Erik Jorgensen, January 4, 1966. The announcement was to be distributed in early 1967, UTA A200-0025/013 (03) “Shade Tree Research Laboratory, 1966–.”


57. Sisam, p. 110.


61. See Jorgensen, “The History of Urban Forestry in Canada,” and J. W. B. Sisam to Rene Brunelle, Minister of Lands and Forests, June 5, 1968, UTA A2004-0025/013 (03) “Shade Tree Research Laboratory, 1968–.” Sisam commented further: “Indeed this subject and the work of the Shade Tree Research Lab receive considerable and I believe favourable attention through one of the committees of the conference.”


64. Derrick de Kerckhove, cited in Benedetti and DeHart, eds., Forward through the Rearview Mirror, p. 138.

**FURTHER READING**


Thinking Spatially

Matthew Evenden

“Mapping Cold War Canada: George Kimble’s Canadian Military Geography, 1949”

Stéphane Castonguay and Diane Saint-Laurent

“Reconstructing Reforestation: Changing Land Use Patterns along the Saint-François River in the Eastern Townships”
“World position” matters most, wrote geographer George H. T. Kimble, the author of the 1949 *Canadian Military Geography* (CMG): “It is this that largely decides the kinds of climate the continent has: these in turn decide broadly the uses to which the land may be put, which in their turn set the general pattern of settlement and industry. Then the location of the constituent countries with respect to their neighbours helps to fix the flow and character of overseas commerce in a time of peace, and to determine fortunes in a time of war.” Turn the page, and Kimble illustrates his point (see Figure 14.1). Projecting the world with the north pole at its centre, and with Canada as the only country identified and oriented towards the reader, Kimble sketches a series of dotted and solid lines to represent shipping and air routes, connecting Montreal directly to New York, London, Paris, and, more menacingly, Berlin and Moscow. Entitled “Global position of Canada,” the map represents the country as a cross-hatched, northern continental space, caught up in a world of flows and connections; the major transportation routes identified run between centres in the northern hemisphere. Few physical features appear: two oceans, the equator, the tropics of Cancer and Capricorn and, most prominently, the Arctic Circle, which lies near the map’s visual centre. At the margins, Australia, Africa, and South America appear as bloated, empty continents, tenuously connected to the centre. This is the world as Kimble saw it, or as he wanted others to see it. Why he should see the world in this way, and what work that vision aimed to accomplish are what we wish to discover.

Maps do not simply summarize or represent the world as it really is; in their choice of projection, map makers distort the world and in their carefully made selections and omissions, they create it. Kimble, the chair of McGill’s geography department, created a particular national and
Figure 14.1  “GLOBAL POSITION OF CANADA”

George Kimble’s opening map invites readers to think about Canada’s place in the world and connections to it. “World position,” he claimed, determined and conditioned many of Canada’s possible futures, both environmentally and politically. The cartographic style helps to reinforce some of Kimble’s primary claims.


world view in his geography for a military audience of officers-in-training. In 200 pages of maps and text, bound in a red cover and stamped “confidential,” CMG presents one point of entry into the intellectual and cultural fashioning of environment and nation in the early Cold War. Little is known about how Kimble came to write the CMG, or how it was used by officers-in-training. Read on its own terms, however, CMG is a primer in Canadian geography highlighting physical features, resources, and industry across Canadian space. Read against the background of the early Cold War, the atlas takes on other meanings: the environment is an instrument of economic and military power; Canada’s geography is at once a storehouse of potential and a vulnerable home; geographical knowledge is one element of a defensive and offensive geopolitics. For these reasons, the CMG reminds us to think hard about the context of documents, as well as their contents, and of the importance of visual evidence and maps in framing environmental ideas. This chapter
offers one way of reading CMG, of identifying its significance and of thinking more broadly about maps, the military, and environmental history.

Making Sense of Maps

Since much of what follows relates to maps or to text accompanying maps, it makes sense to begin by thinking about how maps are constructed. In my introduction I tried to provoke you somewhat by suggesting that maps are distortions and that mapmakers create the world on paper. Now let me take a few steps back from that position. Maps are distortions, but they are distortions with rules. I use the term “distortion” not to be cynical about questions of accuracy, but because it is an accurate description of what happens when we seek to represent in two dimensions what appears in real life as three. Mark Monmonier puts the problem succinctly: “Although the globe can be a true scale model of the earth, with a constant scale at all points and in all directions, the flat map stretches some distances and shortens others, so that scale varies from point to point.”

In the best-known projection, named after the cartographer Mercator, most of this scale distortion occurs at the poles and in northern Canada and Russia; these northern land masses appear much larger than they really are relative to land masses at the equator. This does not really matter much if your main purpose is to locate, say, political boundaries or major world cities. It does become a problem, however, if you want to work out distances between places, or to plot the best flight routes from one continent to another.

Kimble had these problems of projection in mind when he drew his “global position” map. In an appendix to the first chapter of CMG, he described his rationale for representing the world as he did. The projection he used was neither a three-dimensional depiction of the earth, like a globe, nor a conventional projection, like Mercator’s, which represents the surface of the earth as flat. It was, rather, what he called a photographic projection that depicted the earth as if from a specific viewpoint. Kimble understood that this map placed an enormous significance on some parts of the earth while virtually eliminating others, but he believed its simulation of a three-dimensional perspective made it useful in understanding global relationships, such as air routes. A standard or flat Mercator projection, he argued, potentially overstressed the longitudinal view of the earth over the latitudinal. “[I]t makes it difficult to visualise territorial relationships and great circle routes between the main centres of world population. (Thus a surprising number of people, when looking at a Mercator world map are unable to indicate the direction of the shortest route between Ottawa and Chunking.)”

Some elements of precision, Kimble suggested, had to be given up to make way for other lessons and emphases.

If cartographers distort the world with a purpose in mind when they choose a method of projection, they also create it when they make choices about a map’s scale and its representation of themes or symbols. Maps come in all sizes. Cartographers adopt a usable scale to represent a portion of the earth’s surface at some fraction of its real size. On most street or road maps, you will see the scale identified with a graphic bar that shows you how much one centimetre or inch represents in terms of kilometres or miles. On geological, topographic, or even political maps, you will generally see scale described as a ratio, such as 1:100,000, which means one unit of area on the map is equivalent to 100,000 units on the surface of the earth. Maps occasionally do not contain scale bars or ratios,
usually when the map projection does not allow for it. None of Kimble’s maps, drawn by cartographer J. Tremblay, for example, contain scale bars or ratios. Why? For all his discussion of choice of projection in his first chapter, Kimble did not address the problem of scale. The answer may be that most of the maps in the volume assume a standard scale and point of perspective of Canada and identify distributions of things (soils here, industry there), for which measurements of relative distance are not particularly important. However, cartographers recommend including an indication of scale in maps whenever possible to suggest relative distances and a sense of the size of areas depicted. Neglecting to do so can confuse a reader.

Maps contain information and it is the cartographer’s task to decide what information to include and highlight. This necessarily involves a degree of selection, simplification, classification, and symbolization. A vegetation map of Baffin Island that sought to map every different species present at a 1:100,000 scale would be an indecipherable mess. If clarity is a virtue in map making (and it is), then selection must be part of clarification. So must be the use of symbols. To make maps legible, and to represent data well, cartographers choose symbols and thematic fills to cover empty space and give it meaning. In Map XIV of Kimble’s CMG, for example, he identifies rivers with named, heavy, twisting black lines (See Figure 14.2). The width of the lines

Figure 14.2 “PRAIRIE IRRIGATION”

![Map of the Prairies](image)

This map of the Prairies sketches an optimistic geography of progress and expansion. In Kimble’s analysis, irrigation is cast as a scientific response to drylands agriculture.

does not correspond to the width of the rivers, but it highlights the river’s presence cutting across land. The thematic fills identified in the key to the right of the map identify different categories of irrigation projects across Alberta and Saskatchewan as “existing,” “under construction,” and “proposed.” Using those fills, the cartographer identifies the land areas concerned. Again, some distortion occurs to make a point. All of the area identified was not or would not be irrigated. The shaded areas simply identify irrigation project boundaries. At a finer scale, when one wants to zoom in, the cartographer could provide more detail about which parcels of land were irrigated, but for the purpose of this particular map that level of detail would produce only confusion.

Projection, scale, and symbolization are three critical components in drawing a map. With this brief introduction to their significance, we can shift now to thinking about the context of Kimble’s CMG before returning again to the maps and their contents.

**Geography and the Cold War**

CMG has not changed since it was first published more than 50 years ago. Its pages are the same, but the context in which the book may be read today has changed radically. To begin to gain a sense of this book and its significance, therefore, we need to reflect on its political context. To do so involves answering a question: Why write a military geography of Canada in 1949?

Even though the Second World War had been over for four years, conflict loomed on Canada’s horizon in 1949 in ways that seemed more threatening and ominous than ever. Advances in wartime aviation meant that long-distance bombers from Europe or Asia could reach Canada without great difficulty; in 1949 the Soviet Union detonated its first atomic bomb, raising new security concerns in North America. The prospect of nuclear warfare would haunt generations to come. Across the world, the balance of political influence seemed to be susceptible to dramatic changes: Communists seized power in China, and the last vestiges of the wartime alliance between the United States and the USSR lay in shreds as the two powers contested Berlin—the Soviets by blockading the western sections of the city, the Americans by airlifting supplies to circumvent Soviet control. Within a year, a civil war in the Korean peninsula would expand into a major regional conflict with global consequences. Canada’s international position changed as it entered into a new alliance with the North Atlantic Treaty Organization. The rapidly shifting international scene raised questions about Canada’s national defence caught up in a new era of Cold War.

The feature of Canadian geography that gained most attention in the Cold War was its northern location. Neighbour to the Soviet Union across a vast Arctic frontier, northern Canada was frequently portrayed as a vulnerable flank for the defence of the continent: lightly populated, little integrated by transportation and communications, and difficult to control or defend. In the revised international relations of the Cold War, the north seemed to present a liability to Canada and the United States. The continent, wrote geographer Stephen Jones in 1948, is “wide open at the top.” To impose greater control over this area and improve continental defence, Canada and the United States expanded and deepened their wartime military alliance by establishing monitoring stations and defensive networks, and eventually integrating air defence through the North American Aerospace Defence Command (NORAD). By the early 1950s a distant early warning system, or DEW line, consisting of a string of monitoring stations, stretched across Canada’s most
distant and isolated northern reaches. A military geography of Canada in 1949, therefore, was a timely and pressing topic. As Canada’s continental defence moved into little-known geographical realms, a premium was placed on learning about those realms, about mapping a new geography.

The rise of geography as a distinctive discipline with a place in school and university curricula has often been linked to the rise of the state and of military power. Warfare conducted by states, after all, requires precise geographical knowledge. Armies move through landscapes, navies through seas. The walls of Churchill’s wartime bunker were covered in maps, across which he followed the course of the Second World War and on which he plotted strategy. In Canada, geography had been a relatively neglected field of study before the Second World War. Small departments existed at the Université de Montreal and the University of Toronto, and a handful of geography courses were taught at different Canadian institutions. As the Second World War came to a close, several leading intellectuals, universities, and philanthropic organizations began to develop geography courses and departments across the country. One of the chief aims was to create new knowledge of the Canadian north. McGill became one of the most important sponsors of this new geography where the ties to northern research were most direct. In 1944 a geography department was founded at McGill, and the following year, the Arctic Institute of North America. The two units maintained close ties and attracted a new generation of northern specialists.

George Kimble, the first chairman of geography at McGill, was not a northern specialist, but a generalist of wide learning and experience. Before the war, he taught geography at University College, Hull, and the University of Reading. His scholarship focused principally on geography in the Middle Ages. During the war, he served in the British Royal Navy’s meteorological service, assisting invasion weather planning in Europe. Kimble had no particular Canadian experience or expertise, and his stay at McGill and in Canada would be short. In 1950, he departed for the United States, where he held several administrative positions, including Director of the American Geographical Society. After CMG, Kimble co-edited a book in 1955 on Canada’s north, but this would be his last scholarly contribution on Canada and he wrote none of the text. Subsequently his attention turned to Africa. He was, on the face of it, an unlikely potential author for a Canadian military geography, but his situation was not unusual. Because geography had such a small place in Canadian universities before the war, the rush to expand geography programs in the late 1940s drew heavily on personnel from abroad, particularly the United Kingdom. Kimble’s CMG would be a book written by an author surrounded by a certain concern for northern and military affairs, but without a great deal of specialist knowledge about Canada or the north.

Mapping Canada

Any geography that purports to situate Canada in its world position immediately runs into questions of scale: just what ought to be covered in a book of this scope—how much of the world and how much of Canada? And just what about Canada ought to be discussed? Particular cities? Regions? Provinces? Natural features? Kimble’s choice of focus and coverage suggests an uneasy tension between an interest in international affairs and a focus on national coverage broken into regional components.
Although the CMG can be read in other lights, when I came to write about Kimble’s book my thoughts kept returning to these overarching themes of scale, regionalism, and the problems of representation. In some earlier work on the social scientific understanding of the Canadian north, I had been impressed by how relatively unstable definitions of a region (like the north) can come to take on considerable meaning and permanence in a scholarly community or a broader public discourse. As I leafed through Kimble’s volume, I felt that I could recognize a similar set of processes at work: of the identification and representation of territory shaped by a particular vantage point and way of seeing, which would go on to influence later interpretations of that territory. The CMG appeared to me as one attempt to produce a national portrait between two covers, and the question of scale—of how the world, the continent, the nation, and the region were represented—seemed like a key point of entry into my inquiry. I also knew from my teaching that much of the geographical scholarship in this era had been produced under the sign of regional geography. I had, in fact, received a copy of the CMG as a gift from a retired colleague, J. Lewis Robinson, a much-respected practitioner of Canadian regional geography who had worked for the Canadian government in the north during the Second World War, and who had gone on to found the geography department at the University of British Columbia. As I approached the atlas, then, my own reading was shaped by my past work, my understanding of the relevance of the regional tradition informing Kimble’s book, and the knowledge that Lew Robinson had once owned this book. My reading would even be prompted in certain directions by comments Robinson had scribbled in the margins.

Kimble’s first chapter on Canada’s global position stood in sharp contrast to the rest of the volume. Whereas he sets out boldly to instruct students in Canada’s global linkages in Chapter 1, with discussions of global influences on climate, resources, and trade, as well as analyses of Canada’s setting in relation to airways and “world power centres,” the rest of the volume shifts to broadly Canadian and regional topics. (The sole exception is a final chapter, treating aspects of Canada’s external trade.) The global position map, the first of 20 in the book, is the last one to situate Canada internationally or to describe lands beyond Canada in any detail. Most of CMG’s maps adopt a conventional projection, encompassing the country or region as a whole and describing phenomena within that space but not beyond it. While great lines of contact and influence flow in and through the global position map, Kimble’s 19 other maps all stop abruptly at the border. Contour lines on weather maps magically disintegrate where they might be drawn into Alaska. Maps of the density of population and settlement contrast a blank white southern arc over the United States. Even maps on Canadian resources that might imaginably have contained data on Canada’s important trade relations with the United States instead portray them as stockpiles of things, variously placed across Canadian space. Partly, this may have been a reflection of the fact that Kimble drew primarily on national data sets to produce his maps, and did not pursue the necessary research to extend phenomena across national lines. But his maps also suggest the extent to which this atlas also produced a relevant national territory that could be portrayed, pondered over, and analyzed outside its immediate continental context. Whether this was Kimble’s overt aim is impossible to say, but it was one of the effects his maps produced.

Although the national scale view proved to be Kimble’s favourite, he did also include several regional maps to specify economic distributions. The text accompanying the national maps also
routinely divided the discussion into physiographic regions: the cordillera and the prairies, for example, rather than a political boundary definition, like British Columbia or the Prairie provinces. This regional approach pulled him even further from the promise of the opening chapter on global position. CMG, in the end, was mostly a study in regional geography.

Regional geography was an established genre in early 20th-century scholarship, with strong national traditions in France, Germany, and the United Kingdom. The genre sought broadly to convey a geographical description of place, treating natural, economic, and cultural aspects, and explaining the coherence of a region within itself and in relation to others. In the hands of Canadian authors, the regional genre had become a primarily inventorial exercise. A. W. Currie’s *Economic Geography of Canada* (1945) insisted on its analytical emphasis, for example, but devoted most of its pages to long lists of resources, settlements, and economic potentials. Like Kimble’s work, Currie divided his regions by physiographic divisions, weighting regional definitions in seemingly inalterable physical reality. He explained economy first by way of physical descriptions of Canada’s climate, soils, and topography. Upon that basis much of his economic discussion unfolded. Kimble similarly began his discussion with Canada’s physical features, and chapters on weather and climate as well as plants and animals, before turning to economic and settlement geography. Implicit in the genre and Currie’s and Kimble’s practices of it was the idea that the environment underlay human activity, bounded it, and set limits and possibilities for human life.

Kimble’s regional approach emphasized some regions over others. In the text, the least discussed of Canada’s regions or areas is Newfoundland, an understandable oversight in some senses because the province joined Canada only in the year of publication. Although Newfoundland appears on all of the Canada maps, it is not discussed at any length in the text, nor does it appear in the statistical appendices. The longest discussion is a paragraph dealing with hydroelectric potential in the province. What is more surprising given Kimble’s opening remarks on Canada’s world position and the relevance of its northern frontier to discussions of international politics is the absence of much focus on the Canadian north. Because of Kimble’s division of the volume into chapters on physical geography and economic and settlement geography, rather than on regions per se, the north gains some representation in the physical chapters describing climate patterns, soil, and plant types, but little in the chapters dealing with agriculture, mining, and settlement. One of the later chapters on transportation re-emphasizes the importance of air travel in the north, but does not develop the point. The area that is highlighted in the introductory chapter as a potential stage of international significance, and which had gained considerable attention in the security discourse of the era, remains at the margins. The emphasis on national coverage and the treatment of particular economic themes structured the volume in such a way that the north was ironically marginal to the main line of discussion.

National coverage by an author with little national experience produced other problems. Several of the national maps contained unintended distortions and inaccuracies. So did the text. As mentioned earlier, my copy of CMG was originally owned by J. Lewis Robinson, who taught the course in the regional geography of Canada at UBC for many years. Unlike Kimble, Robinson spent much of his career studying Canada and knew its regional dimensions well. In Robinson’s handwriting, several of the maps and parts of the text have been amended and corrected. The map on physiographic divisions, for example, contains one of Robinson’s unmistakable pencil lines in
its upper left-hand corner, seemingly extending the eastern border of the interior plain north and
eastward (see Figure 14.3). Where Kimble describes the Coast “Ranges” of British Columbia,
Robinson amended this to the Coast “Range” (31). These small factual errors stood alongside
errors of emphasis and symbolization. In Map XV, on minerals and waterpower, for example,
Kimble’s deep black thematic representation of coal deposits seems to trump symbols for water-
power sites. In western Alberta, where several power sites were developed along the Bow River, all
one sees are coal deposits blanketing the entire region (see Figure 14.4). In other parts of the
country, rivers with significant power projects are not identified. To judge by Kimble’s map, the
only significant waterpower site in British Columbia was located in the vicinity of Victoria,
whereas this was one of the smallest waterpower sites in the province, following large projects on

Figure 14.3 “MAJOR PHYSIOGRAPHIC DIVISIONS OF CANADA”

The physical geography of Canada, painted in broad regional strokes, provides the foundation for Kimble’s
analysis of Canada’s economy and political future. Notice the area between the Interior Plain and the Canadian
Shield, where Professor Lewis Robinson identified an error in pencil (above Great Bear Lake, Canada’s northernmost
large lake).

Source: George H. T. Kimble, “Major Physiographic Divisions,” Map IV of Canadian Military Geography (Ottawa: Directorate of
the Kootenay River and tributaries of the lower Fraser. Small errors may be found in most published books, but these errors were not trivial. Kimble’s distance from his subject showed.

If Kimble’s book aspired to situate Canada in a global context but succeeded mainly in offering a regional geography, just how was it a military geography? Just as regional geographies have a long tradition, so too do military geographies. Military geography is a branch of knowledge devoted to studying the surface of the earth and human settlements with a view to military logistics and strategy. Jean Martin, a military historian, has written an essay exploring the relative dearth of military geography in Canada, and rightly identifies Kimble’s volume as one of the first in name but with relatively little military content. Indeed, no section of the volume seeks to connect the discussions of physical or human geography to military questions or concerns. There are no discussions of

Figure 14.4 “LOCATION OF MINERALS AND WATER POWER”

The crude symbolization in this map makes coal deposits seem much more important than waterpower sites. Kimble’s inexperience in Canadian research shows in the absence of several important Canadian waterpower projects.

military installations, problematic regions, or the challenges of logistics such as supplying a land army across such a vast and episodic settlement geography. None of the maps relate military information. The military component in the CMG is rather indirect. Kimble comes closest to addressing Cold War concerns in the questions he poses for readers at the end of each chapter. Intended as discussion points for readers, these questions link the text to broader world affairs. At the end of Chapter 1, for example, he encourages readers to discuss “The distribution of strategic resources in relation to the future peace of the world” (11). At the end of the final chapter he asks students to consider “The ‘survival role’ of cities in an atomic war” (193). Curiously, this is the one and only mention of atomic warfare in the entire volume, a striking absence given the context. Kimble’s CMG provided the groundwork for a discussion of military geography based on an understanding of general geography. Just how well this worked for students or teachers is unknown.

If Kimble’s CMG presented a remarkably unmilitary geography, then just what kind of geography did it provide of Canada’s environment and economy? How did its contents help to fashion a Cold War vision of the Canadian environment? One of the most striking things about Kimble’s portrayal of the environment is that it assumes throughout an instrumental purpose. That is, the earth and all it contains is there to be used. Canada’s natural variety makes sense and gains meaning in relation to possible human uses of that diversity. Even the opening chapters of the book, focusing on physical features like climate and plants and animals, assume this perspective. Consider, for example, Map IV, Major Physiographic Divisions, a clear-cut depiction of seven physiographic divisions, each of which halts at the country’s borders, our first clue that Kimble is interested in more than physiography (see Figure 14.3). The text accompanying the map provides further background on the features that typify these divisions, salted with a range of comments on the suitability of these features for settlement and use. The large number of lakes to be found in the Canadian Shield merit this dismissal: “Most of them are shallow: many of them little better than bogs” (24). In Kimble’s reading and set of assumptions, shallow lakes/bogs stand in the way of useful farming or some other form of exploitation, so they are practically useless. Kimble’s description of rivers of the western Cordillera—which are not to be found on the map—further point toward their service as communications arteries: “The most striking feature of Pacific streams is their rectilinear layout, trough-like stretches being separated from one another by transverse canyons which cut deep gashes into the grain of the country. These canyons effectively control east-west lines of communications” (34). Although the map summarizes physical geography, the author seeks to mobilize that knowledge to instruct readers in the use of that geography and the limits it presents to human settlement.

In the latter half of the volume, aspects of human geography appear in the foreground. With Canada’s physical features established, Kimble moved on to work out various ways in which they were or could be used. If we look again at Figure 14.2, which we examined originally in discussion of map symbolization, it is evident that Kimble is mapping here an anticipatory geography. This map seeks to project or predict future land use. Comparing actually existing projects to projects under construction or proposed, one notes that at least half the land area identified is not actually contained within operating irrigation projects. In his textual discussion, Kimble stressed that irrigation farming was on the increase, reclaiming lands lost in the previous decade to dust-bowl conditions; he noted approvingly that farming was becoming more scientific and the exploitation of land more industrial. Recent trends suggested, he claimed, an upswing in large farms, producing
benefits of scale and efficiency. His interests appeared not to focus on how farming affected soils, how industrial farming (his term) consumed high inputs of energy and materials, or how large farm sizes might have unknown effects on land stewardship patterns or community life. Expansion was to be welcomed and the rational exploitation of the earth facilitated.

Farming was one way in which Kimble explained the significance of Canada’s physical geography for human use. But this utilitarian logic ran through the entire volume. Rivers do not appear as a major focus of attention in the early chapters on physical features, but they are central actors in the economic chapters. In Chapter 6, on minerals and waterpower, rivers fit within the parameters of hydroelectricity: they are judged according to their flow, their potential delivery of energy, and their accessibility to major settlements. In Chapter 9 on transportation, rivers appear again as modes of communication. Alongside discussions of highways and railroads, rivers are described in terms of their contribution to moving goods and people across the continent. Their function as a moving transportation network trumps any other interest in rivers as habitat for flora or fauna, or as a landscape feature. Another examination of human concerns with rivers might consider them as freshwater sources, fishing sites, or flood hazards, but Kimble’s treatment focused in particular on rivers as moving energy, as drivers and carriers.

Kimble’s utilitarian logic made some accommodation for the idea that resources were finite and needed to be treated in such a way as to perpetuate use over time and through space. His description contained some acknowledgment, in short, of a conservationist approach to resource development. This comes most clearly into focus in discussions of population and settlement, in which he seeks to project forward what might be the prospects for agriculture in Canada. In a subsection dealing with “population capacity” he asks whether or not the rapid exploitation of Canada’s “natural wealth” might put a brake on Canadian economic and social development. He notes the soaring rates of consumption of timber and minerals, the poor effort to restore forests, and the inability to expand a finite supply of nonrenewable resources. In general, however, he was not overly troubled. Canada’s vast northern realms presented new frontiers of possibility. The northward course of settlement, of which he seemed fairly confident, promised to break open new agricultural fertility and resources. Of six Canadian regions identified for agricultural expansion, four lay in the northern sections of provinces (the Peace River district and the Claybelt of northern Ontario) or in the Northwest Territories or Yukon (the Mackenzie Basin and Yukon Valley). Although conservation held a place in Kimble’s environmental perspective, it was harnessed to a utilitarian principle.

Contrasting this treatment of the Canadian environment as a storehouse of potential was a recurring tendency to emphasize the determining aspect of environment on human culture. The environment not only placed limits and offered possibilities to human cultures in this view, but also shaped them and partly determined their development. As a former meteorologist, Kimble was particularly interested to note the effect of weather patterns: “A . . . notable characteristic of most of the continent,” he explained in his discussion of Canada’s world position, “is the variability of its weather. The pressure pattern is constantly changing. Cyclones (lows) and anticyclones (highs) with their distinctive airmass conditions move across North America in an almost never-ending sequence. The effect which these changing atmospheric conditions have on the population can hardly be over-estimated. Huntington argues that the energy of North American people is directly related to the physical and psychological stimulus derived from the alternating arrival of warm and
cool airmasses” (2). Ellsworth Huntington was not just any authority to be invoked. An American explorer and geographer, he was a leading proponent of “environmentalism,” a term that then carried a very different connotation than today, stressing the influence of environment on humans. Huntington’s work argued the fitness of the North American environment for human communities and drew a close connection between race and climate, assuming that some “races” performed better than others in particular environments.16 Kimble did not follow Huntington this far, but he did seem to share Huntington’s confidence in the overriding effects of physical geography on human communities and behaviours. In a section addressing Canada’s Arctic frontier, he laid out the changing nature of air travel in the north and then noted that “in view of the persistent tendency for the world’s power centres to migrate polewards, rather than equatorwards, the aerial importance of the 

Arctic zone may well increase during the next generation” (10). Kimble portrayed human settlement geography as a morphing amoeba that grew and expanded in ways ordained by nature. In a discussion of climate as a control factor on the location of industry, he suggested that shipbuilding had located substantially in Vancouver during the war because of the beneficial climate, which resulted in a lack of sea ice and good outdoor work conditions (132–33).

As a geographer, Kimble was also broadly interested in the spatial aspects of Canada’s site and situation. His maps suggested this in their emphasis on patterns of distribution and areal differentiation. His environmental vision, in short, was fundamentally spatial. Although this may not appear to be a particularly important feature of his treatment of environment, it does make sense of his regional approach and his constant concern to pin down generalizations about the national scene with particular examples and synoptic specifications. Kimble did not simply write about the number of waterpower sites in Canada, for example; he also sought to map them, and, in this way, give expression to the spatially variegated topography of Canadian physical and human geography. Environment, in Kimble’s treatment, was a spatially dynamic set of processes and patterns.

As we pull back from the detail of Kimble’s CMG, a broad interpretive pattern stands out: Canada is a coherent cartographic (read: national) space, situated in a vulnerable international context, and differentiated internally in terms of physical regions with close connections to economic zones. The country consists of a vast and varied resource wealth, which must be developed and conserved but always used; that resource wealth is partly a product of environmental circumstances that impose controls on human use, even as human agency over the earth is assumed to be proper and good. Student readers of this text might well have been forgiven if they found these implicit messages to be contradictory. In Kimble’s hands the geography of Cold War Canada was contradictory. The cultural fashioning of environment and nation in his text implied a country notably defined by its physical resources and the economies that grew up to exploit them. Although questions of military significance shaped the production and reception of the volume, regional, not military, geography animated its central concerns.

So What?

When I am about to write a conclusion to an essay and find myself staring at a blank page, I find it useful to ask, so what? What has our reading of Kimble’s CMG suggested about the practice of doing environmental history? What has the nature of our evidentiary base meant for the conclusions we
can draw? And finally, what can be said about military geography as a form of environmental knowledge?

One of the advantages of focusing on Kimble’s CMG is that it has brought into focus the possibility of examining historical maps or geographical treatises as a source for environmental historians. Historians are best trained as interpreters of words and fragments of paper. Maps are like texts in some ways, but they also require specialist knowledge of cartographic methods, compositional styles, and geography to be fruitfully and critically deciphered. On the whole, environmental historians have made little use of maps in their research. They also rarely produce maps, except simple locational maps, in their published work. As a result, environmental historiography tends not to be particularly sensitive to spatial questions or approaches. I can think of at least three good reasons to read historical maps as part of the general research strategy for any environmental history project: (1) This puts researchers in mind of contemporary spatial representations and of their use by different groups, (2) maps yield environmental information and spatial data that are sometimes difficult to obtain from other sources, and (3) maps provide a different perspective, a fundamentally spatial perspective, on historical processes than is usually offered by other kinds of archival, published, or oral historical sources.

One of the mixed advantages of focusing on Kimble’s CMG, however, is that it represents a rather limited evidentiary base for drawing conclusions about the cultural fashioning of environment and nation in the early Cold War. Its contents are certainly relevant, and I have pushed where I could to highlight notable aspects of the text and maps that shed light on the problems before us. But most of those points gain significance by situating them in a context, by pointing out just who the author is and where and in what fashion he worked, by noting the political and intellectual climate in which this volume was produced, and by thinking in general about how CMG represents a Cold War text, significant in part because it reflects and shapes the cultural discourse of an era. We have been able to draw out some of these contextual observations by anchoring the analysis in the secondary literature and by reference to a small scattering of other primary sources, such as A. W. Currie’s *Economic Geography of Canada*.

If you have been reading the endnotes as you have proceeded, however, you will have noticed an absence of references to archival sources, or to interviews. Reading CMG on its own terms in the absence of other archival work has therefore imposed some limitations on some of the questions that we could ask and answer. I have tried to flag several of these along the way: we know little about how and why Kimble was asked to write this volume; we do not know how the book was used in officer training curricula or how those officers-in-training made sense of Kimble’s work. I would be interested in knowing the answers to these questions, but at this stage of my research I can’t answer them. Perhaps military records might shed some light on the commission for the volume? Perhaps other military or educational records might include some discussion of CMG in an educational context? Answers to these questions await further investigation. In the meantime, it is best to acknowledge frankly what we can and cannot know and not to overstep our ground by making rash speculations. If we were drawing a map, the equivalent would be to leave some sections blank, or to insert small question marks where our data are thin. In the accompanying text we might alert the reader to the difficulties of representing a partially realized geography.
There is one final point to make. As a source of environmental ideas, military literature has only recently become a focus of environmental historiography. In general, as John McNeill argues, environmental historians have not paid due attention to the force of the military and of preparations for war in shaping environmental ideas and policies, as well as environmental change. War has been a recurrent and transformative force in human history, which historians have examined broadly from political, economic, and social perspectives. But the consequences of war touch not only on human communities, but also on land, seas, and other species. As environmental historians expand the bounds of their work and their imaginations to encompass military problems as appropriate subjects of study, sources like Kimble’s CMG will become more important. A volume like Kimble’s will yield other readings and other relevant information for studies of war and environment in Canada.

**DISCUSSION QUESTIONS**

1. How might maps reflect a person’s time and place? How do maps reflect an environmental understanding?
2. Why does scale matter in environmental history?
3. How do wars and all of the activities that go into making wars shape the environment and our understanding of it?
4. In what ways do states create environmental knowledge? And with what effects?
5. Why was an Englishman, with little experience or knowledge of Canada, the person to write an authoritative volume on its military geography? What does this suggest about the state of Canadian universities and intellectual life, as well as Canada’s position within the British Commonwealth after the Second World War?
6. Why do the maps in Kimble’s book stop at the Canadian border? Is this a common practice, and, if so, why? What kinds of environmental phenomena ignore national boundaries? Can you think of any that respect them?
7. How does shading on a map affect its representation? How do figures make symbolic statements?
8. What is environmental determinism and do aspects of that ideology find their way into Kimble’s military geography?

**NOTES**


**Further Reading**


Reconstructing Reforestation: Changing Land-Use Patterns along the Saint-François River in the Eastern Townships

Stéphane Castonguay and Diane Saint-Laurent

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Environmental changes to the Canadian forest followed its economic history.¹ When the colonial economy moved into merchantable timber at the end of the 18th century, large stands of white pine in New Brunswick, Quebec, and Ontario were cleared. By the end of the 19th century, the growth of the sawmill industry and the advent of the pulp and paper industry gave new impetus to the deforestation process, resulting in the cutting of forest species formerly considered undesirable, such as spruce and fir. The situation inspired a nascent conservationist movement that denounced the myth of the inexhaustible forest. To alleviate this “Canadian assault on the North American forests,” the conservationists recommended a series of silvicultural measures to protect and regenerate the forest cover. Some provincial governments and pulp and paper companies undertook reforestation projects, but many opted instead to devote their resources to combating
fires, since the forest, they claimed, regenerated on its own. Regeneration could be seen on land cleared for agricultural production that farmers had abandoned after years of meagre yields.

Reforestation, as a process of environmental change, appears then to result from two causes: one related to ecological dynamics, the other to industrial activities and government policies. Distinguishing one from the other is a complex task, however, which we attempt to tackle in this chapter. Our case study describes the reforestation process as it occurred in the Eastern Townships in Quebec in the second half of the 20th century. Our aim is to use historical and geographical approaches to determine how the forest cover re-established itself after the severe clearing of the late 19th century, and whether this reforestation process was of anthropogenic (human-induced) or ecological origin. Of particular interest is the fact that our research on reforestation originated from two distinct projects on flood problems in the Eastern Townships, along the Saint-François River (Figure 15.1). As a physical geographer, Diane Saint-Laurent was looking at the role of precipitation and other climatic factors in modifying the frequency and intensity of flooding events. She started her research with a chronological reconstruction of flooding events, and by collaborating with a historian she was able to find sources for events that occurred before the collection of official data began. As a historian, Stéphane Castonguay employed data similar to that collected by Saint-Laurent, although his concern was related to the perceptions and discourses of social actors, especially as some of them attempted to show that industry was—or was not—responsible for floods. As geographical and historical research proceeded, reforestation appeared simultaneously on our research agendas. We resolved to combine our approaches to understand the role of reforestation in controversies revolving around the role of forest cover in modifying the hydrology of the Saint-François River.

This chapter stresses the importance of collaborative work in environmental history. In particular, we wish to draw attention to the fact that analysis of traditional sources of historical research such as archives and printed materials, when used alone, can hardly account for ecological change. Of course, analysis of the discourses and representations of social actors is the mainstay of the historian’s craft, and environmental history is no exception to that rule. From its early days, environmental history grew out of an intellectual tradition that sought to understand the philosophy and politics of human and social relationships to nature. But ecological change involves more than discourses and representations. It is about the soil and trees, air and water, dirt and animals, natural elements and processes that compose an ecosystem. If environmental history relies solely on what humans say or think about ecological change, it loses track of the role of the environment in framing and influencing human discourse, and of the role of human impact on the transformation of the earth. This is why we think that the analysis of traditional sources is greatly reinforced when combined with the geographical interpretation of modes of land use. The use of data from the natural sciences enables a better understanding of how those perceptions are framed and influenced by the environment, what actors attempt to enlist in their dispute, and how human actions and intentions impact the environment. Therefore, an environmental historian who wishes to understand the role of human actions in bringing about ecological change in a given area needs the physical evidence drawn from different disciplines in the natural sciences to portray the material basis of the society–environment interactions. But this is only part of the story. Supplementing analysis of traditional sources with scientific evidence does not mean that the
Figure 15.1  LOCATION OF THE SAINT-FRANÇOIS DRAINAGE BASIN

This map shows the location of the main municipalities of the Eastern Townships and rivers of the Saint-François drainage basin.

Source: This map is reprinted with modifications from Stephane Castonguay, “The Production of Flood as Natural Catastrophe: Extreme Events and the construction of vulnerability in the drainage basin of the St. Francis River (Quebec), mid nineteenth to mid-twentieth century.” *Environmental History* 12(4):820–844; published by the American Society for Environmental History and the Forest History Society, Durham, NC.

latter alone is sufficient to discuss ecological change. The natural sciences may provide a description of the change and its immediate cause, but not its proximate cause—that is, the human actions and motivations behind the changes. And as pointed out by Stephen Bocking in the following chapter of this volume, science is both a tool and a subject for the environmental historian. It is a tool when it provides facts to describe the environment and when it points at immediate causes responsible for the changes that the environmental historian wishes to explain, yet it is also a subject in that an understanding of the context underlying the production of scientific knowledge is required. Thus, if one wishes to use scientific literature in crafting
a historical narrative, one must use it critically. One way to do so is to participate in the production of natural scientific knowledge, and this is another reason that collaboration between a historian and a physical geographer provides an interesting opportunity to develop a critical understanding of environmental change.

To demonstrate the fruitfulness of collaborative work in environmental history, we will show how to use a combination of historical and geographical approaches to construct and resolve a problem in environmental history. How do the tools of these two fields strengthen our historical understanding of geographical and ecological phenomena? Before answering that question, we first start by looking at the deforestation of the Eastern Townships and its ecological and human consequences. Then we see how a historian and a geographer addressing different research problems came to identify deforestation and reforestation as key phenomena. By combining their research, the historian and the geographer reconceptualize reforestation to take into account both the discourses about the river landscape and the changes in land use. The end result is to unravel the anthropogenic or ecological origins of the reforestation process of the Eastern Townships, as well as to understand better the relationships of this society to its river environment.

**Deforestation, Floods, and Reforestation in the Eastern Townships Region**

Logging-based industrialization of the Eastern Townships soared with the Reciprocity Treaty of 1854 and the construction of a railway along the Saint-François River linking Montréal to Portland, Maine. Relying on the water and other primary resources of the area, sawmills multiplied along the river and its tributaries, taking the lumber from the forests of Mont Orford and Mont Mégantic. Settlement of the area, begun in the late 18th century, increased and intensified the clearing of the land, thereby modifying the region’s economy and environment within the space of a few decades.3

Making use of electrical and chemical technologies rather than steam power, coal, and steel, the second industrial revolution increased this trend and led to greater use of the Saint-François River. The river was harnessed for the needs of heavily capitalized industries such as pulp and paper production, and the generation of hydroelectric energy was used to supply power to growing towns and heavy-machinery industries. Population growth and intensive urbanization along the river increased pressure on the river’s floodplains; greater use of the floodplains and a growing number of storage reservoirs gradually transformed the Saint-François River’s hydrological regime—that is, its seasonal variations as affected by climatic conditions and anthropogenic modifications—and heightened the devastating effects of ice jams and subsequent flooding. Moreover, the clearing of the riverbanks aggravated the surface runoff problem, creating a rapid rise in river-water levels during heavy precipitation. The riverbanks between the municipalities of Sherbrooke and Drummondville were the most affected by these anthropogenic changes, and this section of the Saint-François River was in fact the one that experienced the largest number of floods.4
Floods were not the only “extreme” climatic event attributed to deforestation; so were droughts, although they were less frequent and less spectacular. Even if communities were better able to deal with droughts than floods, the economic and political elite denounced droughts more fiercely; compared to floods, droughts interrupted industrial production for longer periods and affected all manufacturers because of their impact on hydroelectric power generation. Because manufacturing plants needed the river for energy, either directly or through hydroelectric power plants, they had to stop production during low-water periods. In this respect, a drought brought bad press to the area, which sought to be a flagship of Canadian industrial development. It also became increasingly difficult in the early 20th century to attract investors, who could not tolerate such uncertainty. Thus, “natural disasters” like floods and droughts meant different things depending on the phenomenon involved, the victims identified, and the magnitude and nature of the damage.

Faced with such catastrophes, the local elite, the provincial government, and the engineers from the Quebec Streams Commission considered developing the headwater lakes (Lake Saint-François and Lake Aylmer) into reservoirs in order to ensure a constant, year-long flow. However, the construction of two reservoir-dams at the outlet of these lakes in 1918 and 1927 did nothing to decrease the impact of flooding. Though no one blamed the dams, some noted their inability to prevent flooding. Regardless, the primary objective of the reservoir dams was still the continuous supply of water and, as a result, hydroelectric power. Thus, when the region recorded the worst flooding in its history in 1942 and 1943, the community and the local elite started looking for other solutions to regulate river flow. A severe drought in 1948 made the problem even more pressing. Engineers commissioned by the Quebec Streams Commission underlined the need to prevent rainwater from rapidly flowing into the tributaries, whose simultaneous inflows into the Saint-François River augmented flood damage. In that respect, reforestation of the riverbanks appeared to be a long-term solution.

Historical Methods: Interpreting Reforestation Discourse and Efforts

BY STÉPHANE CASTONGUAY

I came to this history initially through an interest in representations of natural disasters. Specifically, I sought to understand how social actors confer a natural character upon these phenomena, despite the fact that much of the disasters’ damage is often caused by human intervention, such as building a dam or constructing houses in a floodplain. The drainage basin of the Saint-François River offered an ideal site for the study because severe floods had occurred on a regular basis since the middle of the 19th century. The short but intensive period of colonization, urbanization, and industrialization rendered the site even more attractive because of the impact of these human activities on the riverine environment.

Reforestation became a central aspect of my research problem when I reviewed the activities of the Sherbrooke Chamber of Commerce surrounding the regulation of the flow of the Saint-François River. At the Bibliothèque et Archives nationales du Québec (BAnQ), I found reports...
from the committees set up by the Sherbrooke Chamber of Commerce in 1948 to regulate the flow of the river, prevent flooding, and beautify the river’s banks. In addition to the Chamber’s corporate members, the reforestation committee brought together stakeholders such as the region’s main private power company, the Southern Canada Power Company (hereafter, the Southern), the Association forestière des Cantons-de-l’Est (AFCE), and the Québec Department of Lands and Forests. The composition of the committee enabled me to define a preliminary list of archival series to be searched in hopes of identifying the positions and interventions of the regional stakeholders. I sought to understand reforestation as a way for society to create a landscape that masked the social factors and agents responsible for floods.

There were a number of potentially invaluable collections of sources. The collection of the Southern, whose archives have been in the hands of Hydro-Québec since the 1963 nationalization of hydroelectricity, includes a series of records relating to the forestry division and the land that the company reforested, along with Contact, a newspaper intended for the general public. The Quebec Department of Lands and Forests records at BAnQ include annual reports containing a quantitative summary of province-wide reforestation activities by county and region. The AFCE also has its archives at the BAnQ, in a collection comprising minutes of annual reports and executive council meetings. Lastly, at the Sherbrooke Historical Society, I could count on a systematic search of the regional press and the associated indexes, as one can at many local historical societies. I was then able to access articles from a few newspapers over a long period to learn about the events surrounding the floods, and the reforestation work done after the Second World War.

This set of primary and secondary sources appeared sufficiently rich and diverse to provide a good grasp of the subject and allow a critical review of each document. It would allow me to determine the motives of the main protagonists and their roles in the unfolding of the events surrounding the area’s reforestation. There were, however, some deficiencies in the documentary collection. For instance, there are no archives for the pulp and paper mills, for a few reasons. The industry consolidated over the years, leading to the liquidation or merger of several companies, with the subsequent disappearance or purging of archives when they were transferred. Furthermore, many companies do not make the archives that they do have available to researchers. I alleviated this problem somewhat by turning to local newspapers and the sector-based press. This is how I was able to find out, for instance, that Canada Paper was involved in the reforestation of 34,000 acres of land at its Windsor Mills site.

A critical review of these primary and secondary sources would enable me to identify the stakeholders’ interests and the significance of their actions and views on reforestation. For instance, I read these sources closely to understand better how the stakeholders viewed the ecological relationship between rivers and the associated forest environment, how they assessed the reforestation work in terms of objectives and achievements, and how they determined any anthropogenic or natural origins of reforestation. Of course, it should be reiterated that many of these documents were written by interested stakeholders. I needed to not only approach the sources critically (as with all sources), but also take into account the distance between claims and actions. Furthermore, in the case of reforestation, the end result of planting ought to be checked in the field. But, at the very least, I was confident that certain quantitative and spatial trends could be determined based on the historical documents listed here.
How did the stakeholders choose reforestation as the solution to flow control of the Saint-François River, whether the problems related to drought or flooding? The actions taken by the Sherbrooke Chamber of Commerce, the AFCE, and the Southern originated in a comprehensive document prepared by a committee that recommended the reforestation of the banks of the Saint-François River so that “forests could have a beneficial role in the regulation of the hydrological system, the prevention of devastating ice breakups and the prevention of soil erosion.” The fact that the president of the AFCE, a forestry association, spearheaded the document’s creation definitely contributed to the reforestation recommendation, but major companies such as the Southern and Canada Paper also took part in the decision, while the Sherbrooke Chamber of Commerce approved it and submitted it to the Department of Lands and Forests.

Following forest theories that had been in vogue since the end of the 19th century, these stakeholders asserted that a forest behaves like a sponge. Obviously, it was in their own interest to believe this. Trees and forest litter slow the flow of surface water during torrential rainfall. These “natural sponges,” along with the water table, which benefits from the slower surface water flow, act as reservoirs to prevent droughts. The stakeholders also recognized that reforestation would improve the aesthetic quality of the landscape. They expected the beautification of the riverbanks to boost the region’s tourist appeal for people from major Canadian and U.S. urban centres and improve the economy that had been ailing from the decline in manufacturing since the Second World War.

Reforestation appeared, then, as a way to prevent flooding and save a declining economy. How did Southern Canada Power present such a position? First, the Southern had been working on reforesting the site of its power plant at Hemmings Falls, on the Saint-François River, since 1926. Concurrently, it purchased the equivalent of 2,880 hectares of farmland in the area downstream from Drummondville, around the Spicer rapids, to create a land bank to eventually build a new hydroelectric dam. It was only in the 1940s that the Southern began to make systematic efforts to reforest the riverbanks and reduce river erosion—with the added benefit that the trees would also become utility poles for its power transmission systems. The Southern set aside 2,345 hectares to create a forest farm: 700 hectares were reforested, 965 hectares of natural woodlands were kept under forest management, and the rest of the area consisted of wetlands. The company also established nurseries upstream from Hemmings Falls to meet its need for seedlings.

Why did Southern Canada Power associate its power transmission system with the riverside landscape, forests, and wooded banks? The company was aware that its economic growth depended on that of the region. It also used its reforestation efforts to exhibit its contribution to the region’s growth and its social and economic progressiveness. In Contact, a column titled the “Forestry Corner” provided advice and arguments in favour of reforestation, saying that the practice would prevent water erosion, as well as accelerated sedimentation, which would otherwise contribute to overflowing during the flood period. The newspaper spoke especially highly of the Southern’s reforestation efforts, and stressed the need for the region to be made into a hospitable environment.

By 1956, the Southern had planted 2,268,166 trees, mainly white spruce and Norway spruce, with an 80 percent survival rate. Once its land was reforested, it sold extra seedlings to the government, which was otherwise unable to meet requests from farmers wishing to create a farm woodlot. By
1960, Southern claimed to have produced 500,000 seedlings for the government. Five years later, Hydro-Québec undertook commercial felling and sold the timber to Canada Paper. The state-owned company also sold more than 1 million seedlings to the Department of Lands and Forests.14

One of the other stakeholders involved in promoting this project, the AFCE, sought to increase the forest’s viability over a largely deforested area. From its inception in 1943, the AFCE worked in close cooperation with the Department of Lands and Forests, which had been working on reforesting the public woodland on a province-wide basis by setting up a network of nurseries near the lumber limits that had been deforested.15 However, as the Eastern Townships consisted mainly of private forests, the government did not consider pursuing its efforts there, despite the region’s advanced deforestation. The AFCE, which brought together private forest owners and as such acted as a substitute of sorts for the government, became the primary voice of local forestry producers.

Though the AFCE’s archives were not extensive, I learned much about the association through local newspapers. The AFCE acted mainly through conferences and its annual general meeting, as well as through the 4H clubs that it set up in the area. Forty-four of these clubs had their own nurseries, and ended up planting over 150,000 trees.16 Moreover, AFCE representatives travelled throughout the region to encourage farmers to keep a wooded parcel of land on their farms and manage it soundly. Like some American states, the AFCE implemented a certification system for forest farms, establishments of more than three acres in size used solely for tree-planting purposes. There were 129 certified forest farms in the Eastern Townships by 1973.17 Focused first on major institutional players such as the Southern and Canada Paper, certification extended to smaller farmers and then to municipalities that had acquired a community forest. Starting in 1948 when the town of Saint-Camille de Cookshire was given 1,500 trees by Brompton Pulp and Paper, the community-forest movement reached such towns as Sutton (with 60,000 spruce trees on 1,500 acres of land) and Thetford Mines (with 88,800 spruce on 500 acres).18 The community forest project was also supported by the Southern starting in 1951, while Contact’s “Forestry Corner” was subtitled “A Forest for Every Municipality” to encourage emulation through the establishment of demonstration forests.19

The Department of Lands and Forests was less vocal than the AFCE and Southern Canada Power, but its action was no less crucial. Its activities rested on the distribution of seedling plants through its Forestry Extension Services. Any farmer interested in creating a woodlot could turn to the department, whether for seedlings or for technical assistance. In 1946, the government set up a mobile nursery near its extension office in Sherbrooke, with the first 40,000 trees consisting of red pine, white spruce, Norway spruce, cedar, and fir.20 The minister of lands and forests, John S. Bourque, was responsible for setting up the extension office and nursery. Bourque was the MNA for Sherbrooke, a position he held from 1944 to 1958, and was quite sensitive to the report made by the reforestation committee of the Sherbrooke Chamber of Commerce in 1950. When the Chamber submitted the report of its reforestation committee and placed 15 recommendations on the table, Bourque responded immediately.21 He acknowledged that the reconstitution of wooded areas improved the regulation of river flow, and noted that the Forestry Service had already carried out most of the actions being requested, such as setting up a nursery in the area, creating demonstration forests, carrying out reforestation work.
on farms, and distributing trees free of charge. As shown in Tables 15.1 and 15.2, the government was actively involved in reforestation (though it must still be determined what became of the seedling plants—i.e., who was using them and where). In addition to the production of trees at the mobile nursery that the government maintained to meet local demand, the extension service was also supervising and inspecting reforestation projects by individuals across the region. Several projects required that saplings be transferred from the Berthierville provincial nursery, in addition to mobilizing industrial nurseries in the area, such as that of Southern Canada Power.

In sum, my research had shown that by 1950 farmers were already actively involved in planting trees and that the government was working on setting up nurseries and distributing the seedlings. Why, then, did the Sherbrooke Chamber of Commerce, the AFCE, and Southern Canada Power raise the spectre of flooding before the government and public to engage the whole region in a reforestation campaign?

Past annual reports of the Department of Lands and Forest enabled me to identify a factor that likely triggered the reforestation campaign: the 1941 amendment to the Reforestation Act. Given the potential obstacle of heavy taxation on the reforestation of private land at a time when wood was in high demand, and given the shortage of firewood and construction lumber, the Quebec government added Section 164 to legislation on woods and forests, stating that “As long as there are at least 300 trees per acre, the reforested land will continue to be taxed at the same rate as previously [. . .] provided that it continues to be used for planting trees.”

Table 15.1  **ANNUAL PRODUCTION OF THE SHERBROOKE/COMPTON MOBILE NURSERY FROM 1950 TO 1973**

<table>
<thead>
<tr>
<th>Year</th>
<th>Plant Production</th>
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<td>1950</td>
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<td>1951–52</td>
<td>157,500</td>
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<td>1952–53</td>
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<tr>
<td>1953–54</td>
<td>155,000</td>
<td>1965–66</td>
<td>—</td>
</tr>
<tr>
<td>1955–56</td>
<td>150,000</td>
<td>1967–68</td>
<td>298,000</td>
</tr>
<tr>
<td>1956–57</td>
<td>159,500</td>
<td>1968–69</td>
<td>633,000</td>
</tr>
<tr>
<td>1957–58</td>
<td>200,000</td>
<td>1969–70</td>
<td>754,000</td>
</tr>
<tr>
<td>1958–59</td>
<td>200,000</td>
<td>1970–71</td>
<td>562,000</td>
</tr>
<tr>
<td>1959–60</td>
<td>180,000</td>
<td>1971–72</td>
<td>768,000</td>
</tr>
<tr>
<td>1960–61</td>
<td>250,000</td>
<td>1972–73</td>
<td>1,546,000</td>
</tr>
<tr>
<td>1961–62</td>
<td>166,300</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Department of Lands and Forest of Quebec, *Annual Reports* (1950–72).*
This regulatory amendment was a powerful incentive for the Southern, whose “reforestation efforts” had been at a standstill for the past 15 years, from the time it planted its first trees at the site of the Hemming Falls power station. The tax exemption under this amendment allowed the company to decrease the property tax paid on land that it reforested around Spicer Rapids, acquired in the 1920s for the purpose of building a hydroelectric dam downstream from Drummondville. This tax exemption led Southern Canada Power to create its own forestry division in 1942, an unusual move for a power company. Furthermore, it hired a forestry consultant, Elwood Wilson, who had been widely known in North American conservationist circles at the turn of the century when he set up one of the largest private nurseries in the Mauricie region.23

Table 15.2  **Reforestation of Private Land in the Eastern Townships from 1942 to 1967**

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of Reforestation Projects</th>
<th>Number of Plants</th>
<th>Number of Inspections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1942–43</td>
<td>3</td>
<td>2,000</td>
<td>0</td>
</tr>
<tr>
<td>1943–44</td>
<td>43</td>
<td>82,500</td>
<td>35</td>
</tr>
<tr>
<td>1944–45</td>
<td>125</td>
<td>105,000</td>
<td>103</td>
</tr>
<tr>
<td>1945–46</td>
<td>205</td>
<td>170,000</td>
<td>88</td>
</tr>
<tr>
<td>1946–47</td>
<td>358</td>
<td>478,230</td>
<td>191</td>
</tr>
<tr>
<td>1947–48</td>
<td>401</td>
<td>774,960</td>
<td>316</td>
</tr>
<tr>
<td>1948–49</td>
<td>347</td>
<td>646,314</td>
<td>362</td>
</tr>
<tr>
<td>1949–50</td>
<td>386</td>
<td>580,618</td>
<td>327</td>
</tr>
<tr>
<td>1950–51</td>
<td>581</td>
<td>844,320</td>
<td>440</td>
</tr>
<tr>
<td>1951–52</td>
<td>754</td>
<td>1,158,400</td>
<td>612</td>
</tr>
<tr>
<td>1952–53</td>
<td>836</td>
<td>1,953,320</td>
<td>953</td>
</tr>
<tr>
<td>1953–54</td>
<td>970</td>
<td>2,161,627</td>
<td>906</td>
</tr>
<tr>
<td>1954–55</td>
<td>953</td>
<td>2,632,840</td>
<td>1,089</td>
</tr>
<tr>
<td>1955–56</td>
<td>884</td>
<td>2,057,000</td>
<td>1,171</td>
</tr>
<tr>
<td>1956–57</td>
<td>1,057</td>
<td>1,778,535</td>
<td>1,167</td>
</tr>
<tr>
<td>1958–59</td>
<td>1,163</td>
<td>2,639,600</td>
<td>1,381</td>
</tr>
<tr>
<td>1959–60</td>
<td>1,331</td>
<td>2,889,100</td>
<td>1,592</td>
</tr>
<tr>
<td>1960–61</td>
<td>1,745</td>
<td>3,268,050</td>
<td>1,555</td>
</tr>
<tr>
<td>1961–62</td>
<td>1,777</td>
<td>3,949,260</td>
<td>1,703</td>
</tr>
<tr>
<td>1962–63</td>
<td>n.a.</td>
<td>5,222,800</td>
<td>2,517</td>
</tr>
<tr>
<td>1963–64</td>
<td>n.a.</td>
<td>5,350,000</td>
<td>n.a.</td>
</tr>
<tr>
<td>1964–65</td>
<td>n.a.</td>
<td>786,000</td>
<td>n.a.</td>
</tr>
<tr>
<td>1965–66</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>1966–67</td>
<td>n.a.</td>
<td>4,840,000</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

*Source: Department of Lands and Forest of Quebec, *Annual Reports* (1950–72).*
In addition to overseeing Southern’s forestry operations, Wilson wrote *Contact’s* “Forestry Corner” column—in which he cheerfully publicized the work of this “major corporate citizen.” In the column he also gave advice on planting and denounced reckless cutting in wooded areas. The column showed forest-related views becoming interwoven with social issues such as the farmer’s role in soil preservation for the prevention of erosion, the “non-providential” cause of natural disasters (mainly attributed to poor resource management), and the additional revenue that the sale of firewood or lumber represented for farmers whose harvests were subject to the vagaries of weather.

It was also subsequent to the revision of reforestation legislation that the AFCE was created. Reforestation was central to the AFCE’s policies. Whether through the growing number of 4H clubs—a concept that had originated in the United States and thrived in Quebec under the banner of the AFCE’s parent organization, the Association Forestière Québécoise—or through the direct actions of its manager, the AFCE constantly encouraged reforestation of the Eastern Townships. Through its certification system, it guided and publicized the efforts of everyone from small farmers to large companies.

Reforestation thus brought together powerful stakeholders with diverse and complementary interests, while a growing number of views and institutional means enabled Eastern Townships inhabitants to actually proceed with reforesting the land. But how could the project’s results be measured, whether in terms of flood prevention, the implementation of recreation or tourism as a major regional economic activity, or merely as a reforestation tool along the banks of the Saint-François River? What became of the actual practice of planting seedlings and of the plants themselves? To answer these questions, we turn to geography to help describe the transformation of land-use patterns.

**Geographical Methods:**

**Understanding Land-Use Patterns**

**BY DIANE SAINT-LAURENT**

My research project initially concerned the role of climatic change on recurring flooding events along the Saint-François River and its main tributaries since the middle of the 19th century. I was able to provide a chronological reconstruction of floods and map them against series of climatic data. However, it is known that the hydrologic regime of rivers can be affected as much by anthropogenic changes as by precipitation. To consider the relative importance of these potential impacts one needs to identify the anthropogenic transformations of the land that may have amplified the magnitude and scope of the floods. Has there been an increase or decrease in agricultural areas at the expense of wooded areas? Has the expansion of urban areas led to the fragmentation of forests or wooded areas? Were gains in wooded area attributable to reforestation efforts or to ecological dynamics?

I characterized and delineated the main anthropogenic changes along the banks of the Saint-François River between the towns of Sherbrooke-Lennoxxville and Drummondville, using topographic and forestry maps as well as aerial photographs. Topographic maps are based on aerial photographs provided by federal and provincial government departments, and include a number of descriptive elements such as relief (altitude), building locations, road networks, river systems, and
the location of various infrastructural elements (e.g. bridges, dikes, dams). Besides including all the elements found on topographic maps, aerial photographs are useful for other things, such as evaluating forest cover, cultivated areas, and the density and distribution of urban areas.

I then selected the sets of aerial photographs that showed the most significant changes in the study area. Concurrently, I used forest maps to better assess changes in forest cover over several decades. The forest maps provide information on such matters as the different types of forest cover, species groupings, disturbances, and stages of development. The Ministère des Ressources naturelles et de la Faune (MRNF) creates these maps based on aerial photographs at a scale of 1:15,000. Considering the changes observed on available forest maps and aerial photographs, I chose photographs from 1945, 1966, 1979, 1980, and 2000. To make a valid comparison between sets of aerial photographs, I needed photographs of comparable scale, namely between 1:10,000 and 1:20,000.

The first step consisted of georeferencing the digital aerial photographs—that is, matching their elements to the coordinates of a known reference system (such as longitude and latitude)—using data from the Digital Topographic Database (DTDB). Georeferencing has the great advantage of cleaning up the spatial distortions that result from having taken photographs from an airplane. I created georeferenced photographs using standard aerial photos (Figures 15.2 and 15.3). Standard aerial photos show some distortion as a result of having been taken from an airplane and cannot provide an accurate positioning of surface areas. The georeferenced photographs, on the other hand, provide greater metric accuracy than standard aerial photos, and can thus serve as basic information when delineating types of surface areas. For the data transfer, I used the ArcGIS (ESRI™) software program, which involves integrating a given set of digitized data into a geographic information system (GIS). As shown by Peter Pope in Chapter 3 of this volume, GIS is a tool commonly used in spatial analysis that finds applications in archaeology and many other fields. The second step involved delineating directly on the georeferenced aerial photographs the areas showing major anthropogenic changes, such as forest cutting or the expansion of wooded areas, urban sprawl, or abandoned farmland. Lastly, to facilitate the

**Figure 15.2** SOUTH SECTOR OF SHERBROOKE-LENNOXVILLE, 1945

Widespread agricultural activity is evident in this 1945 aerial photograph of the south sector of Sherbrooke-Lennoxville, which also shows forested and urban areas.

*Source: © Department of Natural Resources Canada, 2007. All rights reserved.*
reading of cartographic materials, I identified changes to wooded areas (gains or losses) on the photographs for the year 2000, along with the growing urban areas of four riverside municipalities: Sherbrooke-Lennoxville, Bromptonville, Richmond, and Windsor.

Examining the area along the Saint-François River between the municipalities of Sherbrooke and Drummondville, one sees a widespread increase in woodland since 1945, most evident near Lennoxville, Richmond, and Windsor (Figures 15.4, 15.5, and 15.6). One also notes gains in wooded areas in the municipality of Sherbrooke (north sector). This expansion of wooded areas often occurs to the detriment of agricultural areas that, more often than not, were abandoned by landowners and have returned to a wild state. Many rural areas in Quebec have experienced this phenomenon of agricultural abandonment.

Analysis of aerial photographs reveals that, for most of the areas studied, the gains in wooded areas are greater than the losses. From 1945 to 2000, the measured gains were about 12,183.09 km² and the losses 733.77 km². One hundred and sixty-one wooded areas increased in size during this period, compared to only 24 areas that shrunk. The gains were relatively modest from 1945 to 1979, reaching only 2,598.04 km², whereas another almost 10,000 km² of woodland appeared between 1979 and 2000. This widespread increase in wooded areas late in the century often took place to the detriment of farmland. In other cases, wood gains occurred on river-banks. Lastly, a total of 24 wooded areas (733.77 km²) were lost from 1945 to 2000. Residential developments were the principal cause of these losses, as can be seen around Sherbrooke (Figure 15.4).

Though it is relatively easy to note the expansion of wooded areas on aerial photographs, along with the increase in forest density through the natural growth of trees, it is more difficult to recognize which wooded areas are the result of reforestation efforts. The many field visits that I made to the riverbanks lead me to believe that most of these wooded areas resulted from ecological dynamics after farmland was abandoned and changed gradually from fallow land to wooded and forest areas. It can also be noted that the riverbanks (±5–10 metres) most often remained wooded over the years due to the fact that their vulnerability to flooding prevented the construction of any
buildings. Furthermore, the wooded banks along the Saint-François River are essentially made up of stands of trees that have adapted to wetland conditions, including the silver maple, the dominant species in the region’s alluvial plains. The presence of these stands must be attributed to natural regeneration rather than reforestation efforts that mainly rested on the planting of red pine, white spruce, and other coniferous species.

Conclusion

Proposed in the early 20th century as a solution to the problem of deforestation and the shortage of wood material for the pulp and paper industry, reforestation was framed as a means to regulate the flow of the Saint-François River after the disastrous floods of 1942 and 1943 and the drought of 1948. Political, economic, industrial, and forestry stakeholders in the Eastern Townships rallied around a practice that could reduce soil erosion, especially on the slopes of riverbanks which, once cleared, were defenceless against gullying and erosion. But how did these discourses translate on the ground—or, should we say, in the forest? While historical methods revealed the stakeholders’ intentions and actions, geographic methods exposed major land-use changes as detected by photo interpretation. Their use enabled us to better determine the material basis for the stakeholders’ views and the subsequent changes to land use (such as deforestation and reforestation, agricultural abandonment, and expansion of urban areas). We were thus able to note gains in wooded surface areas recorded along the banks of the Saint-François River and its tributaries. Relying on historical sources, it would appear that reforestation occurred strictly as a result of a campaign initially launched by the Sherbrooke Chamber of Commerce to prevent flooding events by making up for the deforestation of the Eastern Townships. However, when we also incorporate geographical approaches—including field observation and landscape reading—we realize that the growth of trees on the river banks resulted from ecological processes. We thus cannot affirm to what degree—if
any—reforestation was the result of the campaign orchestrated by the Eastern Townships' economic actors.

Despite the scope of our historical and geographical accounts, we still need to clarify several points to answer our research questions. How was the Saint-François River forest landscape formed after the severe clearing of the late 19th century? Which gains in wooded areas were truly attributable to voluntary human action, i.e., tree planting? Which gains in wooded areas were the result of ecological processes or the unexpected consequences of human action (or inaction)? In the event that anthropogenic forces were in fact responsible for new forest surface areas, who was responsible, what did they do, and for what purpose? And even when these environmental transformations resulted from ecological dynamics, can we determine their social causes? For example, can we associate a situation involving agricultural abandonment that would explain the reappearance of trees along the riverbanks with the socio-economic crises that may have undermined farming activities in the area?

It seems unlikely that the gains in wooded areas between 1945 and 1979 were the result of the reforestation policies associated with the river flow regulation problem. In fact, these modest gains show that, during this time, tree harvesting continued in private forests and agricultural plots, at least enough to limit substantial forest gains. Moreover, it could be said that the region's logging trade was more or less sustained in order to meet the needs of the relatively high number of pulp and paper mills in the region. This forest harvesting, which was especially intense in the early 20th century in the Eastern Townships, may have contributed to the degradation of riverside environments by way of riverbank erosion, reduction in water quality through timber floating, and recurring floods, but, most of all, it created a severe lumber supply problem in the region. In fact, the situation appears to have acted as a driving force for reforestation efforts in the Eastern Townships, while manufacturers and the economic elite, along with governmental and private forest conservationists, promoted reforestation among farmers so that the latter could supply wood material to sawmills and

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**Figure 15.5  EVOLUTION OF WOOD AND URBAN AREAS OF RICHMOND, 1945–2000**

As shown in this georeferenced aerial photograph, from 1945 to 2000 Richmond's urban areas spread along the main roads and highways, even as woodlands grew denser.

*Source: Marlies Hahni, Geographer, UQTR.*
pulp and paper companies, and also benefit financially from it.

A discrepancy appears between the discourse of reforestation and actual reforestation efforts. On the one hand, the discourse focused on the need to cover the riverbanks with trees to prevent flooding. On the other hand, the distribution of seedlings and reforestation were aimed to set up farm woodlots that were not necessarily located on the riverbanks but would provide farmers with additional income and manufacturers with a local supply. One option required new trees to be kept in place to retain the soil from drifting, while the other required cutting down trees for farmers’ profits.

Meanwhile, the reforestation of riverbanks, capable of preventing erosion and the subsequent sedimentation process responsible for overflow, was the result of an ecological dynamic unrelated to any direct, voluntary human action. Reforestation occurred spontaneously along the riverbanks, and planting efforts remained limited there.

While gains in wooded areas on the riverbanks seem to have little to do with the campaign orchestrated in the 1940s, we nevertheless need to understand how and why the reforestation discourse was so prominent in the following decades. Here, an understanding of the economic and social transformations of the Eastern Townships is needed. Reforestation became a popular issue when the Chamber of Commerce designed it as a solution to the problem of flooding. However, a group of stakeholders was already legitimizing some of its actions in the region in relation to these land transformation efforts to ensure a sufficient lumber supply for local manufacturers, from sawmills to pulp and paper mills.

Researchers develop tools, methods, and languages that are (it is hoped) well suited to their disciplines. But these can also be limiting: learning to do something one way can make it difficult to even conceive of doing it another. In this chapter, a historian and a geographer—building on their individual understanding of the processes at work—worked together to tackle issues raised by their research to reveal the human and ecological dynamics of an event. Through his research, the

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**Figure 15.6** Evolution of Wood and Urban Areas of Windsor, 1945–2000

Especially along the riverbanks, forested areas grew markedly in Windsor during the second half of the 20th century, a change that can be observed in this georeferenced aerial photograph.

*Source:* Marlies Hahni, Geographer, UQTR.
A historian showed that an impressive reforestation effort occurred in the Eastern Townships, in terms of both extension activities by public and private organizations and farmers’ acquisition of seedlings, but in areas not previously covered by the geographer. The latter can extend her study by examining the gains in wooded areas across townships that were actively involved in reforestation. Rather than being limited to the study of riverbanks and the role of their erosion in increasing the severity of flooding events, geographical research might seek to understand the impact of reforestation efforts and the forest cover on surface runoff and hydrological regimes. On the other hand, historical research might benefit from this geographical work by seeking to understand the extent of the economic activity generated on the farm by the maintenance of woodlots through reforestation efforts. The interpretation of georeferenced aerial photos would facilitate the identification of counties with net gains in wooded area through the reforestation efforts. Statistical information on these counties drawn from decadal censuses may be used to determine what wood products (firewood, pulpwood, construction wood, etc.) these farmers sold and why they were managing a woodlot. Such work, combined with a study of land tenure using traditional historical sources, would reveal information on the use of the land where forests take form and show the relationship between agriculture and woodlot management. Again, historical research might benefit from the geographical research, this time to understand the ecological changes related to farm abandonment.

Collaborative efforts between historians and geographers can thus provide environmental history with powerful tools to enhance our understanding of ecological changes and human affairs. Collaboration does more than “double” our evidentiary base; it increases our capacity to raise new research questions. Sources, causes, and meanings that we may overlook because we are caught up in our own research thinking can be unearthed by a colleague from another discipline. Moreover, collaboration forces us to expand our thinking: to imagine others’ understanding of ecological phenomena and to improve how we communicate our disciplinary knowledge to others.

**Discussion Questions**

1. Using the conventional aerial photos 1 and 2 (Figures 15.2 and 15.3) from the Sherbrooke-Lennoxville area, can you identify the information that was lost when georeferenced photos were created? What kind of information might have been lost when the original aerial photos were taken?

2. Can you think of other physical evidence that one may use to discuss the environmental changes that addressed in this chapter (and that are addressed in the other chapters of this volume)? What disciplines from the natural sciences should the historian consider? Can you think of other documentary evidence one may use to discuss environmental changes that addressed in this chapter (and is addressed in other chapters of this volume)? What disciplines from the human sciences should the historian consider?

3. The philosopher Thomas Kuhn argued that it is sometimes difficult to compare different theories because they do not share a common measure; he called this “incommensurability.” Do you anticipate that this would be a problem if you tried to integrate physical and documentary evidence? Why or why not?
4. The conclusion points to the use of census data in conjunction with geographical data to understand the process of reforestation. Why might you categorize these data as physical evidence? Why might you categorize these data as documentary evidence?

5. This chapter has focused on reforestation, but what other changes in land use might one explore with the georeferenced aerial photos?

**Authors’ Note**

This research was supported in part by grants from SSHRC and NSERC. The authors wish to thank graduate students in environmental sciences Marlies Hahnï and Ariane Drouin for their technical support on GIS and mapping, as well as graduate students in Québec studies Marilyne Lafrenière and Myriam Brouillette-Paradis for research in archival and newspaper records.

**Notes**


18. “Forêt de communauté à St-Camille de Cookshire,” La Tribune, March 5, 1948, p. 4; “Forêts municipales à créer au plus tôt dans notre région,” La Tribune, October 29, 1948, p. 3.


25. The National Air Photo Library (Natural Resources Canada) and the Photocartothèque québécoise (Ministère des Ressources naturelles et de la Faune du Québec) are, respectively, the major federal and provincial agencies.

26. The photography axis is not perfectly vertical when the photographs are taken because of the relief on the surface of the Earth.


28. To delineate the surface areas, I used the ArcMap module by ArcGIS, a commonly used software program in geomatics.


**FURTHER READING**


SECTION

VIII

Negotiating Expertise

Stephen Bocking

“Nature’s Stories? Pursuing Science in Environmental History”

William J. Turkel

“It Costs Something to Learn Something: Property Rights, Information Costs, and the Struggle at Fish Lake”
Nature’s Stories?
Pursuing Science in Environmental History

STEPHEN BOCKING

Stephen Bocking teaches Environmental and Resource Studies at Trent University.

In our evolving relationship with nature—the subject matter of environmental history—scientists and scientific knowledge have often played large roles. Consider a few glimpses of a particular place: the Mackenzie Delta region, where the Mackenzie River meets the Arctic Ocean. In the early 1930s, Alf Erling Porsild, a botanist, travelled across the delta by canoe and dogsled, assessing the terrain for reindeer herding, which he hoped would become a new local livestock industry. But 20 years later, scientists and technicians had very different objectives, flying in to build Distant Early Warning (DEW) radar stations to watch for Soviet bombers, as the region became a front line of Cold War confrontation—an episode we also encounter in Matthew Evenden’s Chapter 14 of this volume. Then, after another two decades, the region became something else again: oil and gas strikes excited industrialists and politicians, and ships and helicopters carried scientists seeking these resources while assessing the impacts of pipelines and other infrastructure on the local environment. But eventually most of them also left, even as the DEW stations became abandoned relics, and experiments in reindeer herding faded into memory. By the 1990s, Inuit hunters and government biologists were busy surveying beluga whales and other wildlife—species that have always been and are still, as Lyle Dick notes in Chapter 5 of this volume, an essential source of food for local residents. Other kinds of scientists were also appearing in the region, including some assessing the local impacts of warming, connecting phenomena like melting permafrost to global environmental change. The essential point is that in the environmental history of the Mackenzie Delta region—the diverse ways in which this environment has been understood, used, and transformed—scientists have often played leading roles.

For environmental historians, science is in part something to be studied: the history of humanity’s relationship with nature includes the history of scientific knowledge and practice, as well
as the influence of scientists on how we exploit or protect the planet. But science is also a tool, a chief
means by which historians and scientists themselves reconstruct the past. Environmental historians
draw on several scientific disciplines, from ecology to geology, to piece together the history of earth
and life. The focus of this chapter is on these dual identities of science: as subject and tool. However,
it is also worth noting science’s third role in environmental history, at least according to some histo-
rions: moral inspiration. According to Donald Worster, science, by describing the “coherence, pat-
tern, and integrity of nature,” should also guide our conduct in relation to nature. Yet these diverse
roles of science—as research subject, tool, and moral guide—have some contradictory implications,
which imply some challenges for doing environmental history.

Applying Science in Environmental History

For many environmental historians, science is chiefly a device with which to look into the past to
construct a history of environmental change. As Worster noted some time ago, “before one can
write environmental history one must first understand nature itself,” and this, he suggested,
required guidance from the sciences. Many historians have since agreed that nature should itself
be seen as a major source of historical evidence, and that science is needed to ensure that this evi-
dence is interpreted correctly.

Science can provide a wealth of information regarding past environments. Scientists of several
disciplines—geologists, biologists, biogeographers, paleoecologists, among others—have assem-
bled a rich and detailed record of the history of earth and life. This record encompasses change at
the largest scales: 3 billion years of evolution and extinction of species, punctuated by asteroid
impacts, volcanic eruptions, and other cataclysms; the rise and erosion of mountain ranges; the
spreading of continents and sea floors; and the advance and melting of ice sheets. Scientists have
also perceived changes on smaller scales: the scattering of species across new landscapes, some-
times eliminating those species already present; changes in ecosystems as the climate warms or
cools, or as a result of wind storms, fire, or other local disturbances; and ecological succession, as
when a farm field is abandoned and slowly returns to forest. These smaller changes have often
been tied to larger phenomena by intricate relations of cause and effect. Humanity itself, of
course, has also become an increasingly important force of change—as landscapes have been
cleared for agriculture; as timber, fish, minerals, and other resources have been exploited; and as
our release of wastes into the air, water, and soil have accelerated—and the resulting impacts have
also been described by scientists.

Scientific knowledge can contribute not only narratives of change, but also new ways of under-
standing these changes. For example, ecologists are now gaining a deeper understanding of how
species interact across entire landscapes, creating shifting patterns of abundance. Environmental
historians can draw on these insights in understanding why flora and fauna have changed over
time, particularly in relation to changing patterns of human settlement. As Emily Russell has
explained, only with an ecologist’s knowledge of plant succession can one understand exactly what
happens when an agricultural field is abandoned, and why the forest that replaces it may be very
different, depending on whether the field was abandoned during a dry or a wet period.
Castonguay and Diane St. Laurent illustrate this in Chapter 15, demonstrating how knowledge of succession can help in identifying which forests along the Saint-François River were planted, and which were the product of natural regeneration. Similarly, historians studying the salmon fisheries have learned from biologists that these fish range widely in their travels, from the headwaters of rivers to the open Pacific, and as a result these historians avoid trapping the stories they tell within national boundaries that are meaningless to salmon. More generally, insights into evolution—evident, on human scales, in the domestication and transformation of useful species, and in how mosquitoes and other insects gain resistance to insecticides—are essential to understanding the environmental history of agriculture and disease.

Scientific knowledge can often, in fact, give historians a better understanding of events than what was available to those alive at the time. For example, to understand the 19th-century industrial city, and why people were so anxious to gain access to reliable supplies of clean water, or (if they could afford to) to move into suburbs or the countryside, it helps to be aware of modern medical knowledge about the relation between polluted water and once-dreaded diseases such as cholera.

Some of the most ambitious and influential works in environmental history have drawn on scientific insights, particularly from ecology. In Changes in the Land, William Cronon combined conventional written sources with ecological science to understand how the landscape of New England was transformed during settlement. Alfred Crosby’s Ecological Imperialism applied ecological models of competition to explain why the import of new species into a continent—as occurred when European settlers arrived in the Americas—had such devastating impacts on both the humans and other species they encountered there. More recently, Jared Diamond’s best-selling Guns, Germs, and Steel attempted a global explanation of how and why civilizations emerged, at least in part, in response to ecological constraints and opportunities imposed by different continents. In these, as in many other historical accounts, water, air, fish, soil, animals—nature itself, in other words—is given a voice, and this voice is often in the language of science.

These books provide quite sweeping general accounts, but science can also be applied effectively in efforts to reconstruct the history of environmental change and human activities in specific places. Two good examples are Stephen Pyne’s use of knowledge of the fire ecology of particular species, such as the ponderosa pine, and of particular places, such as the African grasslands, the Brazilian coastal forest, the Swedish boreal forest, or the hills of Greece, to explain how and why these habitats have changed over time; and Joseph Taylor’s use of our current scientific understanding of the El Niño climate phenomenon to account for fluctuations in salmon runs that occurred several decades ago.

Using Other People’s Work

It’s a fallacy that history and science don’t have much in common—that they are two cultures, on opposite sides of the division between the humanities and the sciences. In fact, they share a great deal, including how they define questions, use evidence, and draw conclusions. Nevertheless, historians must also remember that most scientific knowledge was not created with them in mind.
mind. Scientists have their own reasons for studying the past. And, as when any tool is used for a purpose other than that originally intended, there can be risks in applying science to environmental history.

What are scientists trying to accomplish when they study the past? In fact, they may have any of several possible goals in mind. First, the history of the earth and life is itself considered central to the work of such fields as paleontology, geology, and evolutionary biology. In these disciplines, scientists ask historical questions, seeking to understand the “agents of change”—ice, water, tectonic forces, competition among plants or animals—that drive the history of the earth and the evolution of species. And the questions scientists ask regarding these agents may be entirely unlike those that historians would consider relevant.

Second, scientists have also realized that a historical perspective is necessary for understanding the world today. For example, most ecologists will agree that while the features of a landscape—including its geology and soil types—as well as the climate will influence what species may grow where, the particular local history, including the movement of species into and out of the region, and any changes caused by human activities such as land clearing will determine what species will actually be present. But here again, this objective focused on understanding the present differs from historians’ ambitions to explain past events.

Besides understanding the past and present, scientists can also have some practical purposes in mind when they study history. For example, to help guide restoration of a damaged ecosystem, ecologists typically seek to identify its original “reference condition”—often taken as the state of the ecosystem before humans began modifying it significantly. And more generally, because ecosystems often change, the management of a natural area can also be more effective when it is informed by an understanding of its history. Jasper National Park, for example, is an area protected as much as possible from change as a result of human activities. Yet it is also in the character of the forests and other habitats of the park that they will change naturally over time, and sometimes management practices such as controlled burns are undertaken to encourage this change.

Finally, scientists consider historical information useful in understanding how humans are changing the environment today. This is especially evident in research on climate change. By examining ice cores from Greenland and Antarctica, which contain within them a record of both the earth’s changing temperatures over the last several thousand years, and the content of the global atmosphere, the unprecedented nature of today’s climate as a result of greenhouse gases can be demonstrated. Historical evidence thus plays a role in today’s global environmental debates. But this also illustrates how, in reconstructing the past, scientists have different goals in mind than do historians. Given their aim of assembling a record of environmental change, scientists will focus on assembling an accurate set of data, and they will have less concern for what these data can tell us about how humans have thought about or related to nature in the past. Similarly, if scientists have some practical purpose in mind, this will also influence the kinds of historical questions that they ask. For example, restoration ecologists studying the history of a habitat may not aim to identify all aspects of past ecological conditions, but only those that are required by whatever species they want to restore.
Doing Historical Science

Scientists use a variety of techniques when they reconstruct the ecological history of a place. We will review briefly a few of these, identifying the key questions and forms of evidence that scientists concern themselves with. (William J. Turkel also describes, in Chapter 17 of this volume, some ways in which scientists examine the material traces of the past.) It is also important, however, to note that these techniques require advanced training and experience, and so are not generally practised by historians themselves. What historians can do, though, is be aware of the possibilities and limitations of these techniques, so that they can draw on scientists’ work, discuss their results with them, and perhaps even collaborate with them.

Some of the best historical information can be obtained from layers of sediment deposited underwater, particularly in lakes. As material is blown or washed into a lake from the surrounding landscape, it settles to the bottom, preserving both inorganic matter, such as clay and silt, as well as tiny traces of life, especially pollen and spores. By taking core samples of the sediment (usually by lowering a long metal tube, often in winter, to take advantage of the stable platform provided by lake ice), and by then analyzing these samples and determining the order in which materials were deposited, scientists can deduce a history of changes in the local environment. Pollen deposits can be especially useful, as they are usually abundantly available and well preserved in a variety of sediment types. The basic idea is that pollen species preserved in the sediment indicate what plant communities once surrounded the lake. Changes in the abundance of these species may indicate both natural changes (such as those due to climate change), and changes caused by human activities, such as land clearing and crop production. For example, much of our knowledge of the history of the landscape of southern Ontario has been gained through analysis of the well-preserved sediments of Crawford Lake, northwest of Toronto near the Niagara Escarpment. These sediments tell the story of 1,000 years of Iroquois agriculture, European settlement, land clearing, and climate change. But care must also be taken in interpreting these records: plants that release a great deal of pollen, or that are taller, will be far better represented in the record than those that do not produce as much, or that grow near the ground.

Besides pollen, sediment may also contain the remains of organisms that once lived within the lake itself, and they too can tell stories. For example, a shifting abundance of diatoms (a type of algae) can indicate changes in the climate or in the chemistry of the water. Analysis of the sediment itself can also tell us much. Layers of glacial deposits, interspersed with layers with organic content, can aid in reconstructing the history of ice ages. Sediment deposits can also hint at the local history of erosion—whether as a result of natural factors, or caused by manipulation of the landscape by humans. Analysis of traces of charcoal can suggest the local history of fires.

A second class of scientific techniques is known as dendrochronology: the analysis of tree rings. Everyone has counted rings to see how old a tree was when it was cut, but these rings have far more to tell us than just age. Trees are ideal natural archives; they live for centuries, their rings can be dated accurately, and changes in the local environment become coded into variations in the rings themselves: their width, density, and chemical content. Environmental changes that leave a trace in tree rings include variations in climate, as well as a variety of human and ecological events, such as the growth and death of trees, fire, and insect outbreaks. For example, tree-ring analysis is being
applied in Jasper National Park to understand how trees have expanded onto alpine meadows over the last century, and to predict how this expansion may continue as the mountain climate warms. Tree-ring analysis may be most useful in reconstructing the history of disturbances, especially fire: by studying burn scars, and tabulating the ages of trees in a stand, fire episodes can be accurately dated. But as with sediments, care must be taken in interpreting this evidence. Conclusions depend on various assumptions regarding chance conditions, local ecology, and other factors that can also influence the patterns of tree rings.

Many other scientific techniques are used in reconstructing the history of the planet. For example, lichens can be used to date changes in the landscape or the age of ancient buildings. As I have noted, another widely used technique (especially in climate research) is the analysis of ice cores from locations such as Greenland, where ice has accumulated over long periods of time. The relative abundance of the different isotopes of oxygen, and the amount of carbon dioxide and methane preserved in ice bubbles, can indicate temperatures and the content of the atmosphere in the past.

These techniques depend on certain principles of reasoning. A key one is the assumption that processes that have acted in the past are similar to those we can observe today. This principle makes it possible to reason historically on the basis of contemporary scientific knowledge (it was a foundational principle for Charles Darwin, the epitome of the historically minded scientist). However, it can also limit the range of explanations that are considered likely—it might exclude as a possible explanation, for example, catastrophes such as asteroid impacts that, while not observed today, may have been significant in the past.

A second principle is the use of multiple lines of evidence. Just as Ruth Sandwell emphasizes in Chapter 7 of this volume the need to use lots of different kinds of evidence when doing micro-history, so can several scientific methods provide a critical check on conclusions derived from any one. Multiple lines of evidence can also be essential to understanding not just what happened, but why, particularly in relation to the impact of human activities. For example, the historical role of humans in fire history can be deduced by combining burn-scar evidence from tree rings with other forms of evidence, such as written records or interpretation of landscape features. Often, in fact, other forms of evidence will be needed to make sense of scientific data. For example, while analysis of pollen deposits in sediment can demonstrate a shift in the dominant vegetation of a region, dating this shift precisely, or explaining why it happened (land clearing for agriculture, perhaps?) would require other kinds of evidence, such as historical documentation of settlement patterns.

The History of Science and the Environment

So far, we have been examining science as a tool: something to be used in our study of the history of the environment. But science has its own history as well. It changes, as scientists invent new ways of studying nature, as new data accumulate, and as scientists think up new ways of interpreting this information. An essential feature of this history is that it has many ties with the broader currents of history. In fact, science has been central to some of the most important events in world and environmental history. Consider a few of these: the expansion of empires and nations, the growth of modern cities, and the emergence of the idea of a global environment. The
field sciences were essential to the formation and expansion of empires. As various European powers—the British, French, and others—established colonies around the world, their armies and administrators were accompanied by botanists, geologists, and other scientists whose task it was to identify natural resources and research opportunities. In doing so, they contributed to the larger political purpose of empires: extending control over colonies and their peoples.17

The same kind of phenomenon—of science in the service of the state—was often evident in the formation of new nations. Canada is a good example: various scientific disciplines that could help in identifying useful natural resources such as minerals, good soil, or plants—what Suzanne Zeller described as the “inventory sciences”—were central to forming and justifying the idea itself of a transcontinental nation. This was a major reason why, even before Confederation, some of the first agencies set up by the Canadian government, such as the Geological Survey, were all about using science to extend the authority of the young nation over its immense territory. More generally, we can see how science has been tied closely to power over the environment, whether this is exercised by empires or by nations.

Interesting connections between government, the environment, and science can also be seen in the history of cities. As Michèle Dagenais and Joanna Dean explain in chapters 12 and 13, respectively, part of the environmental history of cities has been their responses to various challenges as they have grown, such as that of providing clean water and disposing of waste. These responses have often implied a parallel evolution in the sciences that are applied to managing the urban environment. I certainly found this when I examined the environmental history of Toronto in the decades after 1945. In this postwar era, the city grew very rapidly, encountering as it did a variety of environmental challenges, including the need to expand systems for water supply and sewage disposal, build new neighbourhoods, and protect life and property from natural hazards such as floods. Responding to these challenges required several kinds of scientific and technical expertise, from civil engineering to community planning to river-valley management. Each of these forms of expertise also became closely associated with the public and private institutions that managed and encouraged the city’s growth.19

Nowadays, it is common to refer to our “global environment,” especially when we talk about environmental problems such as climate change. Yet this global perspective is also a product of recent events in both science and politics. In the early 1950s, scientists began to track the global movement of radioactive fallout that had been released by the testing of nuclear weapons. By the following decade, the environment had become a major political issue, and by 1970, the Apollo astronauts had brought back the first photos of the Earth from space. These images became a powerful symbol of our unique and fragile world. Now, with increasing evidence of climate change, science is reinforcing the sense that to understand our environment, it is necessary to think and act globally. In other words, science is having political consequences, just as much of the science that led to a global perspective was itself a product of the Cold War.

A key observation from this brief account of a few episodes from the history of science and the environment is worth emphasizing: science does not exist in some separate realm, but has always been closely tied to political and economic power. These ties have not always been with powerful interests, either: in Silent Spring, Rachel Carson used science to criticize how various interest groups had power over decisions about pesticides, and to urge that these decisions be opened up
so that more people could participate in them. A related observation is that science is not only about describing nature, but also contributes to creating new kinds of natures. An empire forms new trading relationships, a nation expands over new territory, a complex city grows up, or a “global environment” captures peoples’ imaginations—these are all cases in which new ideas about nature took shape, and in every case science played a major role. These examples also hint at the kinds of issues encountered in studying the environmental history of science.

Studying the Environmental History of Science

I was originally a science student, but then shifted to the history of science (where I found that a background in science can be helpful, but is not essential, when studying its history). When I began studying history, I decided for my Ph.D. dissertation to study the recent history of ecology. I had read that environmentalists considered ecology as both information and inspiration—that this scientific discipline provided, in effect, the intellectual capital of the environmental movement. And I wanted to see if this was true.

As time went on, I also found (as usually happens in research), that I had to revise my project, developing a more specific focus than simply the historical relations between ecology and environmentalism. I decided to concentrate on the history of ecology since the 1940s. I also formulated several questions about recent ecology that I hoped would make the story of interest to other historians. One was about the agenda of the discipline: how do ecologists choose the research they do? Another related to the social context of the science: were the choices made by ecologists influenced by public concerns about the environment? A third concerned the places in which ecologists did their research: did the natural setting, and the institutions in which they work, make a difference?

I also realized that I couldn’t answer these questions through conventional historical methods, such as a biography of an ecologist, or the study of a single research institution. Instead, I decided on a comparative approach. This meant following the histories of ecology at four sites, in three countries: Great Britain’s Nature Conservancy (until about 1970 both the chief British ecological research institution, and owner and manager of a network of nature reserves); the Oak Ridge National Laboratory in Tennessee (a very large nuclear research centre, and also a major site for ecological research); the Hubbard Brook Ecosystem Study in New Hampshire (a reserve set aside for forestry research, where several influential studies of watershed ecosystems took place); and the University of Toronto and the Ontario government, which together pursued much research on the fisheries of the Great Lakes.

The advantage of comparing these four sites became apparent once I tried to understand how ecologists chose what research they would do. Their choices varied widely. British ecologists often focused on research that could help develop new ways of managing nature reserves. Oak Ridge ecologists studied the ecology of radioactive materials, with an eye to understanding the environmental impacts of nuclear power and nuclear weapons. At Hubbard Brook ecologists studied the effects of harvesting and acid rain on forest ecosystems. And in Ontario they put together an understanding of the effects of fishing, pollution, and other factors on the Great Lakes ecosystem. But beyond these differences, there were some common features. In all these places ecologists
spoke some of the same language: about ecosystems, the movements of energy and nutrients, and the dynamics of populations.21

What this curious combination—of both local issues, and more general theoretical concerns—led me to understand was just how complicated has been the relation between scientists and public concerns. Ecologists were not simply driven to do whatever research was demanded by society; but neither did they exist in some kind of remote ivory tower. Ecologists (like scientists generally) developed their own identity, with their own questions and methods, which they tried very hard to assert: they wanted very much to demonstrate that they had a distinctive body of knowledge about nature. But they also tried to relate their research to public concerns, and to the particular local settings in which they were working, such as nature reserves, forests, or the Great Lakes. (Some of the same kinds of dynamics are exhibited elsewhere in this volume: in Joanna Dean’s account in Chapter 13 of how urban foresters responded to the concerns raised by Rachel Carson about DDT, and in William J. Turkel’s explanation in Chapter 17 of how local conditions affect scientific research.) This interaction between the general preoccupations of ecologists, and their local settings, resulted in a highly diverse array of ties between their scientific methods and ideas, the nature they studied, and particular environmental values.22 Context mattered—and so I had to avoid making generalizations about whether ecology is, or is not, related to environmentalism. I ended the project with an outcome often seen in historical research: not so much with an answer, but at least a better way of asking the question.

Strategies for Studying the History of Science

Studying the history of science in relation to the environment involves a series of steps. The first step is understanding how scientific knowledge itself evolves. A good place to start is with the scientific literature, the reports published by scientists that appear in journals and conference proceedings. To make this enormous literature more manageable, it can be helpful to begin by focusing on a single scientist—perhaps one who clearly had some influence on the wider field—and then expand outward, using that scientist’s lists of references to understand what kinds of information he or she considered relevant to the problems being studied. Read carefully, scientific reports provide an immediate record of the evolving knowledge base of a field, as well as insights into methods, and into how scientists placed their work within the larger context of their field. Review articles are also often very helpful: they indicate scientists’ views of the overall development of the field, including which innovations in ideas or methods they consider most significant. Textbooks summarize the evolving body of knowledge within a discipline. However, all these materials, while useful, also raise issues of interpretation. A scientific paper, for example, provides a distorted view of how science is actually done, capturing little or nothing of the hesitations, mistakes, and dead ends that are a normal part of any research. And as always, it is necessary to consider the intentions of the author, as well as her intended audience.

The published scientific literature is essential, but it is a window onto only part of the history of science. In recent decades, historians of science, while still interested in how knowledge evolves, have also shifted their attention toward understanding not only the product, but also the process, of
science. One dimension of this is the evolving methods of science—what scientists actually do in the lab or in the field. This involves understanding scientists’ “material practices”: their manipulation of research materials, such as field sites, soil samples, or the contents of test tubes; their use of techniques and technologies such as experimentation in the lab or field, computer modelling, interpretation of aerial photos, distribution and collection of salmon tags—every practice, in short, by which scientists generate knowledge that others will see as reliable. Another dimension of the scientific process is scientists’ efforts to justify and explain their research to various audiences, including those who fund the research, apply its results to practical situations, or read about it in the media or elsewhere. For both dimensions, attention to the relations between scientists and specific environments—that is, how their material practices and their communication efforts reflect the places in which they work—can be a step toward writing a genuine environmental history of a science.

For the pursuit of these dimensions of science, a wide range of materials are relevant, such as scientists’ letters to each other, memos to administrators, drafts of scientific reports, annual research reports, proposals to funding agencies, and articles written for the popular press. These may be available in archives, or, in the case of more recent material, in scientists’ files. Interviews can also be valuable: scientists are usually willing to discuss such questions as why they chose certain research directions, or what results have been especially important. While results must be interpreted with caution (given selective or faulty memories), interviews can serve well as sources of ideas and hypotheses. Interviews can also enable access to unpublished but valuable “grey” literature: often only the scientist herself and a few colleagues may have copies of reports published in very small quantities. But a cautionary note is also necessary: scientists usually have their own view of how their field developed and, indeed, their view of the nature of science itself—and so they may dispute the account provided by a historian.

Another valuable way of understanding scientific practices is to visit the terrain in which research has been done. Doing so serves as a reminder that scientists do not study “nature,” but specific places in nature: a lake, a forest, or a field. It also makes it possible to understand the physical conditions and opportunities as experienced by the scientists themselves, to understand more completely how they viewed the research possibilities that were open to them, and to understand how science consists of both knowledge and practice, each closely associated to the other.

My own experience in writing the history of the Hubbard Brook Ecosystem Study in New Hampshire can illustrate some possibilities. The study area extends over several hundred hectares of forest, drained by several streams and a lake. Since its origins in 1963 several dozen scientists and students have worked at the site, accumulating an enormous knowledge of the forest, for both theoretical and practical purposes—particularly for understanding the impacts of forest cutting and acid rain. To understand how this research had developed, I followed several strategies. These strategies emerged not according to some overall plan, but simply as opportunities appeared:

1. Study of research papers, particularly review articles and books, to get a sense of how new questions, and new knowledge, emerged in the course of the study. These papers also provided insights into how the scientists themselves viewed the development of their project. Finding these papers was aided by the study having published its own comprehensive bibliography.
2. Statistical analysis of the entire body of research produced at Hubbard Brook to understand how certain aspects of the project, including its goals and research subjects, and the makeup of its participants (their backgrounds and institutions) had changed over time.

3. Study of funding proposals and memos, to understand how the project leaders viewed the future of their project, and how they justified the project to other scientists and to the institutions supporting their work.

4. Interviews with several scientists, in which I asked them about many aspects of their work, such as what they considered their most important results, and what kinds of questions they could ask at Hubbard Brook that they could not elsewhere.

5. Exploration of the area, by car and on foot, with and without the guidance of the scientists, to get a “feel” for the site. This especially helped suggest areas for follow-up research regarding how specific environmental details, such as the particular relations between the forest and the streams, affected the research.

6. Attendance at the annual meeting of all project participants, to get a sense of how scientists worked and communicated with each other.

It was a challenge to keep straight the evidence from this variety of sources, as the history of the Hubbard Brook research project and my own objectives gradually came into focus. Perhaps most important were the endless iterations between learning new things about what the scientists had done and then using this new information to frame new research strategies and questions.

Science as a Tool and a Topic

As I've outlined, science can be essential to doing environmental history: it is both a tool for reconstructing changes in the environment and itself a topic of historical study. But this dual significance also raises some challenges—in fact, some of the biggest challenges with which environmental historians deal. Stephen Pyne, who studies the environmental history of fire, has described the situation in colourful terms: “Done right, science and history can combine like epoxy into an unbreakable bond. Done poorly, they become an unstable compound, a vial of intellectual nitroglycerin ready to blow its handler to oblivion with the first stumble.”

What Pyne is referring to are the dual roles of science in history—tool and topic—and the fact that these contradict each other. Using science as a tool depends on stability: that is, on being confident that the scientific information or techniques one is applying are reliable, and not likely to be soon proven mistaken. In contrast, study of the history of science incessantly undermines this stability, by describing how scientific research is not only a disinterested and objective search for universal truths, but also a set of practices tied to particular times and places, that have various relationships with their social contexts, and that produce knowledge that is often later revised or rejected. Given this contradiction, it is no wonder that historians often struggle with what to do about science. As another historian, Gregg Mitman, has asked, for “a field in which place has figured so centrally in its narratives, why has environmental history been so reticent to see scientific knowledge about nature as a historical product of particular material and social relations?”

Historians need to know two things about science to navigate this contradiction. The first is that there are many potential uncertainties and sources of bias in scientific information. For
example, while, as we have seen, sedimentary records are valuable in reconstructing past environments, they also have various limitations: only certain organisms will make their way into the sediment, and only a sample of those will be preserved. There are similar biases in the rest of the scientific record—for example, in traces of forest fires recorded in tree rings, or in ecological evidence of species migrations. These examples illustrate how scientists must make many choices as they interpret the evidence provided by nature, expanding the fragmentary information available into a fuller interpretation of the past. In making these choices, they are influenced by their own training, experience, and values. The consequence is that all approaches to scientific study provide knowledge of past environments that is both incomplete and is shaped by today’s ideas about how to interpret that record.

These questions of interpretation and bias are not specific to scientific study in the past, but are intrinsic to science as it is applied today. Scientists often provide contrasting views of nature—because of differences in professional background, divergent views of how to interpret uncertain evidence, or economic or political biases. These biases can reflect, for example, where scientists work: one employed by a biotechnology firm may have a different view of genetically modified foods than does one who advises environmental organizations. Similarly, a forestry company scientist may disagree with a university conservation biologist as to the ecological impacts of industrial forestry. This is why there are often intense controversies about science and the environment: scientists themselves often disagree about, say, the health implications of toxic chemicals or genetically modified foods, the potential implications of industrial forestry, or climate change. In all but the simplest cases, there is always room for interpretation, and hence for scientists to disagree.26 We can see this occurring in other chapters in this volume: as Matthew Evenden explains in Chapter 14, maps are not only objective representations of the world, but also reflect the intentions and priorities of geographers and cartographers; similarly, as William J. Turkel describes in Chapter 17, scientific knowledge of a local environment can be shaped by the economic value of that knowledge.

The second thing to keep in mind is that science changes as new knowledge is accumulated, and previously accepted “facts” are revised or rejected. For example, limnologists (scientists who study lakes) once, but no longer, believed that lakes have a kind of life cycle: initially low in nutrients, becoming over time more nutrient-rich, slowly filling with sediments, and eventually becoming a marsh and then dry land. Given how knowledge changes, Worster’s advice to historians is sensible: “be careful not to borrow . . . ideas of nature unthinkingly or innocently from outmoded textbooks or discarded models.”27

As a practical example of how historians experience these challenges, consider what would be involved in reconstructing the environmental history of caribou in northern Canada. Caribou have long been an important food source for northern natives. They have also been central to northern politics, and particularly to the relations between natives and government authority. In particular, government scientists often argued that caribou populations were in decline, and therefore that both native hunting and wolves (the major nonhuman predator of caribou) had to be controlled. Understanding how caribou populations have changed over time would be essential to understanding the environmental history of the species, and of northern Canada generally. But although caribou scientists have, since the 1940s, generated a series of estimates of these populations, these estimates cannot be relied on by historians, because, in hindsight, they appear
to be the product not just of empirical observations, but of interpretations guided by various assumptions regarding scientific practice, native culture, and the caribou themselves. (Lyle Dick illustrates the problem when he notes in Chapter 5 how a 1960 estimate of the Peary caribou population of 25,802 may have been off by up to 50,000.) As a result, in the absence of other information, it is likely now no longer possible to reconstruct the history of caribou populations.

Beyond these challenges, the environmental historian needs to be aware of several pitfalls in using science to reconstruct the historical record. The first relates to applying today’s knowledge in explaining past environmental phenomena. While this knowledge can open up a wider range of explanations, it also presents the temptation to see the knowledge of a previous time as simply incorrect or ignorant, discouraging the necessary effort to understand it on its own terms, not least as a potentially significant motivating factor in decisions and actions taken at that time. A related risk is that of adopting a simplistic and misleading perspective on how scientific knowledge changes: as a simple progression from ignorance to current knowledge. Such a perspective can be an obstacle to understanding what actually happened, because it encourages myths about the straightforward application of new knowledge. An interesting example is the story, often repeated in textbooks, of how in 1854 John Snow, a London doctor, ended a cholera epidemic simply by removing the handle of a pump that had been supplying contaminated water. This classic tale is convincing because Snow was apparently applying knowledge about disease and sanitation in a way that seems, from our perspective, to have been both rational and practical—simply common sense. But the account also distorts and simplifies the actual complexity of Snow’s role in emerging ideas about disease and sanitation—there was apparently no sudden revelation about these problems when Snow removed the handle.

A third potential snare in using science is that it may privilege explanations that can be framed in scientific terms over those that may be attributed to political, social, or other, more intangible, factors. (This also commonly happens in environmental controversies today, when participants use scientific evidence to support their positions, even when they are in fact motivated by other considerations.) For example, a historian seeking to understand why the farms of a region were abandoned may decide to rely on a physical explanation such as soil exhaustion or climate change, because the supporting evidence has a convincing air of inevitability. Other factors, such as changing technologies or markets, may be seen as more conjectural, and hence as less persuasive, regardless of their actual significance. In short, scientific explanations may appear more persuasive, but that doesn’t mean they are necessarily more accurate.

Finally, using science should not imply neglecting other forms of environmental knowledge. As Lyle Dick reminds us in Chapter 5, science is not the only way of knowing the world: particularly in northern Canada, indigenous knowledge can provide some of the deepest insights into wildlife and landscapes. There is also a rich history of observations and experience of the environment gained by everyone other than scientists, simply in the course of everyday life and work. As Joy Parr showed recently, incorporating this “street-level” knowledge—even of smells—can make a historical account much richer. Much of the available knowledge of local change is getting more organized and accessible, particularly through an increasing array of community-based networks of environmental monitoring. A model for these is the century-long database of historic patterns in bird populations produced through the National Audubon Society’s Christmas Bird Counts.
Conclusions

Science can be useful in environmental history: by providing new forms of evidence that enhance the historical record, and by suggesting new questions and new ways of explaining events. But as I’ve also noted, there are various challenges involved in using scientific evidence. In practice, science represents a massive amount of useful information. And while it is appropriate to be aware of how scientific knowledge is produced for particular purposes within specific political and environmental contexts, that does not mean that much of this knowledge has not been tested and found reliable. Just like any other kind of evidence, and particularly that created with different purposes in mind than those of historians, this information can be used pragmatically in building reasonable and persuasive accounts of the past. Nevertheless, a critical perspective is also necessary, informed by a basic understanding of how scientists go about their work.

Having confidence in using science is also a matter of being realistic, and not pursuing goals that go beyond the limits of the available scientific (and other kinds) of evidence. This means avoiding the temptation to pursue grand generalizations about humanity’s relations with the planet. Instead, it is more productive to focus on understanding how peoples’ relationships with their local environment have changed over time, always keeping in mind that context, local details, and chance encounters matter a great deal in determining what happened, and why. As William Cronon once explained, the purpose of studying environmental history is not so much to identify universal laws regarding the relationship between human conduct and the environment, but to tell stories that can illuminate this relationship, and perhaps generate new ways of thinking about it.29

Thinking in these terms—of telling stories—can also be a useful reminder that historians have different purposes than do scientists. While historians seek to understand the evolving relationship between people and their environment, scientists are most often concerned with understanding the world today, for reasons both theoretical and practical, and human activities are generally of concern to them only to the extent that they have an impact on nature. This difference also means that historians must examine scientific results not only as scientists do—as sources of data—but also as texts to be subjected to the same kinds of critical analysis as are applied to any other historical evidence. This includes understanding the purposes of the scientists, how and why they chose certain methods over others, the assumptions that guided their interpretation of the data, and any other considerations that could influence the results.

And finally, it is worth remembering that historians need not just take from scientists. They have something to offer in return: a more sophisticated understanding of science and scientific knowledge. Studying its history makes clear how science is far more than just a matter of describing nature. It is a highly social, and often political, phenomenon that gains its meaning not only through its interaction with the natural environment, but also through its relations with the rest of society. Scientists often find that to accomplish their work—whether they are creating new knowledge or using this knowledge to solve practical problems—requires not only skills in the field or lab, but also an understanding of how scientists themselves form a community that is itself tangled up in the politics and values of their society. As they navigate their way through these tangles, scientists can receive much guidance from the stories told by historians.
DISCUSSION QUESTIONS

1. Is it a contradiction for environmental historians to view science as both a tool and a subject of study? What risks are involved in using science as a tool in environmental history? What kinds of questions might one ask when writing the environmental history of a science?

2. For what kinds of historical events might science be the only source of evidence? For what kinds of historical events could the historian combine scientific evidence with other forms of evidence?

3. How might science provide better insights into past events than would be available to those who were alive at the time?

4. While scientists and historians may share an interest in the same past events and processes, they may ask very different questions about them. Discuss this statement.

5. What kind of roles does historical evidence play in current environmental issues and challenges? What principles of reasoning do scientists use in interpreting evidence of historical change? Why must scientific evidence from the past—pollen sediments, for example—be interpreted with care?

6. Why can it be said that science has political consequences? How is it possible for competent scientists to disagree about their descriptions of nature?

7. What is meant by the “material practices” of science? Do these material practices matter to the outcome? Should they? Why or why not?

8. What does the idea of “stories” tell us about how historians and scientists have different objectives?

NOTES


3. A good overview of this history is A. M. Mannion, Global Environmental Change: A Natural and Cultural Environmental History, 2nd ed. (Essex, UK: Longman, 1997).


9. For a good account of how to do history, and how it has much in common with doing science, see J. L. Gaddis, *The Landscape of History: How Historians Map the Past* (New York: Oxford University Press, 2002).


22. Over the last several years other historians have come to interesting conclusions about how scientific research relates to specific places. Two good discussions are R. Kohler, *Landscapes and Labscapes: Exploring the Lab-Field Border in Biology* (Chicago: University of Chicago Press, 2002); and D. Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge* (Chicago: University of Chicago Press, 2003).
23. Bocking, Ecologists and Environmental Politics, pp. 116–47.


**FURTHER READING**


It Costs Something to Learn Something: Property Rights, Information Costs, and the Struggle at Fish Lake

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We all know that it costs something to learn something. Books cost money, reading takes time, universities charge tuition, and archival visits and fieldwork are expensive. There are also costs associated with holding on to what you’ve learned: file folders need to be stored, hard drives and magnetic tapes become demagnetized, computers need to be replaced (frequently), and people are forgetful. Some skills—like speaking a new language or rock climbing or computer programming—require years of practice to master. Once you begin to take these kinds of information costs into account, however, there are surprising consequences for both doing and understanding environmental history.

In this chapter, I discuss the struggle over a large, undeveloped copper and gold deposit at Fish Lake in the Chilcotin region of west-central British Columbia. Beginning in the 1960s, various companies tried to develop an open-pit mine at Fish Lake, only to find themselves embroiled in disputes with other companies over development rights, with the federal government and anglers over a fishery, with environmentalists over conservation, and with First Nations over land claims. Asking what kinds of things each of these groups knew, how they acquired their knowledge, and why they were motivated to learn particular things gives us one productive strategy for investigating the past.¹ That is to say that these questions are useful precisely because they can be
answered with the sources that we have and because they lead to further questions. What is more, keeping information costs in mind turns out to be a good way to be reflective, to think about your own research as you are doing it. As you study a topic you will constantly find yourself making decisions about what to learn and what not to. Which books on your preliminary bibliography are worth reading in full? Which should you skim? Is it worthwhile to sift through a large number of search results online or should you try to reformulate your query? Does it make sense to learn enough about a given environmental science to be able to read the scholarly literature in that field? How much fieldwork can you afford to do? Should you visit an archive that doesn’t seem to have many sources for your topic? Is it worth staying another day at an archive to look through some boxes that you haven’t seen yet?

Getting Started

I first heard about the Fish Lake case while I was doing fieldwork in the Chilcotin in the summer of 2002. I had deliberately chosen to study the location because it was familiar, close to where I had grown up. In order to write the environmental history of a place, you really have to know the environment, and I figured I would finish my dissertation sooner if I didn’t have to learn about someplace completely new. I also had relatives in both Victoria, where the provincial archives are located, and in Williams Lake, where the regional archive is. Staying with family would greatly reduce the costs of doing research in BC. My brother, who had worked in the Chilcotin region with a team of surveyors, had showed me around and introduced me to his former employer. I took the opportunity to ask the surveyor about environmental conflicts, and he told me that there was controversy about a proposed copper mine at Fish Lake. He did not know many of the details and I hadn’t yet come across the story in my archival work. Besides, I had to return to Boston for the school year, more than 3,000 miles away.

Some literatures about a place are more local to that place than others. What I mean by this is that there are some kinds of sources—like postcards, pamphlets, small-press local histories, flyers, newsletters, regional trail and wildlife guides, and so on—which are much easier to find in the place itself than anywhere else. As I travelled in BC, I made sure to stop at tourist information centres, local libraries, second-hand stores, and motel lobbies to collect these kinds of sources. In our profession they are collectively known as ephemera, stuff that doesn’t last very long and is liable to get thrown away unless someone makes a special effort to preserve it. Other kinds of sources—like government documents, legal decisions, public securities information, satellite photographs, and scientific literature—are much more likely to be found in some other place than the one that you are writing about. One of the ironies of studying the Chilcotin was that in some ways I was much better positioned to do so in Boston, where I had access to the Harvard and MIT Libraries, than I would have been had I lived much closer to the Chilcotin itself.

By the time that I began to work on my dissertation, the World Wide Web was already booming and it was clear to me that digital sources would offer unprecedented advantages to historians who developed the skills to work with them. I made sure to enter in a bibliographic database a reference to each source that I discovered. I also bought a desktop scanner with a sheet-feeder, and scanned all the photocopies that I brought home. The Adobe Portable Document
Format (PDF) allows you to keep both an image of each page, which is easy to read, and an automatically extracted and hidden text layer, which is easy to search. I then installed a search engine on my own computer that allowed me to search through the full text of all of the sources that I had collected. In this volume, Alan MacEachern describes the historian’s process of skimming through records looking for something of significance. Like every historian, I did a lot of that kind of skimming, much of it in front of my own computer. With my digital archive and search engine, I was also able to go back and find things that I had skimmed over without making a note of. Every scholar worries about some disaster wiping out his or her research. I could back up not only my notes and writing, but also my filing cabinets. I sent data disks to relatives for safe keeping, and travelled with a digital copy of all of my paper files. This scheme, of course, involved a tradeoff of costs. For greatly increased access and security, I had to be willing to spend a bit of time and money to create a digital archive. In retrospect, it turned out to be a very wise investment, making it much faster for me to finish my dissertation and revise it for publication as a book.

As I studied the geological literature about the Chilcotin, I began to come across references to mineral surveying at Fish Lake. People who want to extract mineral resources face a difficult problem: it is impossible to completely know the three-dimensional characteristics of the earth’s crust, much of which is covered by forests, lava flows, and glacial drift. As a result, geological surveyors study outcrops, take core samples, make inferences from surface features, and make local measurements of gravity, radioactivity, and magnetism. They also use their knowledge of the region’s geological history to try to predict what they will find under the surface.

The kind of surveying that was done at Fish Lake required the expertise of a number of different specialists. (See Stephen Bocking’s Chapter 16 in this volume for an excellent introduction to thinking about the role of scientific expertise while doing environmental history.) For example, in one study, an airplane with extremely sensitive magnetic detectors was flown back and forth above the plateau, recording deviations from the background magnetic field. These deviations, known as magnetic anomalies, are often a clue to the presence of magnetic minerals in the rock. In another study, researchers used a helicopter to dip down and snip off pine tree tops at regular intervals on a large grid. These samples were then passed on to the Geological Survey of Canada in Ottawa, where biogeochemists dried them, burnt them, and then tested the ash for concentrations of various metals like copper and gold. As trees grow, they extend their roots into soil, glacial drift, and bedrock, drawing water and nutrients up through their root system. They also extract minerals that aren’t needed for growth, and these become concentrated in tree tops, twig ends, and bark. The researchers could thus use the concentration of metals in the tree tops as one measure of the concentration of minerals in the ground below. Other specialists dated the radioactive decay of chemical elements in rock samples, used devices similar to metal detectors to map features below the ground, studied the distribution of plants, and tested the composition of soils.

Each one of these studies—and there were literally hundreds of them—must have required a fair amount of money: to pay scientists, technicians, pilots, administrators, and other personnel; to buy, lease, or rent expensive equipment like helicopters, drilling rigs, and magnetometers; to pay for data processing, statistical analysis, report writing, and publication; and so on. Most of the studies were designed to answer basic questions about the mineral deposit: How big was it? What were its subsurface dimensions? What percentage of the rock was waste and what percentage a
valuable commodity like copper or gold? Were the metal crystals concentrated in a particular region? How much would it cost to mine it? Geological exploration is a pretty clear case where it costs something, actually costs a heck of a lot, to learn something. But who was paying for all this learning and why?

Most of the studies were funded by mining companies and/or the government. I was at a point where I felt like I understood the science of geological exploration and mining (at least well enough to make my way through the literature) but not the economics. Presumably, the mining companies and the government hoped to translate their costly knowledge into profit, but how did this happen? Fortunately, the BC Ministry of Energy, Mines and Petroleum Resources had provided a large amount of information online, including historic mineral price data. When I compared mineral exploration activity at Fish Lake to the yearly average producer price for copper, I discovered an interesting pattern. New mineral exploration in the area was undertaken every time the price for copper rose, and it stopped every time the price fell. So prospecting was stimulated by the increasing value of mineral resources, but why should that be the case? Why should individuals or institutions be motivated to learn more about something as its value increases?

An Analytical Framework

Here the historian can make use of one kind of economic analysis, known as new institutional economics (NIE). This framework explicitly takes into account information costs, the costs associated with learning, measuring, negotiating, transacting, and so on. If we wanted to summarize NIE with a motto, we might say “it costs something to do something.” New institutionalists use these transaction costs in their analyses of firms, contracts, property rights, and other socio-economic phenomena. In the case of property rights, the reasoning goes like this. Think of any entity as a bundle of attributes. A national park, for example, consists of water, rocks, vegetation, animals, microbes, and many other things. Some attributes of the park, such as its boundaries, are more easily determined than other attributes, such as the subsurface distribution of a particular metal. Each of the entities within the park has attributes of its own. A given beaver, for example, has attributes that are relatively easy to determine (at least for a wildlife biologist or trapper) like sex, age, weight, pelt condition, and so on. The same animal also has attributes that are difficult and expensive to determine, such as the details of its genetic makeup. According to NIE, the progressive costliness of learning means that every entity has attributes that will never be completely measured or known. Following from this, rights can never be exhaustive. Instead, they cover the use or ownership of particular attributes. You may have the right to camp in a national park, but you don’t have the right to relocate wildlife to your own backyard. You have the right to start a campfire in a designated area, but you don’t have the right to set fire to the underbrush. And so on. One might think that parks managers don’t have the right to trade or donate wildlife from the parks, but as Alan MacEachern shows in Chapter 11 of this volume, the reality of the situation is a bit more complicated.

To return to Fish Lake, the copper and gold content of the deposit was estimated from samples but could not be known with certainty (short of digging the whole thing up, which might easily lead to disastrous financial loss). In the 1980s, two mining companies owned some rights to the
property at Fish Lake. Neither company knew exactly how valuable its rights were. As the value of copper rose, both companies were willing to spend money to obtain more information about the attributes of the Fish Lake property. If one of the companies had been unwilling or unable to spend money on exploration, the other company would have been in a position to exploit the advantage that any additional information gave it. If one company found out that there was less copper in the deposit than was generally believed, it could sell its own rights for more than the rights were worth. If, on the other hand, it discovered there was more copper in the deposit than other people thought, it could buy rights at a discount. Either way, information could be turned into money. This was true for not only the two companies involved, but also any individual or institution that was willing and able to allocate enough resources to learn something about the property that wasn’t generally known.

So under the NIE theory, property rights aren’t exhaustive or constant. They can change as different attributes become known to various stakeholders. Property rights are a function of the resources that people commit to protect them, the resources that other people commit to capture them, and the resources that the government allocates to protect a given distribution of rights. Note that this theory sets questions of legal or moral rights to one side, which is not to say they are unimportant. As we will see, they resurface later.

From the little that I knew at that point of the events at Fish Lake, this theory of property rights seemed to make reasonable predictions. It explained why the government and mining companies were paying so much to learn about the Fish Lake region (especially as metal prices increased), and it suggested that other stakeholders might be motivated to commit their own resources to learn more about it, too. I could imagine where controversies might arise, but I didn’t yet have much evidence for controversy. I clearly needed to know more about what had happened at Fish Lake.

Historians often find themselves in this position: needing information that is probably in a distant archive. One possible course of action is to wait until you are able to travel (and can afford it), then visit the archive. This is expensive and time consuming. Most seasoned researchers will first contact the archivist to ask about the holdings; occasionally, archivists can send photocopies for a fee or arrange for microfilm or fiche to be borrowed through interlibrary loan. Sometimes they can recommend a local researcher who will look through the material for you, again for a fee. The Cariboo-Chilcotin Archives, however, were a small room in the Williams Lake Public Library. They were only open by appointment, and although the library staff was friendly and helpful, the archives lacked the kinds of finding aids or systematic organization that a better-funded institution would enjoy. Fortunately, my parents live in Williams Lake. They were willing to go to the archive, search for stuff on Fish Lake, and mail me photocopies of it. I ended up with a large file of newspaper clippings that way, which I scanned and added to my own digital collection.

In many archives, this kind of aggregation of clippings is known as a vertical file. Vertical files exist because librarians and archivists take the time to read through the news and save stories on topics that are of local interest. In so doing, they greatly lower the information costs for their users. Reading through the clippings took me less than an hour and gave me the outlines of a historical narrative. Reading through decades worth of newspapers looking for items about Fish Lake would have taken me hundreds of times as long. Travelling to Williams Lake, Quesnel, and 100 Mile House to read old newspapers would have taken even longer.
A Contest of Stakeholders

The newspaper articles provided me with plenty of evidence for conflict at Fish Lake and dozens of new leads. One thing that I learned was that mining companies, in their efforts to defend their own property rights and to secure investment capital, were forced to release information for which they had paid a great deal. This made it much easier for other stakeholders to enter the fray. Some companies began mineral exploration on properties adjoining Fish Lake. When I eventually wrote my account of the case, a significant portion of the narrative was dedicated to the efforts made by mining companies to capture and clarify property rights, with one company, Taseko Mines, emerging victorious after years of legal and financial wrangling. As information about the Fish Lake deposit and the potential open-pit mine became available to the public, other groups of stakeholders found new uses for it. Sport anglers, for example, were dismayed to find that the plans for the mine required that Fish Lake itself be drained. The BC Ministry of Environment, Lands and Parks and the federal Department of Fisheries and Oceans shared the anglers’ concern. Conservationists wanted to include the region around Fish Lake in a proposed park. The Xeni Gwet’in T’sihlqot’in First Nation included Fish Lake in the area claimed by its Nemiah Aboriginal Wilderness Preserve, a move that was supported by a number of environmental organizations.

As different groups of stakeholders tried to influence the future of Fish Lake, they chose to learn different kinds of things about the area. Aboriginal land claims were buttressed by archaeological studies that showed that the ancestors of First Nations had been using the region for millennia. The provincial government, in search of a reasonably equitable allocation of natural resources that would also be profitable and (ideally) renewable, surveyed aquatic and terrestrial ecosystems, atmosphere, culture, land use, and earth sciences. Taseko Mines set up a meteorological station to record temperature, precipitation, snowfall, and snow pack, so that environmental data would be available when the mine facilities were being designed.

The economic theory of property rights suggests that some rights will always lie in the public domain, waiting to be captured by anyone who is willing to commit enough resources to do so. Although Taseko Mines had legal title to Fish Lake, the company’s actions suggest that it was at least tacitly aware that the fate of the region would be determined as the outcome of a contest of stakeholders. The company conducted an extensive public relations campaign, inviting members of the public to visit the exploration site and emphasizing the number of high-paying union jobs that the mine would create. Management also discussed the project with representatives of the First Nations, gave site tours to senior representatives of the major environmental organizations in BC, and courted allies in the city of Williams Lake. Taseko could not have foreseen that the project would be stalled by some rainbow trout.

In 1987, the World Commission on Environment and Development released a report that defined sustainable development as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs.” This agenda was adopted internationally, and served as one of the contexts for mining-related development in BC in the early 1990s. It was especially important to the NDP government elected under Mike Harcourt in 1991. The following year, the province adopted a new strategic land-use planning framework for crown land that tried to balance the interests of various stakeholders in a process
of shared decision making based on the collection of standardized data. (Standardizing data is one well-known way of lowering information costs.) An independent commission, the Commission on Resources and the Environment (CORE), was established to incorporate sustainability, an ethic of land use, a process for conflict resolution, planning at the regional level, and community consensus. The Cariboo-Chilcotin, long a site of intense land-use conflicts, was chosen as one of three regions to undergo the CORE planning process. During more than 100 CORE meetings held throughout the region, 24 sectors formed to represent the interests of different groups, including agriculture, forestry companies, local governments, placer and hard-rock miners, tribal councils, and multisector alliances representing conservation, backcountry tourism, and even one to protect the interests of “all beings.” Even within a given sector there was often conflict; different tribal councils, for example, had interests in different land claims. On the plus side, CORE gave a voice to more stakeholders. On the minus side, by allowing such a diversity of interests to be represented, the process fragmented stakeholder positions, as different individuals and institutions found things they especially liked or disliked about various proposals. This fragmentation prevented opposing stakeholders from uniting to put up concentrated resistance to projects, like the mine, that involved significant resource extraction.

By 1994, Taseko Mines was close to beginning construction on the mine at Fish Lake. That summer, however, the BC Ministry of Environment, Lands and Parks objected to the company’s proposal to drain Fish Lake and use the former lake site to dump more than 2 million metric tons of waste rock and tailings. Under the federal law of the time, it was illegal to “carry on any work or undertaking that result[ed] in the harmful alteration, disruption or destruction of fish habitat.” Since the lake was home to a self-sustaining population of unique rainbow trout, the law clearly applied. Taseko Mines responded by offering to stock barren lakes to create new fishing spots. It offered to provide a heritage fund to enhance fisheries. It offered to buy a private lake and put it into the public domain. There was no way, however, that the company could mine the deposit without draining Fish Lake. The federal government strengthened its own objections to the project by making Fish Lake subject to a Canadian environmental review process as well as the provincial one. Without federal fisheries approval, the CORE process became stuck. Around this time, the project director of Taseko Mines commented bitterly, “We’ve spent $41 million on studies. Some environmental group can call up and scuttle those millions of dollars for a $1.25 phone call.”

The rainbow trout in Fish Lake were rapidly becoming more valuable, and, as a consequence, various stakeholders began to spend money to learn more about the attributes of the fish and their habitat. Taseko Mines studied the nearby Nuntsi lakes, hoping to find potential habitat that the Fish Lake trout could be moved into. The company tested pH (a measure of acidity), electrical conductivity, water chemistry, and biological productivity. By all these measures, the company argued, some of the Nuntsi lakes were just like Fish Lake, and the rainbow trout should thrive there. The federal Department of Fisheries and Oceans did not find Taseko’s arguments persuasive. At the time, Canadian scientists were lobbying the federal government to protect habitat as the key way of protecting biodiversity. This in turn gave management of Taseko Mines a new idea. Suppose the company could show that the rainbow trout had been introduced to the lake in the 20th century as part of a stocking plan? That would greatly weaken any arguments that the trout
were contributing to the biodiversity of the province. Never mind the fact that the archives of the provincial Ministry of Environment, Lands and Parks did not have any record of the lake ever being stocked. Taseko Mines hired an environmental consulting company to do a genetic study of the Fish Lake trout.

Toward the end of 1995, Taseko Mines decided that the last thing it wanted the Fish Lake copper deposit to be associated with in people’s minds was fish, so the company officially changed the name of its property to Prosperity Gold. The provincial ministry didn’t like the new direction that Taseko Mines was taking. The ministry argued that genetic techniques were limited, and that even if the Fish Lake trout were genetically indistinct from other trout in the province, the fish wouldn’t be expendable. Furthermore, the ministry thought that the fact that the lake was an isolated system meant that it offered unique opportunities for fishing. The following year, however, Taseko Mines received some bad news from its environmental consultants. The results of the genetic study showed that the trout in Fish Lake were genetically unusual, and that the population had a unique origin. Rather than being stocked in the 20th century, the ancestors of the Fish Lake trout had migrated into the lake following the end of the last Ice Age, when temporary meltwater channels allowed fish to swim into drainage basins where they would later be stranded. The fish were then genetically isolated from other trout populations in the province.

The legal status of aboriginal land claims was also changing in the 1980s and ’90s, giving the Tsilhqot’in First Nations much firmer ground to oppose projects of which they did not approve. In 1996, the Tsilhqot’in National Government sent Taseko Mines a letter demanding that the company vacate the Fish Lake area and restore it to the condition that it was in before the company began what the First Nations called “illegal explorations.” Refusing to meet with company officials, the Tsilhqot’in cited the landmark cases of Sparrow and Delgamuukw as the legal bases for their demands. The Sparrow case, decided by the Supreme Court in 1990, ruled that Section 35 of the Constitution limited the federal government’s ability to put into effect laws or policies that might infringe on aboriginal rights. In the Delgamuukw case, the Supreme Court eventually ruled in 1997 that aboriginal title did exist in BC, and that it was a right to the land, and not merely to traditional practices of hunting, gathering, or fishing. In cases where First Nations held the title to the land, they could exclude others from it, use it for pleasure or business, and extract resources. Neither case, however, clarified which lands in BC were covered by aboriginal title. That would have to be negotiated in treaties, or settled in the courts, one case at a time. Following the Delgamuukw decision in 1997, the Tsilhqot’in National Government sent a letter to the provincial government demanding that BC “cease and desist from further processing of land-related tenure application and all processes involved with alienating lands and water.” Although the Tsilhqot’in wanted to prevent mining operations, their immediate target was the forest industry, which had, between 1984 and 1994, generated nearly a half a billion dollars in revenue for the provincial government in the Cariboo forest region alone.

Taseko Mines continued to push the project forward, in spite of opposition from the federal government, environmental groups, and the First Nations. But gold prices were near a 12-year low by the fall of 1997, and shares in gold-mining concerns were doing poorly. By the end of the year, the company faced the one thing that could surely halt the Prosperity project indefinitely. The economies of Thailand, Malaysia, Hong Kong, Korea, and Japan had all suffered sharp downturns.
The demand for copper and gold dropped, and producer prices fell with it. Mines across the province were revising profit margins, downsizing, closing. As the Asian markets changed for the worse, the provincial economy did too. Worldwide, the falling price of gold threatened the economic feasibility of 40 percent of all gold mines. The company weathered the economic downturn, however, and continued to study the ore deposit and its environs. A new provincial government was elected in 2001, one much more supportive of resource extraction. Nevertheless, in 2003 the company decided to set aside the Prosperity Project and concentrate on projects “with near-term feasibility.” At the end of 2006, stakeholders in the Chilcotin were still struggling with one another over the fate of Fish Lake.12

Costs and Rights

The fact that a proposed mine could create such controversy was due, in part, to the external costs of mining: the social and environmental costs that would be paid by everyone, and not borne solely by the mining companies. These costs are a factor in any large-scale resource extraction industry and are not specific to the Fish Lake project. Nevertheless, it is important to understand what was at stake for people who did not stand to make money directly from the mine. External costs of mining are incurred at every stage of the process, from preliminary exploration to management of the site after the mine closes.

Impacts from mining exploration are funnelled in such a way that many large areas are diffusely affected while fewer and smaller regions come under increasing pressure. Preliminary surveying might start with airborne studies, which are relatively benign (other than the disruptive noise of planes or helicopters). These surveys sometimes lead to legal alienation of some of the land: claims are staked, vegetation and surface soils stripped, lines cut and roads built, trenches dug and holes drilled, samples extracted for bulk testing. Local habitat is disrupted and new roads give hunters and anglers more access to wildlife. Runoff from poorly built roads can load streams with sediment, which kills fish and other organisms. The sites that seem most promising for mining are further disrupted with bulldozing and drilling. Sometimes sample drills hit reservoirs of natural fluids, like brine or natural gas, which are brought to the surface and wash into local streams. In the places where mines are actually created, these become nodes in a reworked landscape that includes transportation routes, the infrastructure needed to generate and deliver large amounts of energy, piles of waste rock and ponds for tailing, and mills, smelters, and refineries.

The most significant long-term environmental impact of a new mine is the creation of waste rock and its potential for polluting fresh water through a process called “acid mine drainage.” Waste rock and tailings accumulate as ore is extracted, crushed, ground, and passed through various flotation steps. Technological advances in mining multiply this waste as it becomes more profitable to mine low-grade ore. Since the grade of the Prosperity deposit was estimated to be around 0.22 percent, more than 99 tonnes of waste would be produced for each tonne of copper. The problem is that waste rock contains acid-generating sulphides and heavy metals. When stored above ground, the sulphides are exposed to air and water, and react with them to form sulphuric acid. Sometimes when the water becomes acidic enough, a naturally occurring bacterium (Thiobacillus ferroxidans) finds the habitat to its liking, and begins to oxidize sulphides.
to sulphuric acid, too, greatly accelerating a process that is otherwise fairly slow. Acid production can go on for decades or centuries, seeping into the water and polluting it. Although the federal and provincial governments have regulations to prevent pollution from mining and to manage the impact of mine waste, budgets are usually too limited to effectively monitor and enforce compliance with the law. Information costs in yet another form.

Since minerals are a non-renewable resource, when the ore gives out, the mine has to shut down. The local community suffers most from the boom and bust of mining activity. The workforce is often brought in from outside the community, especially for the highest-paying, highest-skilled jobs. Housing shortages often result from the influx of people. When metal prices drop, workers are laid off. Mine closure can turn a vibrant community into a ghost town, something that has happened repeatedly in BC in the past 150 years. Miners suffer from many occupational hazards. When the mine is finally closed and disturbed areas are reseeded or replanted with vegetation, the new growth sometimes fails. Often the costs of cleanup are passed on to the taxpayers.

In the struggle over Fish Lake, debate continually focused on what economists call “social costs.” When the actions of one individual or group impose costs on another, who should pay? In a classic paper, Ronald Coase argued that if transaction costs are zero, which is the assumption of standard economic theory, then, regardless of the initial assignment of rights the two parties will negotiate an arrangement that maximizes wealth. According to Coase, what are traded on the market are not physical entities, like many economists assume, but rather rights to perform certain actions. Here is an example that may make the idea more clear. Suppose that a mine is built that will cause $1 million damage to a sport fishery downstream. The damage can be prevented if the company spends $800,000 on a tailings impoundment. Suppose further that the managers of the fishery can also prevent the damage by diverting one of the streams at a cost of $200,000. It is clearly more economically efficient for the fishery managers to prevent the damage than for the miners to do so. So the mining company should be willing to pay the fishery managers any amount up to $800,000 to take care of the problem, and the fishery managers should be willing to take any amount over $200,000 to do so. In the world of zero transaction costs, the company will build a mine and not bother with the expensive tailings impoundment. The fishery managers will divert the stream and receive some payment between $200,000 and $800,000 from the mining company. Coase’s point, however, was that transaction costs are never zero. In our example, neither the mining company nor the fishery managers could know exactly how much damage the mine would cause or how much it would cost to abate it. To enter into any kind of legal arrangement before mine construction began would be costly, as it would be to take legal action after the fact. Coase was saying that we should study the real world, where we can’t know the future effects of our actions, where it always costs something to learn about the past or the present and we can’t know everything, and where it also costs something to negotiate, to enter into legal arrangements, to monitor and enforce them, and to make exchanges. In the real world, it always costs something to do something.

These real-world costs arose time and again in the struggle over the future of Fish Lake. None of the stakeholders had any knowledge of the relevant future costs of their actions. How much would habitat destruction cost in the long run? What would be the future value of a genetically unique population of rainbow trout? What would biodiversity be worth in the future? What
would copper or gold be worth in the future? How much would it cost Taseko Mines if the Tsilhqot’in people gained rights to the land? How much would it cost the Tsilhqot’ins or other stakeholders if the company built the mine? How much environmental damage would the mine cause in the form of acid mine drainage? What would be the impact on other important industries in the area, like forestry, salmon fishing, ranching, or tourism? Were there other, richer undiscovered bodies of ore in the area? Were the rainbow trout the only genetically unique species that would be disturbed or eradicated? Were there archaeological sites that would have to be protected?

One of the distinguishing characteristics of environmental history is that it starts from the premise that human actions and environmental constraints are mutually determining and historically specific. Indeed, this is often taken to be the definition of the discipline. The key environmental entities in the struggle at Fish Lake, the copper and gold deposit and the rainbow trout, both had natural histories of their own. This meant that their valuable attributes were contingent on the sequence of events that led to them being in the same place in the Chilcotin in the late 20th century. To know those attributes, people had to reconstruct those histories. The natural history of the ore deposit unfolded in geological time; that of the trout in glacial time. Human activity at Fish Lake unfolded on a number of time scales, ranging from millennia to days. Each of these histories played a role in the dispute. By focusing on the contest of stakeholders in a particular place and adopting their temporal frames of reference, it becomes possible to see things that might have been obscured if the analysis were limited to a single time scale. As the lines between natural history, prehistory, and history blur, the nuances of place become more clear.

**Finding a Stable Interpretation**

So how do you know when you’ve finished your research? Information costs play a role here, too. Before the widespread digitization of sources and metadata, the scope of historical projects was often set by the holdings of one or a few archives. Someone working in a particular area was expected to have a relatively thorough knowledge of relevant material in local, regional, and national archives. Because the survival of sources is a haphazard affair, extant documents often ended up far from their point of origin. Some historians specialized in searching for and digging up these castaways; the rest accepted the fact that transaction costs were generally too high to find and make use of them. Likewise, the historian was expected to have read the relevant secondary literature, but relevance was understood to be delimited by the holdings of the largest nearby library. Within these parameters (and other traditional ones, like firm date ranges) the historian was expected to have exhaustive knowledge of his or her topic. Other scholars could monitor this knowledge by studying the historian’s footnotes and bibliographical apparatus. Did he or she work in multiple archives? Cite sources in multiple languages? Consult a range of different kinds of sources? Verify claims by checking them against other accounts? Then, as now, footnotes served as a way of reducing the information costs for other scholars who wished to assess the evidentiary base, and thus the reliability, of the author’s work.

This ideal of exhaustive reading was never attained in practice and no longer makes any sense at all. When I started working on my dissertation, I rather naively assumed that I would have a hard time finding sources because few books had been published on the history of the Chilcotin
region. I did a Google search for “Chilcotin” and got about 2,000 hits. I went through all of them, finding many online sources that I never would have thought to look for otherwise. Since these were already in digital form, it was very easy to add them to my own digital collection. I also found references to publications, people, places, groups, activities, and events that I could do more traditional kinds of literature searches for. I soon realized that I could find much more material about the Chilcotin than I could ever read. Four years later, while writing this chapter, I did a Google search for “Chilcotin” and got 549,000 hits.17

Historian Roy Rosenzweig suggested that we may soon be confronted with a “profound challenge.” “What would it be like to write history,” he asked, “when faced by an essentially complete historical record?” Widespread digitization of existing sources and the rapid proliferation of “born-digital” sources (things like e-mail and text messages, computer software, digital photographs, video recordings, and sound files) situate the historian in what Rosenzweig called a “culture of abundance.”18 Instead of trying to read everything, you stop doing research when your interpretation stabilizes. Louis Menand puts it beautifully: “You stop when you feel that you’ve got it. The test for a successful history is the same as the test for any successful narrative: integrity in motion. It’s not the facts, snapshots of the past, that make a history; it’s the story, the facts run by the eye at the correct speed.”19

We started with a straightforward principle: learning is costly. From that idea, we were able to generate both substantive questions, ones that help us to understand the people of the past, and methodological implications, ones that help us to go about our research. Since it doesn’t make sense to try to be exhaustive, it is important instead to monitor your research practice, to ask what is working and what is not. It is also important to approach historical research as an apprenticeship. Always try to work with people who know more than you do, get their feedback, and plan to keep rewriting until you get your interpretation right.

**Digital History**

At the same time, if you do continue in the historical field—or for that matter, in any research-related field—you should realize that your research practice will be very different than the practice learned by your teachers in the last century. Your generation is the first to face an almost unprecedented abundance of easy-to-acquire online sources. This may strike you as an impediment: your mentors will be learning the necessary new skills right alongside you (when they learn them at all). But actually it is a great opportunity. It means that you will be finding, integrating, and analyzing sources in ways never before imaginable to historical researchers, and developing new historical questions and answers as a result. And it means that you will be able to benefit from the work of other digital history researchers and use the tools that they create, but only if you’re willing to invest some time and patience in learning how to do so. An information cost once again.

In order to make the best use of digital sources and tools, you will need to learn some of the basics of web programming. There certainly isn’t enough room here to teach you how to program, but I can briefly describe a few examples of how programming can help you with historical research right now.20 For more information about getting started with these and many other techniques, see my weblog “Digital History Hacks.”21
First, programming can help you compile a bibliography at the beginning of your research. When wading into any topic, it can take time to figure out which books are considered important in the field, which ones you should read first, which ones you shouldn’t bother reading at all. Suppose you’re working on a project on the environmental history of the Columbia River. You read Richard White’s 1996 *Organic Machine* and discover that he cites Leo Marx’s 1964 *Machine in the Garden*. You look it up and add it to your list. Wouldn’t it be nice to be able to find other books that have material about the Columbia and that cite *Machine in the Garden*? If you are working with paper copies, you are pretty much limited to following citations in one direction only: backward in time. But you can do far more if you have access to a large collection of digitized books. Using the Amazon website, for example, you can find all of the books in its database that cite *Machine in the Garden*, regardless of when they were published. Then make a list of books returned by a search for “Columbia River.” Compare the lists to find books that appear on both, such as Richard W. Judd and Christopher S. Beach’s 2004 *Natural States*. Furthermore, Amazon can tell you which key phrases commonly appear in the text of a few books, but are rare in the overall database. The phrase “Columbia Basin” occurs in *The Organic Machine* and also in an edited book called *Bioregional Assessments*. The title of the latter book suggests that it might be a useful source for your environmental history, but without the ability to search inside the book you wouldn’t know that it had information about the Columbia River region. Amazon can also tell you which books are purchased together, leading you from *The Organic Machine* to Donald Worster’s 1992 *Rivers of Empire*. All of these searches are done thanks to someone else’s (Amazon’s) computer programming. Piggybacking on that organization’s work to reduce your own information costs makes a lot of sense. Recognizing the possibilities of computer programming may lead you to doing some of your own: writing a program to follow the citations, key phrases, and customer recommendations of the Amazon database can allow you to create detailed bibliographies for any subject in fractions of a second.

Second, programming can help you to harvest online sources. Imagine that you want to make intensive use of a large collection, such as the 24-volume *Dictionary of Canadian Biography* (DCB), published since 1966 and now online. The website includes a search engine, so that you can look through the entire DCB for a particular person or group. (This tool wasn’t available to DCB readers for more than three decades. Instead, people had to look things up in the indexes that accompanied each volume.) Suppose, however, you are interested in studying the DCB itself, to see how the kinds of people profiled in it changed over time. It’s a safe guess that there are more biographies of 18th-century fur traders than 20th-century ones. But what about Catholics, or soldiers? Once you learn how to program, it is relatively easy to write a “spider,” which visits a webpage, downloads a copy to your computer, and then follows each of the hyperlinks on that page in turn. As it reaches a new page, the spider checks to see if it has a copy of the page or not. If not, it saves a copy and extracts all of the new links, following each of those in turn. In a few minutes, such a program can automatically build a copy of a website with thousands of pages, like the DCB. (If done constantly and on a vast scale, spidering can create a dynamic map of most of the web; this is how search engines like Google compile their indexes.) Having downloaded the DCB, you can write other programs to process the text. You could discover, for example, that about 20 percent of the biographical subjects who died in the early 1700s were members of the armed forces,
while only 4 to 5 percent of those who died in the 1890s were. No one reading the published *Dictionary of Canadian Biography* may have noticed that fact in its first 40 years, or, if they had, would have been able to prove it without hours and hours of work. And this is just one, quick finding that you can make now that you have the DCB downloaded.

Third, programming also allows you to take on more sophisticated projects, like writing a custom search engine. In the previous example, I described how you might download the DCB to use for your research. The information in the DCB can help you with searching. Here’s how. If you type “Frobisher” into Google, two-thirds of the first few pages of hits are about the 16th-century explorer. You won’t have nearly as much luck if you try to Google “Radisson,” however, because that is also the name of a large hotel chain. Instead, you can pass Pierre-Esprit Radisson’s DCB entry through a program that determines the frequency of every word. This will allow you to locate half a dozen or so key phrases that are common in Radisson’s biography but relatively rare in the DCB overall. You can then try searching for Radisson’s name in conjunction with each of these key phrases. If you write a program to automatically extract key phrases from the DCB, try various searches and aggregate the results, you have the makings of a custom search engine, one that is more sensitive to the nuances of Canadian historical biography. As with the Amazon example, this program builds on the prior work of many other programmers.

Fourth, programming can help you to present and analyze information in new and different ways. For example, you can create a “mashup” to combine information from different databases on the fly. As a historical researcher, it is very useful to know exactly when and where things happened. You could pass the DCB, for example, through a program that identifies dates and place names. You could then provide a website where the places are plotted on a dynamic map, and the dates on a timeline. When you click on a location on the map, it shows you all of the passages in the DCB that relate to that place; when you click on a date in the timeline, it shows you the entries that mention that date. As in earlier examples, your work builds on the work of others. Your mashup serves as glue, binding together information and web services to create a unique custom application that helps you and other people with historical research.

There are information costs in learning how to program, to be sure, just as there are in learning to express yourself in another language. Programming requires practice and patience, an investment of time and energy. But you will be amply rewarded by your growing ability to take on research questions that would be too difficult, too immense, otherwise. Programming is not yet being taught in most history departments. The first generation of historians to master these skills will completely change the information costs for everyone else, not to mention the landscape of historical knowledge itself.

**Discussion Questions**

1. In the story of Fish Lake, different stakeholders tried to influence the present by appealing to different narratives about the past. Do you think that these narratives count as “history”?  
2. The events discussed in environmental history often unfold on a number of time scales. How do historians relate these different scales to one another? Does it make sense to say that something that happened 10,000 years ago can cause something that happened 10 years ago?
3. Think of an assignment that you completed recently. What were some of the transaction or information costs that you faced?

4. What is the difference between data and metadata? Can you relate this to the difference between primary and secondary sources? Why or why not?

5. When a search engine returns a half a million hits to a query, a simple consideration of information costs suggests that the researcher will be able to look at only a tiny fraction of the results. Does this mean that the order in which the results are presented is a potential source of bias? Discuss.

6. Could the digitization of historical sources lead to a point where we have too much information about the past? Why or why not?

**NOTES**


2. I was inspired to do this by reading M. H. Dunlop’s *Sixty Miles from Contentment: Traveling the Nineteenth-Century American Interior* (Boulder, CO: Westview Press, 1995). She collected a mass of present-day tourist literature to compare to the experiences of her historical subjects and “in the paper deluge of contemporary tourism” found that “many subjects around which the commentary of travelers in the interior once clustered reappeared . . . some reshaped, some partially submerged, some unaltered,” p. 7.

3. It is now possible to assess the “locality” of any literature by using OCLC’s Open WorldCat; http://www.worldcat.org is a freely accessible catalogue of more than 1 billion items held in libraries worldwide.

4. If you want to do this yourself, one option is Google Desktop at http://desktop.google.com.


7. This follows from the government’s allocation of resources to protect a particular property rights regime. In this case, the information was released as required by Canadian and U.S. laws that govern securities and exchange.


14. Metadata is data about data, including bibliographic information; notes on the format, content, quality or condition of the data; information about the circumstances under which it was collected or created; and so on.
16. The publication constraints of a reader like this one preclude the extensive footnoting that monographs allow. For evidence relating to the Fish Lake story, see William J. Turkel, *The Archive of Place*.
20. If you’d like to start learning how to program, try the Python language. It is free, powerful, easy to learn, and available in PC and Mac versions. The language, beginner’s tutorials, and tools are available online at http://www.python.org.
24. At least they were when I checked on June 25, 2007. Since search engines are dynamic, results to the same search can and do change from day to day.
25. Such a program is available from the Canadian group TAPoR (Text Analysis Portal for Research) at http://portal.tapor.ca.

**Further Reading**


