

‘Not so very *fine* and *healthy* as has been reported’: Settlers, Malaria, and the Construction of the Rideau Canal (1826-1832)

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## ABSTRACT

### **‘Not so very *fine and healthy* as has been reported’: Settlers, Malaria, and the Construction of the Rideau Canal (1826-1832)**

**Gabrielle McLaren, MA Concordia University, 2022**

Nineteenth-century understandings of malaria as an environmental illness led Euro-Americans to pathologize certain places as healthy or unhealthy, including Upper Canada where the disease was endemic. Using the construction of the Rideau Canal (1826-1832) as a case study, this thesis asks how British imperial agents reconciled their visions of settlement, agriculture, and growth for Upper Canada with malaria’s presence in the colony. Drawing on the written work, financial reports, and correspondence of John Mactaggart and Lieutenant-Colonel John By, I argue that imperial agents mobilized knowledge of disease from across the British Empire to rationalize their presence in Upper Canada. Mactaggart carefully crafted the personae he presented so that experiences with disease flagged his loyalty and dedication to the imperial project. Meanwhile, By dealt with malaria’s paralyzing effect on canal construction by avoiding disease as much as possible and expanding his vision of the canal so that it healed the landscape it traversed. The canal was subsequently understood as a kind of health infrastructure by settlers. My thesis emphasizes the Rideau Canal’s role as settler colonial infrastructure and situates Canada within the global imperial history of malaria, thus also showing the limitations of current understandings of malaria as a “tropical disease.” My work also adds to our understanding of environment and health’s interconnectedness in pre-Confederation Canada. I end by investigating the environmental *longue durée* of the canal’s construction in the twenty-first century, focusing especially on those associated with health such as wetland drainage.

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## Canal Construction Glossary

**Acclimatization:** The process in which a body, plant, or animal removed from its home environment becomes habituated to its new disease environment and climate. Also called “seasoning.”

**Artificer:** A skilled craftsman. On the canal this included masons, stonecutters, and carpenters.

**Canal:** An artificial inland waterway built for transportation, navigation, irrigation, or drainage.

**Cutting:** Digging through land to create a new canal passage.

**Grubbing:** Land clearance that involves removing tree stumps, roots, and other debris.

**Improvement:** Early modern to nineteenth-century concept referring to the gradual bettering of places, people, resources, societies and environments through agriculture, innovation, urbanization, colonization, or any combination of these.

**Lock:** A device used to raise or lower watercrafts so that they can navigate down waterways at different levels. A lock creates a chamber with two gates that can be opened and closed so that water flows in or out of the lock. This allows for a boat also in the chamber to be raised up or lowered to a stretch of the waterway at a different level. Each lock is operated by a lock keeper or lock master, and supporting infrastructure is called a lock station.

**Ordnance Department:** British government body responsible for supplying the army and navy, as well as defensive infrastructure. At the time of the Rideau Canal’s construction, its hierarchy consisted of the Master-General of the Ordnance (Sir James Kempt), the Inspector General of Fortifications (General Gother Mann), and some civilian positions. The Inspector General of Fortifications supervised the department’s three corps: the Royal Engineers, the Artillery, and the Sappers and Miners. The most detailed monograph on the Ordnance Office in the Canadas is George Raudzen’s *The British Ordnance Department and Canada’s Canals, 1815-1855* (Waterloo: Wilfrid Laurier University Press, 1975).

**Malaria:** Mosquito-borne parasitical disease, caused by parasites of the *Plasmodium* group and spread by female *Anopheles* mosquitoes. In the nineteenth century it was also called: swamp fever, lake fever, intermittent fever, paroxysmal fever, remitting fever, ague, or simple ‘fever.’

**Miasma:** Noxious disease-causing vapors emanating from a given environment or specific pollutants (ie: rotting vegetation, human waste, still water, swampland...) understood to cause disease until the mid-to-late nineteenth century. Also called miasmata or effluvia.

**Slackwater canal:** Type of canal that makes use of pre-existing waterways and lakes.

**Sluice:** Valve in a canal’s lock that controls the flow of water in or out of the lock’s chamber.

**Timber crib:** A kind of support structure, especially used to support wharfs or the canal’s walls.

**Waste Weir:** Gate through which to remove excess water or to drain the section of a canal.

Figure 1: Map of the Rideau Canal<sup>1</sup>



<sup>1</sup> Ken Watson, "Map of the Rideau Canal," [map]. *Rideau Info*. <http://www.rideau-info.com/canal/map-waterway.html>.

## Introduction: Into the “Thickly Forested and Malarial Wilderness”

Surveyor and clerk of works John Mactaggart described some places in Upper Canada as “seemingly designed by Nature to allow the Rideau Canal to pass through,”<sup>2</sup> but the “infernal place” known as Cranberry Marsh was not one of them. As he described it, the marsh’s surface was covered by floating cranberry bushes around which canoes struggled to navigate. The plants were entrenched by long, trailing roots that were difficult to cut through. “The berries are very plentiful,” Mactaggart wrote, “but as the mist of the marsh is extremely noxious to life, people prefer staying at home, instead of visiting the abode of the ague.”<sup>3</sup>

Cranberry Marsh was one of many “abodes” where the Rideau Canal’s builders sickened with malaria, a disease which they also called swamp fever, lake fever, intermittent fever, or ague (a term that described any kind of fever marked by fits of shivering). Originally built to reinforce Kingston’s defensive position after the War of 1812 by providing an alternative supply route, the Rideau Canal crossed 202 kilometers of sparsely settled and unfamiliar land in the colony of Upper Canada. While today we think of “malaria” as a stable diagnosis for a single parasite-borne disease, when Mactaggart was writing in the early nineteenth-century the disease seemed to be caused by noxious mists or miasmas tied to the landscape. Cranberry Marsh had, as Mactaggart wrote, a “*quivering atmosphere*” whose “smell is very nauseous, like that of a cadaverous animal in the last stage of decomposition.”<sup>4</sup> In the summer, the sick atmosphere of places like Cranberry Marsh paralyzed the canal’s construction as workers sickened with relapsing cycles of chills, headaches, nausea, vomiting, fever, and extreme sweating that often

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<sup>2</sup> John Mactaggart, *Three Years in Canada: An Account of the Actual State of the Country in 1826-7-8*, volume 1 (London: H. Colbourn, 1829), 106.

<sup>3</sup> John Mactaggart, *Three Years in Canada*, volume 2 13-14.

<sup>4</sup> Mactaggart, volume 2, 16.

lead to long-term disability.<sup>5</sup> This paroxysmal presentation and the successful use of quinine as a treatment for those lucky enough to secure it help to retrospectively diagnose these fevers as malaria.<sup>6</sup> “Canada,” Mactaggart concluded after describing the severity of disease along the canal, “is not so very *fine* and *healthy*, as has been reported.”<sup>7</sup> I latch onto this quote as the title of my thesis because it underscores the issues that I am most concerned with: how does a pathologized and unhealthy landscape become a place where settlers belong?

In a well-known essay, medical historian Charles Rosenberg compares the structure of an epidemic to a play in three acts. While there are limitations to this model and ample criticism of it, I hold on to Rosenberg’s insight that epidemics reveal the cultural assumptions, social configurations, and fault lines of the societies they affect. For Rosenberg, this is also true of the stories that are told about disease in its wake: “Just as a playwright chooses a theme and manages plot development, so a particular society constructs its characteristic response to an epidemic.”<sup>8</sup> With these wider repercussions in mind, this thesis is about how two different men recounted their experiences with malaria: engineer, surveyor, and first clerk of the works John Mactaggart, and Lieutenant-Colonel John By who oversaw the canal’s construction. Ultimately, I argue that disease was profoundly destabilizing to the builders of the Rideau Canal and that both

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<sup>5</sup> These symptoms, described by Mactaggart, reflect the clinical presentation of malaria today—as the parasite goes through its life cycle inside the host. Severe complications of malaria include renal failure, cerebral malaria, pulmonary edema, and anemia (and are usually caused by the *P. falciparum* parasite in particular). See: Andrej Trampuz, Matjaz Jereb, Igor Muzlovic and Rajesh M Prabhu, “Clinical review: Severe malaria,” *Crit Care* 7, 315 (2003).

<sup>6</sup> For more on historicizing quinine as a commodity and diagnostic tool see Rohan Deb Roy, *Malarial Subjects: Empire, Medicine and Nonhumans in British India, 1820-1909*, (Cambridge, New York: Cambridge University Press, 2017) and Samir Boumedienne, *La colonisation du savoir : Une histoire des plantes médicinales du ‘Nouveau Monde’ 1492-1750*. (Vaulx-en-Velin : Éditions des Mondes à Faire, 2014).

<sup>7</sup> Mactaggart, Volume 2, 16.

<sup>8</sup> Charles Rosenberg, “What is an Epidemic? AIDS in Historical Perspectives.” *Daedalus* 118, 2 (1989), 2. Critiques of Rosenberg’s model are well-summarized and accessible in the following special issue on epidemic histories: Mary E. Fissell et al, “Introduction: Reimagining Epidemics,” *Bulletin of the History of Medicine* 14, 4 (2020): 543-561.

Mactaggart and By appealed to imperial values and knowledge in order to navigate malaria's presence in Upper Canada.

While there are plenty of ways to think about malaria along the canal, I chose to focus on Mactaggart and By for two reasons. First, they both left behind enough written work to be archivally accessible, and for their thoughts on the canal and disease to be fleshed out. There are others for whom this is not true, such as the Ordnance Office surgeon M.H. Tuthill who tended to sick soldiers from 1828-1832. Secondly, there are intriguing parallels and compelling differences between Mactaggart and By: both men were sick with malaria in Canada, and both likely died of complications related to malaria when they returned to Britain. But their roles in Upper Canada, their involvement in the canal, and the writing they resultingly produced are all different enough to offer unique case studies on how environmental disease was experienced and managed by settlers. Understanding why the stories they tell about disease matter requires some background on the history of malaria and the context of the canal's construction, which I outline in these next two sections, before outlining my thesis's structure.

### **Context: What is and what was malaria?**

Malaria is a parasite-borne disease caused by a handful of parasites in the *Plasmodium* genus, which is most commonly transmitted from one human host to the next by *Anopheles* mosquitos as they feed. There are four elements required in malaria's transmission: a parasite (which causes disease), a vector (which carries the parasite), a host (which receives it), and a suitable environment in which this interaction may happen. These components all require a complex series of interspecies relationships rooted in place, which can be impacted by a myriad of human, animal, and ecological factors including the feeding preferences and habits of local mosquito

populations, socioeconomic demographics, climate, urbanization, work patterns, rainfall...<sup>9</sup> As William Reisin explains, “transmission occurs when all four components come together in time and space.”<sup>10</sup> The host-vector-parasite relationship is thus a complicated environmental and historical event both at a microlevel (when one parasite meets one vector which meets one host) and at the macrolevel (when, for example, a vector-borne disease becomes endemic to a new region). Because of how crucial environment is to malaria’s transmission, malariologists today are increasingly turning to an understanding of malaria as an environmental disease.<sup>11</sup>

For very different reasons nineteenth-century Euro-Americans also understood malaria as an environmental illness. The disease’s etymology captures its longstanding association with miasmas, as “malaria” derives from the Italian for “bad air.”<sup>12</sup> While the relationship between malaria and mosquitos had been observed in Roman, Indian, and Chinese medical texts as well as African traditions, European scientists only pieced together malaria’s infection cycle and parasitical nature at the end of the 19<sup>th</sup> century.<sup>13</sup> Until then, laypeople and medical professionals alike connected malaria to miasmas: noxious disease-causing vapors emanating from a given environment or specific pollutants, ranging from rotting and fermenting vegetation or waste to stillwater and swampland.<sup>14</sup> According to these Hippocratic conceptions of illness, one’s

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<sup>9</sup> Frederick Dunn. “Malaria” in *The Cambridge World History of Human Diseases*, ed. Kenneth F. Kiple (Cambridge, New York: Cambridge University Press, 1993), 858.

<sup>10</sup> William K. Reisin, “Epidemiology” in *Arthropod Borne Diseases*, ed. Carlos Brisola Marcondes (Springer International Publishing, 2017), 8.

<sup>11</sup> See, for example: Laretta Ovadje and Jerome Nriagu, “Malaria as an Environmental Disease,” in *Encyclopedia of Environmental Health*, ed. Jerome Nriagu (Elsevier: San Diego, 2019), 173-181.

<sup>12</sup> G.C. Cook and A.J. Webb. “Perceptions of malaria transmission before Ross’s discovery in 1897.” *Postgraduate Medical Journal* 76: 2000, 738.

<sup>13</sup> Randall M. Packard. *The Making of a Tropical Disease: A Short History of Malaria*. (Baltimore: John Hopkins University Press, 2007), Kindle Location 1373; Curtin, 136.

<sup>14</sup> Nikolova, Lolita Petrova. “Miasma Theory of Disease.” In *Encyclopedia of Consumption and Waste: The Social Science of Garbage*, edited by Carl A. Zimring and William L. Rathje (Thousand Oaks: Sage Publications Inc, 2012), 539.

environment—whether it was built or natural, temporary or permanent, home or work—was responsible for one’s degree of exposure to illness.

Within miasma theory, disease could be detected by virtually anybody through smell and sight, which made miasmatic theory both visceral and accessible.<sup>15</sup> A lexical field based on smell and sensation thus developed to describe and qualify disease, which provides insight on how to close-read disease narratives as literary scholar Jessica Howell does in her book *Exploring Victorian Travel Narratives: Disease, Race, and Climate*. As Howell’s case studies illustrate, describing the environment and sharing experiences of disease was key to creating knowledge about health, especially in colonial settings.<sup>16</sup> Another important point here is that miasma theory gained traction since sick patients often recovered if they were removed from a “sick” place, and public health initiatives targeting miasmas tended to address culprits of disease recognizable to us in the twenty-first century—including waste disposal, sewage management, and polluted water. To borrow Dana Tulodziecki’s phrasing, miasma theory was “right for the wrong reason” in understanding environmental impacts on health.<sup>17</sup> Historical actors invoking and describing miasmas were working with empirical evidence and long-standing scientific facts.

Managing disease meant managing miasmas by getting rid of bad smells or changing the environment that generated miasmas in the first place. The latter approach has a long history in Europe, as Eric Ash shows in *The Draining of the Fens*. Ash’s monograph concerns the wetland-rich English lowlands, where endemic malaria nursed the Fens’ reputation “as a poor, unhealthy,

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<sup>15</sup> Winderman, Emily, Robert Mejia, and Brandon Rogers. “‘All Smell is Disease’: Miasma, Sensory Rhetoric, and the Sanitary-Bacteriologic of Visceral Public Health.” *Rhetoric of Health & Medicine* 2, 2 (2019): 120.

<sup>16</sup> Jessica Howell, *Exploring Victorian Travel Literature: Death, Race, and Climate* (Edinburgh: Edinburgh University Press, 2014), 15.

<sup>17</sup> Dana Tulodziecki. “How (not) to think about theory - change in epidemiology.” *Synthese* (2019).

and uncivilized quagmire.”<sup>18</sup> In the seventeenth century, draining the wetlands to convert them into agricultural land and getting rid of malaria were both useful in the broader context of making land exploitable and profitable and was understood to have a “civilizing” effect on the Fens and its inhabitants. Thus, the transformation brought on by wetland drainage was not purely environmental or medical but also cultural. As Greg Bankoff argued, in the English Lowlands, “Landscape and fever combined together to forge a sense of separate identity that was acknowledged within and recognized outside the region.”<sup>19</sup> Water, air, and local land use rights and customs related to environmental regulation and malarial folk cures created “a social as well as physical landscape.”<sup>20</sup> Ash is one of many environmental historians to have noted that miasma theory was a framework with which to pathologize certain landscapes as sick and dangerous. Vladimir Jankovic goes so far as to argue that Western environmental health was born out of concerns about how “ordinary surroundings and private space were constituted as spaces of instant pathological potential that required surveillance and management,” a process closely connected to gender, class, and race.<sup>21</sup>

A central argument I am making in this thesis is that pathologizing landscapes took on additional meanings in colonial settings where Europeans were actively trying to gain and control territory by providing settlers with a justification for the ecological transformations they prompted. William Cronon, in a reflection piece on environmental history, wrote that: “If the story ends in . . . the happy conclusion of a struggle to transform the landscape, then the most

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<sup>18</sup> Eric Ash, *The Draining of the Fens: Projectors, Popular Politics, and State Building in Early Modern England*, (Boston: John Hopkins University Press, 2017), 6.

<sup>19</sup> Greg Bankoff, “Malaria, water management, and identity in the English lowlands,” *Environmental History* 23, 3 (2018), 475.

<sup>20</sup> Bankoff, 485.

<sup>21</sup> Vladimir Jankovic, *Confronting the Climate: British Airs and the Making of Environmental Medicine* (New York City: Palgrave MacMillan, 2010), 61.

basic requirement of the story is that the earlier form of that landscape must either be neutral or negative in value. It must *deserve* to be transformed. It is thus no accident that [storytellers] begin their narratives in the midst of landscapes that have few redeeming features.”<sup>22</sup> Disease was one way to devalue a landscape and signal that it “*deserve[d]* to be transformed.” For Europeans who held Lockean conceptions of property rights, in which the amount of labour poured into land defined who it belonged to, managing malarial landscapes worked towards ‘owning’ and belonging to certain places, if not legally then culturally and affectively.<sup>23</sup>

As a rule of thumb, there is a larger historiography on malaria in the places that Great Britain tried to colonize than in the British Isles themselves. Admittedly, malaria is more common, still endemic, and much more dangerous in some of these places: 90% of global malaria deaths today occur in Africa, where the most aggressive form of malaria, caused by *P. falciparum*, is most prevalent.<sup>24</sup> But this is somewhat ahistorical: GIS research has shown that before the twentieth century, malaria was prevalent on 53% of the world’s land surface—including much of Europe and, following the Columbian Exchange, the Americas.<sup>25</sup> There is thus a (as I will explain, likely racialized) historiographical bias at play that needs to be accounted for in histories of malaria given the history of tropical medicine, which hinges on what Philip Curtin calls the “relocation cost” of colonization. Because of Europeans’ lack of immunity to diseases they encountered overseas, relocating troops to a tropical place had a human cost that

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<sup>22</sup> William Cronon, "A Place for Stories: Nature, History, and Narrative." *The Journal of American History* 78, 4 (1992), 1354.

<sup>23</sup> Allan Greer, “Commons and Enclosure in the Colonization of North America,” *The American Historical Review* 117, 2 (2012), 366-367.

<sup>24</sup> Roser and Ritchie.

<sup>25</sup> Simon Hay et al, “The global distribution and population at risk of malaria: past, present, and future,” in *The Lancet Infectious Diseases* 4, 6 (2004): 327-336. A map summarizing their findings on malaria’s historical prevalence has been redrawn and is available without institutional access: Max Roser and Hannah Ritchie, “Malaria,” *Our World in Data*, Oxford Martin School, 2015, <https://ourworldindata.org/malaria>.

could be measured through death tolls as record-keeping practices improved, which is exactly what Curtin did in his quantitative study on the topic.<sup>26</sup> As a result, imperial powers in the nineteenth century became invested in a variety of sciences destined to lower this human cost including medical geography, which mapped disease onto the world to designate where Europeans should and should not go, and tropical hygiene to help them survive new disease environments when they went anyways.<sup>27</sup> Disease management was thus central to colonial exploration and control.

Stemming from this insight, a more sensationalist depiction of malaria has emerged highlighting malaria's global historical impact based on the impact of disease on human activity, with a focus on warfare and colonization. Timothy Winegard's book *The Mosquito: A Human History of Our Deadliest Predator* is one such example. The book's introduction and conclusion revolve around the metaphor of a "war with the mosquito," and its jacket is peppered with rhetorical questions like: "What doomed the Crusades? Why did Scotland surrender its sovereignty to England? What was George Washington's secret weapon during the American Revolution? . . . The mosquito has steered the fates of empires and nations, razed and crippled economies, and decided the outcome of pivotal wars."<sup>28</sup> The framing of mosquitoes as deadly predators thwarting human progress and activity both misrepresents the role mosquitoes play in the cycle of malaria transmission, and ignores the agency of those affected by and responding to malaria and other diseases.

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<sup>26</sup> Philip Curtin, *Death by Migration: Europe's Encounter with the Tropical World in the Nineteenth Century* (New York City: Cambridge University Press, 1989), 6. While Curtin does briefly discuss non-British troops (such as French soldiers in Algeria) I am focusing here on his discussion of British forces given the historiographic tradition and context I am interested in.

<sup>27</sup> Curtin, 104 and 133.

<sup>28</sup> Timothy Winegard, *The Mosquito: A Human History of Our Deadliest Predator* (New York: Penguin Books, 2019), 1 and 437.

The emergency of tropical medicine is one such response, and Douglas Hayes expands on its imperial and racialized foundation in his book *Imperial Medicine: Patrick Manson and the Conquest of Tropical Disease*. As he explains, through tropical medicine rehabilitating and transforming malarial landscapes and curing the disease through scientific and technological means was folded into wider ideologies of the white man's burden. Consequently, "the representation of the tropics in the medical press as diseased or backward provided a space for constructing the image of Britain as an advanced and healthy society and British medicine as a tool of modernity."<sup>29</sup> Furthermore, as Michael Zeheter noted in his comparative study of cholera in Lower Canada and India, disease and its management played a crucial role in expanding and legitimizing the power of colonial states through medical infrastructure by creating "both a challenge and an opportunity for local authorities."<sup>30</sup> While disease was destructive in the moment, in the long-term medical institutions served colonial authorities in search of legitimacy and administrative power quite well. Western medicine inherited tropical medicine from these inquiries on place and health, and malaria was further entrenched as strictly "tropical."

European empires' interests in medical geography are mirrored in the history of the United States. There, histories of malaria focus on the South (especially in the context of plantations) and in the country's Westward expansion. Using nineteenth-century California where malaria was endemic as a case study, Linda Nash shows that for Americans too "bodies were themselves barometers of place" and that a place's effect on health factored into the aesthetic and material valuation of new landscapes.<sup>31</sup> Nash argues that settlers saw the need not

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<sup>29</sup> Douglas Haynes, *Imperial Medicine: Patrick Manson and the Conquest of Tropical Disease* (Philadelphia: University of Pennsylvania Press, 2001), 176.

<sup>30</sup> Michael Zeheter, *Epidemics, Empire, and Environments: Cholera in Madras and Quebec City, 1818-1910* (Pittsburgh: University of Pittsburgh Press, 2015), 252.

<sup>31</sup> Linda Nash, "Finishing Nature: Harmonizing Bodies and Environment in Late Nineteenth-Century California," *Environmental History* 8 (2003), 25.

only to conquer the natural world around them but to adapt to the climate and disease profiles of new places to establish white dominance. In addition, Nash argues that “the invocation of health was often another justification of appropriation, and conceptions of health merged conveniently with European landscape aesthetics,” highlighting how foundational settler futurity was to understandings of North America’s healthiness.<sup>32</sup> However, Nash also shows that settlers on the ground were not always sure what to do with these sick places and were torn about whether extending agriculture’s civilizing influence would cure sickly landscapes or aggravate the disease environments they encountered by disturbing the natural world.<sup>33</sup> Contradicting ideas about health and white (in)vulnerability run through her essay, with Nash concluding that ultimately the health anxieties of settlers contradicts typical understandings of conquest which teleologically assert Euro-American dominance, confidence, and disregard for the environment.<sup>34</sup>

Experiencing new disease landscapes was also a deeply personal process, as Conevery Bolton Valenčius emphasizes in *The Health of the Country: How Settlers Understood Themselves and Their Land*. Settlers in the American West, whose correspondence and media culture form the backbone of her book, drew intense parallels between healing their bodies and healing the landscapes they occupied. As she explains, “leveling forests and draining swamps released their miasmatic, disease-bearing potential in a manner resonant with the ‘letting’ of bad humours associated with nineteenth-century medicine.”<sup>35</sup> Beyond this association of landscapes with bodies, working on unsettled land “represented moral and spiritual engagement” with new places, which connected settlers to these new landscapes.<sup>36</sup> For settlers who did get sick, the

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<sup>32</sup> Nash (2003), 37.

<sup>33</sup> Nash (2003), 37 and 40.

<sup>34</sup> Nash (2003), 43.

<sup>35</sup> Conevery Bolton Valenčius, *The Health of the Country: How American Settlers Understood Themselves and Their Land* (New York: Basic Books, 2002), 224.

<sup>36</sup> Bolton Valenčius, 192.

“action of miasma in and through the human body blurred the boundaries between self and environment.”<sup>37</sup> In this way, experiencing a new place’s diseases connected settlers and landscapes—making the issue of disease landscapes one of settler identity formation.

With this context in mind, what do we know about malaria in Canada, a place where malaria once existed and which settlers continue to call home today? Frankly, not much. Prominent Canadian parasitologist Albert Murray Fallis suggests that malaria was brought to Canada by British troops previously garrisoned in endemic areas of the empire or, most likely, by Loyalists fleeing the United State; two theories also suggested by historian Charles Roland, although he notes that malaria on a smaller scale along the Detroit River preceded Loyalist migrations.<sup>38</sup> Either way, malaria became endemic in Ontario towards the late eighteenth-century and gained a comfortable foothold in central to southern Ontario.<sup>39</sup> Fallis’s article provides a rich bibliography of settlers who noted malaria in their environments, and mid-to-late nineteenth-century physicians attempting to puzzle through it.

Malaria was on military physicians’ radar during the War of 1812—the same war that prompted the canal’s construction. As Joseph Miller notes in his dissertation on environmental illness during the War of 1812 the success of military operations depended on managing the health of soldiers, including those sick with malaria, something that he argues the British excelled at.<sup>40</sup> While Miller writes mostly about American experiences, British military physicians took advantage of their forays into Upper Canada to record their knowledge about the colony. James Douglas, for example, wrote that in a six-week period in 1814, half of the corps at

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<sup>37</sup> Bolton Valenčius, 130.

<sup>38</sup> Charles G. “‘Sunk under the Taxation of Nature’: Malaria in Upper Canada,” in *Health, Disease, and Medicine: Essays in Canadian History*, ed. Charles G. Roland (Clarke Irwin Inc, 1983), 155.

<sup>39</sup> Albert Murray Fallis, “Malaria in the 18 and 19 centuries in Ontario.” *Canadian Journal of Health History/Revue Canadienne d’histoire de la santé* 1, 2 (1984), 25.

<sup>40</sup> Joseph Miller, “‘The Men Were Sick of the Place’: Soldier Illness and Environment in the War of 1812,” PhD diss., (University of Maine, 2020), 43.

Fort Chippawa were hospitalized with malaria. The situation became so dire “that we were under the necessity of evacuating the position, and of retiring to the rear of the army to a more salubrious situation.”<sup>41</sup> For Douglas, watching malaria’s debilitating effects was disempowering. “There is perhaps no situation in which a medical practitioner can be placed,” he wrote, “more painful to his feelings than . . . witnessing the effects of an obstinate intermittent fever spreading its ravages amongst the wounded.”<sup>42</sup>

Douglas shared these and other malarial encounters in his 1819 *Medical Topography of Upper Canada*. The book was dedicated to James McGrigor (Director-General of the Army Medical Department), printed in London, and focused on diseases common among soldiers. All these things highlight the importance of knowing and managing malaria to the imperial project and its metropole. Because disease was driven by the environment, Douglas considered that “in unhealthy situations, a minute regard should be paid to every local circumstance.”<sup>43</sup> His writing thus describes climate, vegetation, soil composition, precipitation, the changing harshness of winter, the warmth of the sun, and other parts of the natural world that readers today may not associate with health. As a result, Douglas’s book commented on the health of specific places; he considered York “liable to be attacked by intermittent fever,” Fort Erie “unhealthy and thinly inhabited,” and the West of Lake Ontario “but partially settled, and withal very unhealthy.”<sup>44</sup> Fort Chippawa was in such a marshy and “unhealthy situation” that “though a military position both in times of war and peace, it ought never to be garrisoned by troops except in cases of the

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<sup>41</sup> John Douglas, *Medical Topography of Upper Canada* (London: Burgess and Hill, 1819), 64.

<sup>42</sup> Douglas, 86.

<sup>43</sup> Douglas, 42.

<sup>44</sup> Douglas, 17 and 22. While I focus here on Douglas’s work because it is the most locally relevant, the most famous medical topography of malaria in North America is probably Daniel Drake’s *A Systematic Treatise, Historical, Etiological, and Practical, on the Principal Diseases of the Interior Valley of North America, as They Appear in the Caucasian, African, Indian, and Esquimaux Varieties of Its Population* (Cincinnati: Winthrop B. Smith & Co. Publishers, 1850). Drake was aware of malaria among British troops but was mostly concerned with the United States (Drake, 708).

most urgent necessity.”<sup>45</sup> Douglas connected sickness to settlement and land use here, but also hydrology—unknowingly pinpointing where mosquitoes were likely to breed. Douglas wrote that: “The tract of land which stretches from Chippawa to Fort Erie, is in many parts deep and marshy, and divided by narrow creeks, the swelling and recession of whose waters are also dependent on the increased or diminishing size of the river Niagara. It is, therefore, not to be wondered at, that settlers in this line of territory are at times indisposed by sickness.”<sup>46</sup> I quote Douglas’s description fully here because the parallels between managing the flow of water and the flow of disease will be a recurring theme in this thesis.

In Douglas’s view, while malaria complicated settlement, settlement would ultimately solve Upper Canada’s malaria problem. Douglas considered that “the rude physiognomy of nature is now softening by degrees to the labours of industry,” and happily anticipated “the future grandeur of this majestic country, when an increase in population shall cover its surface, and when those bounties which nature at present scatters so profusely around shall not pass unseen nor unenjoyed.”<sup>47</sup> However, disease was also a barrier to this desirable and necessary growth, as “Settlements adapted to commercial intercourse prove often unhealthy to their inhabitants. Placed as they generally are on the banks of oozy streams and stagnating rivers; in certain seasons of the year, they contribute materially to the production of sickness.”<sup>48</sup> Douglas pinpointed malaria as an obstacle to development, as settlers had to face disease to foster industry, commerce, and growth.<sup>49</sup> The implication that settlers’ health and lives had to be

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<sup>45</sup> Douglas, 20.

<sup>46</sup> Douglas, 20.

<sup>47</sup> Douglas, 14.

<sup>48</sup> Douglas, 15.

<sup>49</sup> While getting into details would be beyond the scope of this thesis, I want to note the centrality of productivity and improvement to nineteenth-century discussions of malaria is eerily similar to how malaria is discussed today in certain international studies and economics contexts. See Randall Packard’s critique: Packard, Kindle Location 2325.

sacrificed to pursue settlement is another manifestation of Curtin's relocation cost. However, Douglas thought that Upper Canadians could gain immunity to malaria if they survived it, writing that:

As [settlers] grow up to manhood, their constitutions become naturalized to the climate; and except when they reside in unhealthy situations, they seldom relapse into fever . . . Many of the old settlers, though living in places which are productive of disease, and who, after their arrival in the country, had been annually seized with obstinate agues, may now be seen, even at an advanced period of life, actively employed with their numerous offspring in the cultivation of their farms.<sup>50</sup>

I quote Douglas in full here not only to show that scientific understandings of acclimatization were at play in the Canadas, but also to show the extent to which acclimatization was conceptually linked to productivity. The image Douglas used to epitomize successful acclimatization is male, active, agricultural, and his image of "numerous offspring" working on the family farm underscores the growing importance of populating Upper Canada to prevent further American invasion and fully exploit the colony's natural resources and agricultural potential.<sup>51</sup>

Douglas was not alone in aligning disease management strategies with larger imperial goals such as populating and commercializing Upper Canada. In his *Sketches of the Endemic Fever of Upper Canada* (1852), JJ Jaron wrote that "in the new world, the effects of malaria exhibit perhaps more varieties than in the old"<sup>52</sup> given the geographic diversity of lakes and rivers "so fertile of that peculiar malaria..."<sup>53</sup> This sense that disease was somehow more complicated in North America reflects broader settler anxieties about new, and more importantly "uncivilized,"

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<sup>50</sup> Douglas, 107. Acclimatization was a gendered process, understood to occur differently in the bodies of men and women. Ruth Morgan has produced interesting work in the context of settler colonial Australia on climate and gender. See: Ruth A. Morgan, "Health, Hearth and Empire: Climate, Race, and Reproduction in British India and Western Australia," *Environment and History* 27, 2 (2021): 229-250.

<sup>51</sup> Harris, 315.

<sup>52</sup> J. Jaron, "Sketches of the Endemic Fever of Upper Canada." *The Upper Canada Journal of Medical, Surgical and Physical Science* 2, 1 (1852), 3.

<sup>53</sup> Jaron, 3.

environments. Jarron lamented that “in the present state of improvement and cultivation of the province, we have not a spot without the sources of local malaria.”<sup>54</sup> Lessening the burden of malaria relied most heavily on environmental changes that would eventually facilitate settlement, as “the clearing and improvement of the country has also a decided effect in rendering the diseases of the climate less frequent and severe.”<sup>55</sup> In short, settling Canada was key to managing its environmental illnesses to Jarron. Until then, settlers on the ground resorted to folk cures used by settlers included “bitter vegetable infusions and ardent spirits, to which are added Cayenne pepper, nutmeg, and other aromatic stimulants.”<sup>56</sup> The consumption of bitter plants and bloodletting are other cures noted by Fallis, and Roland describes a type of folk charm settlers made.<sup>57</sup> Quinine was frequently too expensive for settlers to access, although some general stores in remote areas carried quinine in the absence of pharmacies.<sup>58</sup>

The journals and correspondence of settlers are peppered with descriptions of ague and fever. Anne Langton’s journal, published as *A Gentlewoman in Upper Canada*, shows the burden of care that was placed on her because of her household’s susceptibility to malaria, as family members fell ill from April to November in 1842. When she and her aunt both sickened in September, Langton wrote that: “Yesterday we were both in our beds in a miserable state, and as neither of us have thrown off the fever sufficiently to venture upon quinine, we must anticipate a repetition of the suffering to-morrow.”<sup>59</sup> That Langton was the family’s caretaker when illness struck shows how gendered social reactions to the disease were, but this excerpt also reflects how disease could be compounded when nobody was healthy enough to perform care work.

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<sup>54</sup> Jarron, 4.

<sup>55</sup> Jarron, 5.

<sup>56</sup> Douglas, 93.

<sup>57</sup> Fallis, 30 and Roland, 157.

<sup>58</sup> Roland, 156.

<sup>59</sup> Anne Langton and Barbara Williams, *A Gentlewoman in Upper Canada: The Journals, Letters, and Art of Anne Langton* (Toronto University of Toronto Press, 2008), 386.

Langton also went on to describe how in her community, “we have still many new cases [of malaria], and another death in our neighborhood, that of an elderly person, whose illness in its nature and duration seemed very similar to that of my dear mother.”<sup>60</sup> The comparison she ends with underscores Langton’s concern for sick and recovering family members (her mother’s health had disintegrated since her spell of malaria that April). More saliently, the fact that everyone in a community was susceptible to malaria, and thus connected by shared experience and concern, shows disease’s role in shaping those communities. In other places in her diary, Langton records news about the extent of malaria in other communities “where three individuals only have escaped, whole families being ill at once,”<sup>61</sup> and local debates about the nature of sickness. She reported that: “Canadians say that the species of ague we have had this year is much worse than ordinary ague. Some attribute it to the raising of our waters, and say we shall always have it; others assure us that everywhere it has been more prevalent than usual this year, so we hope to fare better another year.”<sup>62</sup> Langton’s entry shows that settlers did not simply accept malaria’s presence, but actively worked to understand the disease’s peculiarities in their new regions and homes. The fact that Langton records what “Canadians say” without weighing in on these discussions, writing only that she and her family can only hope for less serious disease in the future, show the importance of experiential knowledge as settlers went through seasoning.

In another settlement story, Anne Harris recounted her mother’s motivation to leave the United States for Upper Canada in the summer of 1794 by writing that she had “brought from the healthy climate of New Brunswick four fine children, all of whom she buried in New York in

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<sup>60</sup> Langton, 386.

<sup>61</sup> Langton, 358.

<sup>62</sup> Langton, 364.

eight weeks. She gave birth to four more; three of those had died also, and she felt sure if she stayed down there, she would lose the remaining one.”<sup>63</sup> The family clearly attributed climate to the loss of their children, and to the family’s disappointment Upper Canada was not necessarily healthier or safer. As Harris describes, when her father went ahead of the family to build their first house, he “fell ill with the Lake fever; his men erected a shanty, open in front like an Indian camp, placed my father in it, and left him with his son . . . as his only attendant. When my father began to recover, my half-brother was taken ill, and there they remained helpless, alone for three weeks.”<sup>64</sup> Harris’s mother, while waiting for news from her husband, had “tortur[ed] her mind with all sorts of horrors—Indians, wild beasts, snakes, illness, and death had all been imagined.”<sup>65</sup> She understood malaria as one of many obstacles and dangers that needed to be faced to put down roots in North America. If we think of the context in which Egerton Ryerson published Harris’s story, celebrating the Loyalists who had remained loyal to the Crown and peopled Upper Canada, we can also think of facing malaria as part of the process of populating and creating Canada for early Upper Canadian settlers.

Furthermore, doctors who worked permanently in the province were used to treating ague, as Jacalyn Duffin showed in her thorough analysis of Dr James Miles Langstaff’s medical records. In the first five years of Langstaff’s practice in Richmond Hill (a community just outside of Toronto), quinine was the most frequently prescribed drug. While quinine was sometimes used as a ‘cure all,’ the symptoms Langstaff recorded and described corresponded with malaria,

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<sup>63</sup> Egerton Ryerson, *The Loyalists of America and Their Times*, (Toronto: W. Briggs, 1880), 230.

<sup>64</sup> Ryerson, 233.

<sup>65</sup> Ryerson, 233.

as did the prevalence of the disease in summer and early fall when mosquitoes were most active. Langstaff learned to recognize the disease early in his practice.<sup>66</sup>

I will circle back to malaria's presentation, severity, and impact at the Rideau Canal while breaking down its construction timeline but want to end this section by noting that malaria started disappearing from the province in the 1850s. In Longstaff's medical records, the last diagnosis of 'ague' came in 1879.<sup>67</sup> The 'why' is difficult to reconstruct, as Fallis explains: "Lack of knowledge about vital statistics, the extent of the use of quinine, and the amount of draining and clearing of land permit only speculative reasons for the disappearance." Urbanization among other socioeconomic changes, especially those affecting the quality of housing, and the increased presence of cattle and other farm animals for mosquitoes to feed on are also possible factors.<sup>68</sup> Whatever the cause, the chain of infection between human host, infected vector, and parasite was broken and has not been reestablished, although climate change may change this.<sup>69</sup>

Even if malaria is no longer endemic in Canada, malaria mattered to the people who encountered it. The disease shaped the way that settlers positioned themselves in Upper Canada and understood the place they had come to. The historians who have studied the disease so far have focused on documenting malaria's existence, not on analyzing its ideological and cultural impacts for settlers. This means that their work does not fully think through malaria as we know Euro-Americans conceptualized of it.

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<sup>66</sup> Jacalyn Duffin, *James Miles Langstaff: A Nineteenth-Century Medical Life* (Toronto: University of Toronto Press, 1993), 74.

<sup>67</sup> Duffin, 119.

<sup>68</sup> Fallis, 31 and Roland, 165.

<sup>69</sup> L. Berrang-Ford et al, "Climate Change and Malaria in Canada : A Systems Approach," *Interdisciplinary Perspectives on Infectious Diseases* 2009 (2009), 10.

I offer three reasons for the lack of historical inquiry on malaria in Canada. First, there is the question of scale: malaria is no longer endemic to Canada, but even when it was the disease was regionally specific and contingent. Environmental and/or local histories are best suited to thinking about malaria; Roland's article, for example, focuses specifically on Newark. As a result, malaria does not emerge as a universal feature of life in nineteenth-century Canada, especially in comparison to infectious diseases like smallpox, measles, or cholera. These types of infectious diseases, which transcended local conditions, are far better represented in early Canadian medical history, especially given their impacts on Indigenous People.<sup>70</sup>

This brings me to my second point, since thinking of malaria in the nineteenth century means thinking of the disease much differently than we do today. Historians have inherited the understanding of malaria as a "tropical disease" that came to shape at the end of the nineteenth century. This association has obscured malaria as a historical phenomenon in decidedly non-tropical environments, like Canada. That historians discussing malaria in Canada have continued to call the disease "swamp fever" or "ague" in their writing reflects how malaria's tropicalization has stunted historians' understanding of what exactly historical actors were experiencing. It is difficult to analyze a problem that is not properly identified and understood, and even harder to then connect it to relevant literature and historiographies. This is also true when it comes to our understandings of what constitutes a therapeutic intervention. Historically, infectious disease, and cholera especially, invited institutional interventions from local and colonial governments, medical boards, hospitals, and churches.<sup>71</sup> Malaria was addressed differently, as Jarron and Douglas's writing showed, and the interventions settlers turned to are not as obviously medical

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<sup>70</sup> To this end, see Paul Hackett's *"A Very Remarkable Sickness": Epidemics in the Petit Nord, 1670-1846* (Winnipeg: University of Manitoba Press, 2002) and James Daschuk's *Clearing the Plains: Disease, Politics of Starvation, and the Loss of Aboriginal Life* (Regina: University of Regina Press, 2013).

<sup>71</sup> Zeheter, 13.

as the creation of hospitals or the implementation of sanitary cordons and quarantines. They were, however, deeply concerned about health.

Thirdly, as I have emphasized here, malaria's history is profoundly shaped by imperial agendas, population movements, and science. Thinking about malaria in Canada means situating Canada as one of many colonies in the history of British Empire, while also disrupting our understanding of Canada as a settlement colony. To echo Mactaggart's findings that Canada was not as healthy as he had been told, malaria's presence problematizes depictions of Canada as a welcoming home for settlers. Settlers faced with malaria in the nineteenth century understood that Canada was not a natural home for them: they had to make it one. Put simply, thinking about malaria's historical presence in Canada goes against much of how we think about Canada as a place.

### **Methodological note: A history of settlers**

While mindful of critiques that settler colonial studies can obscure the presence of Indigenous people and “(re)produce another form of ‘elimination of the native,’” this thesis is about settlers.<sup>72</sup> I echo Fred Burrill's claim that “it is the responsibility of non-Indigenous scholars, as beneficiaries of the violent history of colonialism, to undermine dominant settler narratives and to analyze their imbrication in the worlds inhabited by our subjects of study.”<sup>73</sup> As such, another important note here is how I use the term “settler,” given the complicated issue of defining who is and who is not a settler.<sup>74</sup> While Eve Tuck and Wayne Yang describe settlers simply as those

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<sup>72</sup> Kēhaulani Kauanui, quoted in Jean O'Brien, “Tracing Settler Colonialism's Eliminary Logic in Traces of History,” *American Quarterly* 69, 2 (2017), 251.

<sup>73</sup> Burrill, 180.

<sup>74</sup> See: Laura Madokoro, “On future research directions: Temporality and permanency in the study of migration and settler colonialism in Canada.” *History Compass* 17, 1 (2019).

who have colonization stories, not creation stories, about coming to “be in” and “be” a particular place this project examines in part how colonization stories can and are framed as creation stories by settlers—for who the concept of “creation stories” may not have the same cultural resonance.<sup>75</sup> As such, I will lean on Bartell and Baker’s definition of settlers as those who:

require the creation of social and cultural structures which need to be constantly rebuilt in a material sense as the land is adapted to the uses that Settler societies desire, and in a conceptual sense as Settler people generate histories and stories and political and legal systems that anchor them in place. These are human-centric relationships: they are about what the land can be made to give and how it can be made to give it.<sup>76</sup>

This definition provides useful language to articulate my argument as well: experiences of disease along the canal did “anchor settlers” in place, as the canal continuously allows for “the generation of histories and stories” by settlers who live near the canal, those involved in tourism or the creation of national heritage, and (as my literature review will show) scholars.

Furthermore, it is worth noting that Bartell and Baker’s definition of a settler is about lands which have “pre-existing and undisputable claim upon them.”<sup>77</sup> In the Rideau Canal’s case, that land is Algonquin, Anishinaabe, and Haudenosaunee.

In this thesis, I also use the word “settler” to describe not only those who, as Patrick Wolfe defines settlers, “come to stay,” but also those Europeans who returned to England after construction.<sup>78</sup> By and Mactaggart both returned to and died in England, as did many of the soldiers who built the canal and chose not to stay in Upper Canada. I call them settlers anyways because they worked with, for, and like settlers to establish the structure of European invasion that facilitated settlement for others. As such, By and Mactaggart behaved as settlers in the

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<sup>75</sup> Eve Tuck and Wayne Yang, “Decolonization is Not a Metaphor,” *Decolonization: Indigeneity, Education & Society* 1, 1 (2012), 6.

<sup>76</sup> Barker and Battel, 56.

<sup>77</sup> Barker and Battel, 53 and 15.

<sup>78</sup> Patrick Wolfe. "Settler colonialism and the elimination of the native," *Journal of Genocide Studies* 8, 4 (2006): 388.

historical moment I discuss. Their writing—like that of Douglas, Jarron, and others writing about malaria—demonstrates keen interest in what Tuck and Yang call “settler futurity.” That is to say, they imagined a future in which settlers thrived in Upper Canada and furthered that project materially, through infrastructural development, and rhetorically, through their articulations of place, health, and belonging.<sup>79</sup>

The Anishinaabe, Algonquin, and Haudenosaunee nations have their own politics, territorialities, and histories. As such, telling an Indigenous history of the Rideau Canal’s construction would be a different project. I focus on settlers to respect my source base, methodology, and research questions, but Indigenous people were certainly impacted by the canal’s construction. For example, the canal’s completion went hand-in-hand with the acceleration of settlement in the 1830s and onwards which displaced Algonquin communities.<sup>80</sup> Algonquin scholar Lynn Gehl notes that between 1778 and 1881, Algonquins watched British incursions in their territory, motivated by accelerated settlement and the lumber trade (both of which the canal enabled), and submitted “a total of 28 petitions, speeches, and appeals. Thus, and contrary to what many think, the Algonquin Anishinaabeg did not sit idly by as their land was taken from them and settled.”<sup>81</sup> Oral histories and recent scholarship, including Brittany Luby’s *Damned: The Politics of Loss and Survival in Anishinaabe Territory* about Dalle 38C reservation, have highlighted how damaging damming, flooding, and tampering with water resources and ecologies can be and has been to Indigenous communities, resources, and

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<sup>79</sup> Tuck and Yang, 35

<sup>80</sup> Lynn Gehl, *The Truth that Wampum Tells: My Debwewin on the Algonquin Land Claims Process* (Halifax and Winnipeg: Fernwood Publishing, 2014), 36-40

<sup>81</sup> Gehl, 36

lifeways.<sup>82</sup> It remains a problem that there is no historical work on canalization's impact on Indigenous communities in Ontario.

One example I can give of the Rideau Canal's effect on Indigenous geographies and territoriality concerns the Kiji Sibì (sometimes Kichesippi or Great River), now more commonly known as the Ottawa River. The Kichesippirini, the People of the Great River, traditionally acted as toll collectors on this important trade routes.<sup>83</sup> While Samuel de Champlain originally aimed to develop positive relationships with the Kichesippirini given their military and economic power over tight the river and its trade, their insistence on territorial integrity and sovereignty eventually frustrated French missionaries and Jesuits.<sup>84</sup> When the Kichesippirini lost control of the river through a series of epidemics and shifts in Indigenous politics and military politics (notably ongoing conflicts with the Haudenosaunee that dispersed Algonquins from their traditional territories), they became "expendable . . . no longer regarded as vital to the French cause."<sup>85</sup> During this precarious phase, the Odawa ventured into the territory to trade and hunt and the Ottawa River began to be called as such—though in my research I found correspondence sent to the "Grand River" as late as 1827.<sup>86</sup> But the river's renaming is, for Bonita Lawrence, symptomatic of a bigger phenomenon: "This misrecognition of Algonquin territory may have been deliberate, for bypassing those who held title to the land would facilitate the removal of

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<sup>82</sup> See: Brittany Luby, *Damned: The Politics of Loss and Survival in Anishinaabe Territory* (Winnipeg: University of Manitoba Press, 2020).

<sup>83</sup> Peter Hessel, *The Algonkin Tribe : the Algonkins of the Ottawa Valley : an Historical Outline* (Arnprior: Kichesippi Books: 1987), 14.

<sup>84</sup> Hessel, 30 and 23. Peter Hessel, a settler who combed the Jesuit's archives and records, has found several instances of missionaries trying to bypass the tolls and being punished for it dearly with economic retaliations (fish sold at exorbitant prices) or with physical punishment in the case of one missionary who was allegedly suspended from a tree by the armpits. Hessel, 30 and 54.

<sup>85</sup> Hessel, 52.

<sup>86</sup> For example, see: Letter to A.J. Christie, March 7 1827. LAC, Hill Collection, MG24-I9, Volume 2.

resources from their territory."<sup>87</sup> Through similar misrecognition, the British purchased Algonquin land from the Mississauga (through the Rideau and Crawford Purchases in 1819 and 1783) and the Mohawks (the Oswegatie purchases, 1784).<sup>88</sup> Thus, as Jean-Maurice Matchewan writes, “none of the entire Algonquin territory has ever been surrendered or ceded to the Crown, and our pre-existing rights in these lands were specifically recognized by the Royal Proclamation of 1763.”<sup>89</sup>

The reasons that these rights were ignored by settlers, and that many Algonquins were never given Indian status, are complicated but include administrative confusion and violence tied back to the Ottawa River.<sup>90</sup> Since 1763, British colonial borders crisscrossed Algonquin land. Upper and Lower Canada (then Canada West and Canada East, and then Ontario and Québec) were divided by the Ottawa River—making the river a useful and convenient cartographic resource. The confusion of this administrative aftermath gave colonial governments space to wash their hands of the Algonquins.<sup>91</sup> “Through these processes of creating Canada,” Gehl

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<sup>87</sup> Bonita Lawrence, *Fractured Homelands: Federal Recognition and Algonquin Identity in Ontario* (Vancouver: University of British Columbia Press, 2012), 34.

<sup>88</sup> Lawrence, 36. The best source to consult for a clear timeline of the purchases, and descriptions of the land they considered (as well as highlights of these purchases’ lack of clarity and relevant maps), is the 1993 Report on the Algonquins on Golden Lake Claim by Joan Holmes & Associates: *Report on the Algonquins of Golden Lake Claim*, Joan Holmes & Associates Inc, 1993.

<sup>89</sup> Jean-Maurice Matchewan, “Algonquins North of the Ottawa: Our Long Battle to Create a Sustainable Future” in *Drumbeat: Anger and Renewal in Indian Country*, ed. Boyce Richardson (Toronto: Summerhill Press, 1989), 141

<sup>90</sup> Issues of status have also complicated the contemporary land claim settlement process between Canada, the province of Ontario, and some Algonquins which begun in the 1990s. The 36,000 km<sup>2</sup> area includes the National Capital Region, an important military base in Pembroke, and much of the Rideau Canal corridor. The negotiations have been messy, bitter, and profoundly upsetting, with Heather Majaury calling them “one of the most toxic internal wars I could imagine—a battle to the death between the “Real Indians” and the “Wannabees” . . . The final score of this war game can only be zero.” (Heather Majaury, 146) The conclusion of Lawrence’s book highlights the disappointment and disillusionment of many non-status Algonquin community leaders and activists, both with land claims processes in general and with internal Algonquin nation politics. While it would be far beyond the scope of this thesis to tap into this complicated and painful issue, and for me as an uninvolved settler to comment on it, it is an important and painful legacy of British invasion of Algonquin land—one which embodies Patrick Wolfe’s well-known assessment of settler colonialism as a structure, not an event. For more on the Algonquin land claim process and contemporary issues in Algonquin nation-building see: Paula Sherman, Lynn Gehl, Heather Majaury, and Bonita Lawrence.

<sup>91</sup> Lawrence, 47.

writes, “Algonquin Anishinaabe territory was severed into two parts . . . This process of dividing the territory can also be said about the dividing of our nation.”<sup>92</sup> The Ottawa River marks the starting point of the canal, and Bytown was built on its banks by soldiers during the canal’s construction. Ultimately, one of the reasons that the national capital designation fell on Ottawa, the city that emerged from Bytown, was its proximity to both Ontario and Québec, and thus to the Kiji Sibi’s reduction to a border.<sup>93</sup> I retain Gehl’s insight throughout this thesis that “at the heart of the construction of Canada the nation state, is the denial of the Algonquin Nation.”<sup>94</sup>

### **Construction and historiography of the Rideau Canal**

Most, if not all, canal histories start with the War of 1812, as the conflict underscored Kingston’s vulnerability, and its total isolation in the event that the Americans gain control of the St. Lawrence.<sup>95</sup> Preliminary plans for the canal were submitted before the war ended, though Robert Legget mentions in his book *Rideau Waterway*, the main monograph on the canal, that ideas of canalization had floated around as early as the 1790s.<sup>96</sup> That the canal’s history begins with the War of 1812 is important given how the war has been, as Daisy Raphael writes, mobilized to “[tell] a story of Canada as a white settler-colonial nation-state.”<sup>97</sup> One of the historiographical critiques I will levy in this section is that the canal’s story has been used to tell a similar story.

While the military defense of the colony has frequently been underscored as the motivation for building the canal, understandings of the canal were always far more capacious. Francis

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<sup>92</sup> Gehl, 31.

<sup>93</sup> John Douglas Belshaw, *Canadian History: Pre-Confederation* (Victoria: BC Campus, 2015), 440.

<sup>94</sup> Gehl, 42.

<sup>95</sup> Robert Legget, *Rideau Waterway*, second edition (Toronto: University of Toronto Press, 1986), Kindle Location 406.

<sup>96</sup> Legget, Kindle Location 384.

<sup>97</sup> Daisy Raphael, “‘Triumph Through Diversity?’ The War of 1812 Commemoration and Settler-Colonial Myth Making.” *International Journal of Canadian Studies* 58 (2020), 93.

Cockburn argued that the canal would help Upper Canadians who had been during the war both “useless as to the general defence of the province” and “even to the protection of their own property,” as well as new migrants.<sup>98</sup> “How much more advantageous, therefore must it be, to put the emigrants who may arrive from England on lands at the military settlements than to scatter them in small numbers, as heretofore, in the different parts of the province!”<sup>99</sup> Cockburn’s concern was both for the settlers already in Upper Canada and for those “who may arrive,” and thus the permanence and stability of a British presence in Upper Canada. This same concern for emigrants shines through in an 1823 letter between British parliamentarians, where the canal was projected to “furni[sh] employment to many hundred starving emigrants” and “greatly advance the settlement of all the country between it and Kingston, which is at present an immense wilderness and forest.”<sup>100</sup>

Both John By and John Mactaggart also held this more-than-defensive view of the canal. After his first portage trip down the canal’s route in 1826, By reported that the canal: “would at once deprive the Americans of the means of attacking Canada; and would make Great Britain mistress of the trade of that vast population on the borders of the Lakes, of which the Americans have lately so much boasted.” In his view, it would “ultimately serve as so many outlets for Britain manufactured [sic] goods” which was “one of the great proofs of the increasing trade and prosperity of the country.”<sup>101</sup> In the same breath that By acknowledged the canal’s military

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<sup>98</sup> At the time, Cockburn was the Lieutenant-Governor serving as deputy quartermaster-general for Upper and Lower Canada. He was himself a veteran of the War of 1812.

<sup>99</sup> Report on the Military Settlement in the Neighbourhood of the Rideau, pointing out the Communication which may be established in that direction between La Chine and Kingston, Lieut. General Cockburn, November 26 1818, LAC, WO44, Volume 18, Reel B-1294.

<sup>100</sup> Correspondence from R. Wilmot Gerlon, Esq to George Harrisson, Esquire, 10 December 1823, Downing Street, LAC, WO44 Volume 18, Reel B-1294.

<sup>101</sup> Correspondence from Lt. Col. John By to General Gotheer Mann, July 13<sup>th</sup> 1826, Montreal, LAC, WO44 Volume 19, Reel B-1225.

importance, he jumped to trade, economic gain, and once again the long-term futurity of British settlement—showing the entanglement of these ideas. John Mactaggart, writing to a general British audience, predicted that the canal would “not only answer for transporting stores safely, either in times of war or peace, but might the means of opening an important tract in the interior of Canada.”<sup>102</sup>

Thus, a return to the primary sources disrupts a clear-cut protectionist narrative of canal construction given the high importance placed on trade, settlement, and agriculture both implicitly and explicitly. These activities also center settler futurity. Nick Esse, for example, thinks of agriculture as “a mode of production [that] personifies settler colonialism: it’s sedentary and mostly permanent; it reproduces itself; and it always eats more land and water. As it expands, it eats away at Indigenous territory, destroying fauna and flora and annihilating Indigenous subsistence economies.”<sup>103</sup> In short to overemphasize the canal’s defensive purpose is to miss the plurality of roles that the military took in early 19<sup>th</sup> century Upper Canada and foregrounding potential American invasions obscures Britain’s own invasion of Indigenous lands, to draw on the language Patrick Wolfe uses to describe settler colonialism.<sup>104</sup> Thinking of Britain’s colonial activity in Upper Canada allows us to think of the Rideau canal as colonial infrastructure—a type of infrastructure which, as Deborah Cowen writes in her article on the Canadian Pacific Railway, become the lynchpins to overlapping physical, urban, financial, and political geographies fundamental to settler colonialism.<sup>105</sup>

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<sup>102</sup> Mactaggart, volume 1, 104.

<sup>103</sup> Nick Esse, *Our History is Our Future: Standing Rock Versus the Dakota Access Pipeline, and the Long tradition of Indigenous Resistance* (Verso Books, 2019), Kindle Location 2299.

<sup>104</sup> Patrick Wolfe. "Settler colonialism and the elimination of the native," *Journal of Genocide Studies* 8, 4 (2006): 388.

<sup>105</sup> Deborah Cowen, “Following the Infrastructures of Empire: Notes on Cities, Settler Colonialism, and Method,” *Urban Geography* 41, 4 (2020): 469-486.

When canal construction began, Kingston (with a population of 3,000 people) and York (later Toronto, but was at the time smaller yet) were the only sizeable settlements in the colony.<sup>106</sup> The British military took on the project because, as one report outlined, “the settlers are very poor, and the Province of Upper Canada is yet in its infancy.”<sup>107</sup> While the British government was understood to be the only one capable of handling the project, Upper Canada’s legislature cooperated by passing the Rideau Canal Act in 1827. The act gave By and his team power to take land and commandeer natural resources in Upper Canada for the purpose of canalization, or to purchase them from settlers if their pre-existing claims to land were realized. To his annoyance, By was sued several times by Upper Canadian settlers who claimed he had taken or damaged their land and its resources, but the cases appear to have gone nowhere.<sup>108</sup>

The military’s main way of knowing the landscape they sought to transform was Upper Canadian civil engineer Samuel Clowes’ 1824 survey, which outlined a route for the canal reviewed and endorsed by a special military commission in 1825. Mactaggart retraced the route in 1826 to provide a final and clearer survey. Still, surveyors struggled to produce accurate and coherent depictions and understandings of this new environment and recognized that their technical expertise was unsuitable in this terrain.<sup>109</sup> Mactaggart admitted how “in thick and dark snow-covered woods . . . calculating at the same time, the nature of canal-making in such places, the depths to dig, or the banks to raise, so that the level might be kept . . . while the weather was

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<sup>106</sup> Bush, 1.

<sup>107</sup> Extract of a Report to His Grace the Duke of Wellington relative to the BRITISH NORTH AMERICAN PROVINCES; by a Commission, of which Major-Gen Sir James Carmichale Smyth was President. Dated 9<sup>th</sup> September 1825. LAC, WO44, Volume 18, Reel B-1294.

<sup>108</sup> Library and Archives Canada has documents from these claims in their collection, which could form the bases for an interesting legal history.

<sup>109</sup> Robert Passfield goes into more technical details on the surveying process in his article: “A Wilderness Survey: Laying out the Rideau Canal, 1826-1832,” *Journal on the History of Canadian Science, Technology and Medicine/Revue d’histoire des sciences, des techniques et de la médecine au Canada* 7, 2 (1983): 80-97.

extremely cold, and the screws of the theodolite would scarcely move; these things all considered, were teasing enough to overcome, and required a little patience.”<sup>110</sup> Resultingly, the canal was built largely blindly; changes were made on the fly by engineers and the long list of more-or-less competent contractors engaged by the British military to execute the works.

Mactaggart’s emphasis on the “wilderness” in which the canal was built is mirrored in contemporary historians’ accounts of canal construction. In his 1973 report for Parks Canada, Edward Bush wrote that: “the last century boasts few engineering achievements more challenging, considering the time and place, than that of the building of the Rideau canal” on account of the “thickly forested and malarial wilderness” builders reckoned with. Robert Legget also emphasized the challenge posed by environment, writing that: “The man who supervised the building of the Rideau Canal was to face one of the most challenging tasks ever given to an engineer—the construction through virgin forest, along untouched rivers and lakes, far removed from any of the amenities even of the new colony, of a waterway over one hundred and twenty miles long...”<sup>111</sup> Environmental historians like William Cronon have long argued that wilderness is in fact “quite profoundly a human creation” despite its connotations. In carrying over the language used in the nineteenth century to describe wildernesses, Bush and Legget are also carrying over the implications of danger, wasted space, and desolation that the word carries.<sup>112</sup> While there are important points to make about the challenges of working in unfamiliar and unsettled landscapes, “wilderness” in contemporary histories of the canal functions as a rhetorical device to underscore the triumph of infrastructure while erasing pre-existing human

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<sup>110</sup> Mactaggart, volume 1, 52.

<sup>111</sup> Legget, Kindle Location 567.

<sup>112</sup> William Cronon, “The Trouble With Wilderness; Or, Getting Back to the Wrong Nature,” in *Ecocriticism: The Essential Reader*, (New York: Routledge, 2015), 103.

presence from the landscape. In short, it makes the canal's construction a frontier story that, like many frontier stories, outlines how and why settlers belong in Canada.

The emphasis on wilderness is particularly important given the association of canals with modernity and progress, especially in North America. Carol Sherriff has demonstrated how New Yorkers related to the Erie Canal by creating “an image of their Canal corridor as a “middle landscape” between nature (the past) and civilization (the future) ... By linking the wilderness of the West to the port cities of the East, the Erie Canal could occupy a middle ground between savagery and urbanization” and bring modernity to the state.<sup>113</sup> Ruth Bleasdale, writing more specifically about Upper Canada, makes a similar argument, writing that infrastructure projects like canals were key indicators of progress and modernity in British North America, as employment on these sites “was presented as the path both to individual advancement and to the social and economic development of the colonies.”<sup>114</sup> Central to this process was the constant influx of new immigrants who formed a pool of “unskilled” labourers for public works, creating a cycle of construction and migration.

Working in unsettled parts of the colony significantly contributed to the canal's cost, since supplying the works and its labourers was both logistically complicated and costly. By's correspondence highlights the high cost of medicine and medical attention, and the costs of supportive infrastructure such as bake houses or bridges, which By had built after “ascertaining that the Country in the immediate vicinity of the Entrance Valley, when it was proposed to commence the canal, was a complete Wilderness.”<sup>115</sup> Additionally, and more problematically, it

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<sup>113</sup> Carol Sherriff. *The Artificial River: the Erie Canal and the Paradox of Progress, 1817-1862*, (New York City: Hill and Wang, 1996), 26.

<sup>114</sup> Ruth Bleasdale, *Rough Work: Labourers on the Public Works of British North America and Canada, 1842-1882* (Toronto: University of Toronto Press, 2018), 61.

<sup>115</sup> “Estimate and Items of the Works.” John By. 26<sup>th</sup> April 1830. LAC. WO44, Volume 18, Reel B-1294.

quickly became clear that there were fundamental problems in Clowes' survey. By had already found inaccuracies of Clowes's mapping of the Cataraqui Creek during his 1827 reconnaissance trip, which was when he pivoted towards the construction of a slackwater canal. Instead of getting from Kingston to the Ottawa in as quick and straight a line as possible, By opted to connect Upper Canada's various waterways to minimize the amount of excavation required.<sup>116</sup>

To By, this seemed to naturalize the canal's construction while Mactaggart had long invoked the language of providence to praise how some places in Upper Canada were "seemingly designed by Nature to allow the Rideau Canal to pass through."<sup>117</sup> Mactaggart's claims to providence also touched on the availability of construction materials, reportedly "of the best quality" and "just for the lifting." "Nature never was so kind," he concluded.<sup>118</sup> Mactaggart was particularly enthused by the adoption of a slackwater canal system, as this made the Rideau "perfectly different from any other in the known world, since it is not ditched or cut out by the hand of man. Natural rivers and lakes are made use of for this Canal, and all that science or art has to do in the matter, is in the lockage of the rapids or waterfalls, which exist either between extensive sheets of still river water, or expansive lakes."<sup>119</sup> While several hundred labourers may have argued that their hands had very much to do with the canal's creation, Mactaggart's whimsical description shows how the canal represented the marriage of European technology and craft with Upper Canadian landscape.

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<sup>116</sup> Passfield, 87. Also worth noting, though I will return to this idea later, is that the fact that the Rideau remains "the best-preserved example of a slackwater canal in North America" is part of what earned its UNESCO World Heritage Site designation. "Rideau Canal," UNESCO World Heritage Centre, United Nations Educational, Scientific, and Cultural Organization, <https://whc.unesco.org/en/list/1221/>

<sup>117</sup> Passfield, 87 and John McTaggart. *Three Years in Canada: An Account of the Actual State of the Country in 1826-7-8*, Volume 1 (London: H. Colbourn, 1829), 106.

<sup>118</sup> Mactaggart, volume 1, 328.

<sup>119</sup> Mactaggart, volume 1, 162.

By was also the one who suggested the most dramatic change of plan: enlarging the canal and its locks to allow steamships to use the waterway. The Rideau Canal was one of the first canals built for steamship navigation, as By argued that “it would be a constant source of regret to construct works too small to pass the vessels best adapted to the navigation and defence of the Lakes.”<sup>120</sup> This did not come cheap. The canal, which had an original budget of £169,000, ended up costing around £800,000.<sup>121</sup> By flagged the low estimates as early as 1826, writing that:

...having previously served nine years in Canada, I was so aware of the magnitude of the undertaking from the manner it was first mentioned to me . . . I remonstrated against the smallness of the sum, and stated to him that as the La Chine Canal, situated close to Montreal, only seven miles in length, without any deep cutting, and requiring but seven locks of seven or eight feet lifts, had cost £137,000, how could it be imagined that the Rideau Canal, 135 miles long, through an uncleared country, with eighteen or twenty miles of excavation some of which was rock, and deep cutting, with forty-seven locks to surmount, a difference of level of 455 feet, with a variety of extensive dams and waste weirs necessary to regulate the spring torrents of the Rideau River, which is the outlet of several lakes, could be excavated for the [original £169,000]...<sup>122</sup>

Corrections to Clowes’ estimate, various problems that arose during construction (including malaria) and this ambitious scaling-up were reflected in the estimates By sent to London—which raised alarm in Parliament and led to the first external review of By’s performance and budgets.

The Bryce Committee was the first group to investigate By’s deviations from the original plans. Ultimately, in their January 1828 report, they endorsed By’s plans for an enlarged canal and concluded, “after allowing Mr Clowes much credit for skill and industry . . . under many difficulties occasioned by the state of the Country,” that the original estimates were simply inadequate.<sup>123</sup> However, their lack of a decisive decision on the size of the locks led to a second

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<sup>120</sup> Correspondence from By to Mann, Montreal, 13th July 1826, LAC, WO44, Volume 19, Reel B-1295.

<sup>121</sup> Legget, Kindle Location 522.

<sup>122</sup> John By, “Report Relative to the Estimate for the Rideau Canal,” Rideau Canal, December 30, 1829. LAC, WO44, Volume 18.

<sup>123</sup> “Report of the Committee on the Rideau Canal, which assembled in London in January 1828.” LAC, WO44, Volume 18, Reel B-1294.

group, the Kempt Commission, traveling to the canal in June 1828 to further investigate. During these investigations, By was under orders to pause all construction—an order he only received after finalizing contracts for the next construction season, which caused a separate set of problems and annoyed his superiors greatly. Delays in communication were a regular problem during the canal’s construction. Even trickier was the incommensurability of By’s orders to contract out work on the canal with the annual sums that he was allocated. Since contractors were hired and paid by job (for example, excavating a fixed section of the canal), By’s expenses almost always exceeded his annual allowances—a consistent sore spot for the Treasury and Colonial Office. Ultimately, the Kempt Commission also found that By was building the canal as efficiently and economically as possible, and recommended that the canal’s locks be enlarged but only to accommodate smaller steamships, thus striking a compromise between Clowes’ original plan and By’s proposal.<sup>124</sup> More strikingly, the committee showed a deference to By’s authority on and about Canada, consistently calling the canal “Lt. Col. By’s project.”<sup>125</sup>

Circling back to the contract-based structure of canal construction, this also meant that the British military claimed little to no responsibility for the labourers that contractors hired in turn, and thus the bulk of the canal’s work force.<sup>126</sup> The most blatant example of this imperfect delegation of care and responsibility, and the one most relevant to this project, was the lack of

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<sup>124</sup> Andrews, 111.

<sup>125</sup> “Report of the Committee on the Rideau Canal, which assembled in London in January 1828.” LAC. WO44, Volume 19.

<sup>126</sup> Legett, Kindle Location 762. As Charles Hadfield notes in *The Canal Age* and as Peter Way notes in *Common Labour*, contracting-out work was typical of canal construction projects in Great Britain and in the United States. Additionally, Hadfield’s work is a useful reminder that the construction of the Rideau Canal took place amidst a frenzy of canal-building in the early 19<sup>th</sup> century, which further connected the Rideau to larger imperial impulses. One safeguard that the British military did seem to have in place to protect contractors was the Ordnance Office’s refusal to pay its contractors until the contractors had paid their labourers—although protecting themselves from lawsuits and criticism was also in the Board’s interests (Bush, 16). There is also significant evidence that the military itself had trouble keeping up with the contractors, who often sub-contracted their own work in turn. See: Dianne Patychuk, “Malaria on the Rideau: A Case Study in the History of Health Care in Canada.” Revised draft, B.A. honours thesis (Queen’s University, 1979), 14.

provision for the health care of the work's labourers.<sup>127</sup> 2,500-4,000 labourers were hired annually to work on the Rideau canal, though labour was seasonal. This high turnover and the myriad of contractors (and the sliding scale of competence on which they operated) also explains why there is no centralized list of canal labourers—a significant obstacle to quantifying death and disease in canal worksites.<sup>128</sup> This is compacted by the variety of standards in worksites: some labourers had access to room and board from their employers, while others built shanties and bought staples, tobacco, and whisky from company stores at inflated costs.<sup>129</sup> A labour surplus in the Ottawa Valley at the time also meant that many workers who could not access the lumber trade (Irish immigrants in particular) tolerated low wages and poor working conditions.<sup>130</sup> The few documented strikes along the Rideau were tied to demands for necessities such as firewood, and none took place after 1827 when military presence along the canal intensified.<sup>131</sup> William Wylie and Clare Pentland argue that through his eagerness to use the military to crush labour strikes, By set an important precedent for Canadian labour.<sup>132</sup> These insights contrast darkly with the images of By as a benevolent employer advanced in later narratives of the canal, a point Dianna Patychuk also made. As the author of the only text specifically dedicated to malaria along the Rideau Canal, Patychuk is well-placed to highlight this lack of care.

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<sup>127</sup> Jaime Valentine, *Supplying the Rideau: Workers, Provisions and Health Care During the Construction of the Rideau Canal, 1826-32*. Microfiche Report Series No. 249, Parks Canada, Ottawa, 1985.

<sup>128</sup> Patychuk, 14.

<sup>129</sup> William Wylie, "Poverty, Distress, and Disease: Labour and the Construction of the Rideau Canal, 1826-32" in *Labourers on the Rideau Canal 1826-1832: From Work Site to World Heritage Site*, ed. Katherine M.J. McKenna (Ottawa: Borealis Press, 2008), 20 and 29.

<sup>130</sup> Wylie, 14.

<sup>131</sup> Wylie, 41-42.

<sup>132</sup> Clare Pentland, *Labour and Capital in Canada, 1650-1860* (Toronto: James Lorimer & Company, 1981), 52.

## **Malaria, disease, and health care along the canal**

After a successful start in the summer of 1827, construction along the canal came to a grinding halt in the summer of 1828 when workers first sickened with malaria. From there on out, a seasonal pattern of disease that consumed the canal's work sites from July to September began. Work was paralyzed for three consecutive summers from 1828 to 1830.<sup>133</sup> Again, while there is no way to pinpoint the exact reasons for the ebb and flow to malaria, the establishment of permanent construction sites and barracks created a more-or-less sustainable human reservoir for the disease. Furthermore, as construction went on it entailed a great deal of flooding and damming which would inevitably change and foster the breeding grounds for infected mosquitos.

Most of the literature on the canal treats malaria as an obstacle to the canal's construction as opposed to an embodied experience of place. Diane Patychuk's 1979 BA Sociology Honours Thesis "Malaria on the Rideau," a copy of which is kept on file at Parks Canada, is the only text specifically dedicated to the topic of health. Patychuk outlines the extent of malaria along the Rideau Canal, the economic impacts it had on workers, contractors, and the military alike, along with some of the strategies that were used to manage disease. There are a few problems with Patychuk's text: Parks Canada's copy has no bibliography and, as the transcription note states, several additional problems related to missing tables, syntax, and argumentation—which reflect that the text, while frequently cited, is not peer-reviewed.<sup>134</sup> In addition, many of Patychuk's quantitative claims are difficult to substantiate or are too spotty to be convincing given the lack of records we have on the canal's labourers, including those to quantify malaria's effect. She places morbidity at 42-96% and mortality at 2% overall, though she notes that her figures do not

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<sup>133</sup> Valentine, 60.

<sup>134</sup> Patychuk, 1.

account for those labourers who fled worksites at the first sign of sickness.<sup>135</sup> Nevertheless, Patychuk makes important points about the socioeconomically stratified nature of malarial experiences along the canal. While providing a sturdy launching point, Patychuk's work ultimately points to the lack of serious inquiry about malaria on the Rideau Canal and raises question about the findings repeated across the literature on the canal.

While the British military did not take responsibility for the healthcare of contracted labourers, By considered the military's civilian employees such as clerks "entitled to medical attendance particularly when the nature of the Rideau Service is taken into consideration."<sup>136</sup> While By does not elaborate on what he means by "the nature of the Rideau Service," even taking 'nature' literally here points to the overwhelming presence of sickness, as does the remoteness of canal worksites, which complicated health care provision.<sup>137</sup> On at least one account, the ordnance surgeon stationed at the Rideau, M.H. Tuthill, refused to sign off on the expenses submitted by a civilian doctor who had been called in while he was away, deeming his fees too high. Alexander James (sometimes known simply as AJ) Christie, an early settler in Bytown and the physician who had serviced the canal until Tuthill's appointment, defended his charges as "his usual ones," and attributed these costs to "being so far from Montreal where medicines could alone be obtained."<sup>138</sup> Along the Rideau Canal, the cost of quinine was as high as \$16 an ounce.<sup>139</sup>

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<sup>135</sup> Patychuk, 41. Additionally, morbidity does not account for the long-term disability that many would have encountered from malaria episodes, nor does it tell us about the reinfection rates of soldiers.

<sup>136</sup> John By, "Estimate and items of the works," Rideau Canal, April 26, 1830. LAC. WO44, Volume 18.

<sup>137</sup> John By, "General Contingencies" in "Estimate and items of the works," Rideau Canal, April 26, 1830. LAC. WO44, Vol 18.

<sup>138</sup> Correspondence from By to Dunford, Royal Engineer Office, Rideau Canal, October 29, 1829. LAC, WO44, Vol 18, Reel B-1293.

<sup>139</sup> McKenna, *Working Life at the Isthmus*, 33. McKenna does not explain how she went about currency conversion in this context.

Christie had emigrated to the Canadas in 1827, landing first in Lower Canada, and put his previous experience as a navy surgeon to use for the soldiers and labourers along the canal.<sup>140</sup> His records are the only medical records about the Rideau Canal available to historians, though they only cover May 1827 to Spring 1828, prior to Tuthill's arrival. Christie's end-of-month summaries frequently reported on the weather as well as on disease since the two were interconnected; when the weather was "favourable . . . few cases of serious disease have occurred." Even in July, at the peak of malaria season, Christie noted that "as the weather has been tolerably good the effects [have] been felt in the diminished number of sick." Some of Christie's observations about weather and climate fit in with our contemporary knowledge about mosquitoes and their habitats, as he noted in October that while sickness had abated, rain "has had the effect of inducing sickness among those exposed to its influence, particularly with excavators in damp situations."<sup>141</sup>

Christie's records also show the non-malaria illnesses experienced along the canal including: indigestion, constipation and other gastrointestinal complaints, venereal disease, dysphesia, phlegmasia (a general term for inflammation), rheumatism, pleurisy (a lung infection), dysentery, influenza, and multiple undescribed injuries.<sup>142</sup> Later on during construction, Bush and McKenna have noted vaccination campaigns at the Isthmus worksite to prevent smallpox among labourers and their families.<sup>143</sup> Disease aside, canal construction was

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<sup>140</sup> Carl Ballstadt. "CHRISTIE, A.J.," in *Dictionary of Canadian Biography*, vol. 7, University of Toronto/Université Laval, 2003–, accessed February 17, 2021, [http://www.biographi.ca/en/bio/christie\\_alexander\\_james\\_7E.html](http://www.biographi.ca/en/bio/christie_alexander_james_7E.html).

<sup>141</sup> Alexander James Christie, "Monthly Return of the diseases and casualties which have occurred to the artificers and labourers employed at the Rideau Canal from the 1<sup>st</sup> day of May 1827 to the 30<sup>th</sup> day of September under the care of A.J. Christie." December 1827. LAC. Hill Collection, MG24-I9, Volume 6, pp 1971-2029. Henceforth cited as: "Christie, Monthly Return," with the month in question if applicable.

<sup>142</sup> Christie recorded the latter using the Latin for 'wound,' 'vulnus.' Christie, Monthly Return.

<sup>143</sup> Bush, 135.

dangerous; at least 5 soldiers were killed in blasting accidents in the canal or its quarries.<sup>144</sup> The deaths of everyday labourers in blasting accidents, landslides, and other accidents were documented by witnesses like John Mactaggart, and sometimes appear in military correspondence though they were not centrally counted or reported. In addition to By's men, Christie treated "labourers coming recently from the country, and being sick from sudden change of diet."<sup>145</sup>

Christie was aware that newcomers to Canada had specific health needs and vulnerabilities. Noting that "the cases of fevers of a continued form have been chiefly among emigrants recently arrived who are particularly liable to disorders of the kind," he bemoaned that "as there is as yet no place appropriate for the reception of the sick much difficulty has been experienced in giving them proper attendance and their suffering has been much augmented from the want of it."<sup>146</sup> In addition to thinking of newcomers' innate vulnerability, Christie understood what we may think of as the social determinants that worsened their experiences of disease, noting that fevers and bowel complaints alike "have been much aggrieved from the miserable accommodations many of these people had and their unacquaintance with the modes of the country." He feared that "contagion may be produced" from the amount of labourers sick that were improperly housed and cared for, and once again signaled the need for a hospital.<sup>147</sup> That Christie consistently asked for a hospital also shows his investment in the long-term development of Bytown, as a hospital would both facilitate his practice but more importantly provide a deeply needed community service. Eventually, By had a hospital built in Bytown for

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<sup>144</sup> T.W. J. Connolly, *History of the Royal Sappers and Miners, Volume 1 (of 2) From the Formation of the Corps in March 1712 to the date when its designation was changed to that of Royal Engineers* (London: Longman, Brown, Green, Longmans, and Roberts, 1857), 287.

<sup>145</sup> Christie, Monthly Return May and June 1827.

<sup>146</sup> Christie, Monthly Return June 1827.

<sup>147</sup> Christie, Monthly Return July 1827.

the use of sappers and miners, and this hospital formed the basis of Bytown/Ottawa's medical infrastructure for years to come.<sup>148</sup>

The lack of preparation for disease was one aspect of canal construction that Christie privately characterized as “hurley burley and helter skelter.” While Christie had originally celebrated the canal's construction as a sign that “Britain is beginning to see the value of Canada,” he soon came to consider that the construction itself was rushed, writing that: “the eminent scientific characters engaged in planning the works have been abashed into it with too much precipitating to allow of their investigation on appreciating the immense scale on which nature works on this great continent.” He considered that the canal's builders were rushing through preparation without enough familiarity with Upper Canada's environment or the reputation of contractors and other professionals in the province.<sup>149</sup> That Christie was not retained after 1828 despite his many inquiries, and that he seemed to have trouble getting his accounts settled in the early days of his service, probably colored his assessment.<sup>150</sup>

Another important finding from Christie's records and other archival sources is that malaria's morbidity was far higher than its mortality on the Rideau Canal—which is usually placed at around 1,000 casualties. Partially, this can be attributed to the type of malaria that was likely present in Upper Canada. While it is impossible to know with certainty which parasite thrived in the canal's worksite, James Webb hypothesizes that *P. vivax* (which often causes

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<sup>148</sup> James A. De Jonge, “The Military Establishment at Bytown, 1826-1856,” Ottawa: Parks Canada, 1976. 15.

<sup>149</sup> Alexander James Christie, “To my friend Billy Tyrconnel in the United States,” c. 1827. LAC, Hill Collection, MC24-I9, volume 2.

<sup>150</sup> See LAC, Hill Collection, MC24-I9, volume 2 for a variety of letters from Christie to British officers including Henry Byng and William Dunford on the topic of the Rideau's surgency. Christie reports problems with reimbursement for his work in correspondence to John By, October 31, 1827. LAC, Hill Collection, MG24-I9, volume 2. Christie may have received an explanation as to why he was not retained, but I have not seen it. I suspect that once the Ordnance Office understood the extent of medical care required along the canal, they chose to hire in-house.

milder forms of malaria with lower mortality rates) was the first parasite to make its way to the Americas since its long dormancy period would allow it to survive the Atlantic crossing. This same quality also means *P. vivax* can cause relapses of symptoms for up to two years after original infection, and that it is the malarial parasite most suited to survive colder temperatures. *P. vivax* has a wide geographic range—and a certain consistency with the long-term effects of illness described in primary sources on the canal.<sup>151</sup> Christie’s monthly records of the sick differentiate between “fever” and “fever, continued” to indicate patients whose fits of symptoms were ongoing parts of the same fever.<sup>152</sup> In January 1828, months after the 1827 sick season, Christie still treated five soldiers for “continued fever” in a case load of only twenty-five patients.<sup>153</sup>

The health care that was provided to everyday labourers was mostly on an ad hoc basis, if labourers could pay physicians themselves or if there were additional resources that physicians or officers could and chose to spare. For example, we know of one labourer blinded in an accident to whom By offered repatriation to England, and of a group of labourers seriously injured in an explosion that By had hospitalized.<sup>154</sup> He explained to his superiors that “as this was the only means I had of saving the lives of these poor sufferers, I trust you will see the necessity of my having so acted.” Yet, he continued, “I have only taken upon myself to order the most distressing cases into the Hospital, but most respectfully beg leave to recommend that all

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<sup>151</sup> James Webb, *Humanity’s Burden: A Global History of Malaria* (Cambridge: Cambridge University Press, 2015), 68, and Medicines for Malaria Venture, “*P. vivax* malaria symptoms & severity,” *P. Vivax Information Hub*. <https://www.vivaxmalaria.org/p-vivax-malaria-an-introduction/p-vivax-malaria-symptoms-severity>.

<sup>152</sup> Christie, Monthly Return.

<sup>153</sup> A.J. Christie, “Monthly Return for January 1828.” January 1828. LAC, Hill Collection, MG24-I9, Volume 7.

<sup>154</sup> Bush, 24

those who are wounded on the works may be placed under the care of the medical officer with the least possible delay.”<sup>155</sup>

Nothing came from By’s request that health care be extended to all labourers along the canal, and historians have drawn different conclusions from the documented instances of haphazard care. Writers interested in biographing By (such as Robert Legget or Mark Andrews) stress By’s history of caring for the working conditions of soldiers under his care, including in his pre-canal career.<sup>156</sup> Bush, writing a triumphant history of the canal’s construction as a whole, characterizes By as “at all times solicitous for the proper care of the sick.”<sup>157</sup> Meanwhile, labour historian Wylie condemns By’s lack of care and support, writing that “as an officer and a ‘gentleman,’ [By] did not question the justice of a hierarchical social order or the inevitability of poverty. . . it was expedient to view the workers primarily as instruments of production required to facilitate the most economical completion of the project.”<sup>158</sup> Patychuk, approaching the topic from a medical sociological background, argues that if By had truly cared about the wellbeing of labourers he would have invested more in their living and working conditions, and advocated more thoroughly and consistently on their behalf.<sup>159</sup>

Ultimately, the ad hoc nature of health care for labourers along the canal supports Wylie’s point that the labourers were only important along the canal insofar as they could provide labour and remain productive. There was a proactive aspect to By’s attempts to manage disease—especially contagious disease that could affect his own soldiers. In spring 1827, for example, By ordered a shipment of 1,000 sets of bedding, explaining that: “[I] fear from the

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<sup>155</sup> Correspondence from By, July 19, 1829. LAC, WO44, Volume 18.

<sup>156</sup> Andrews, 74.

<sup>157</sup> Bush, 29.

<sup>158</sup> Wylie, *Poverty, Distress, and Disease: Labour and the Construction of the Rideau Canal, 1826-32*, 10.

<sup>159</sup> Patychuk, 16.

wretched condition of most of the Emigrants applying to me for work, that it will be indispensably necessary to issue bedding to prevent sickness.”<sup>160</sup> The cost of blankets was deducted from workers’ wages, but By’s proactive goal of preventing sickness also speaks to his productivity-driven approach to labourers’ health.

As of the summer of 1827, the Ordnance Department deployed a medical stoppage system to care for its employees (again, not the majority hired by contractors). In this system, when soldiers or clerks were admitted to the hospital, 9d (pennies) of their pay were credited to the hospital for their care—the rest of their expenses were covered from the medical stoppages, and deductions made from their wages (1-1/2d from the pay of foremen and artificers, 1d from labourers). Other provisions were made to care for workers’ dependents, but the system overall was as inadequate as it was exclusive.<sup>161</sup> The expense and complexity of treating individual disease in the body may also explain how attractive and productive it was to treat disease at its perceived route: the environment. Soon after the implementation of this system, military surgeon M.H. Tuthill replaced Christie in 1828. In 1830, he was given both a pay raise and an assistant, Dr John Edward Rankin, at By’s request.<sup>162</sup>

In the literature on the Rideau canal overall, malaria is most often framed and discussed in its relationship to labour—sometimes in works focusing on labour history concerned with the conditions and rights of workers (such as William Wylie, Jaime Valentine, and Katherine McKenna’s articles, book chapters, and reports to Parks Canada). However, telling the story of canal labourers and their suffering without naming the structures that brought them to Upper Canada and created the scarcities in health care and housing they faced presents an incomplete

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<sup>160</sup> Correspondence from By to Darling, April 12, 1826. LAC, RG8 C-Series, Volume 43.

<sup>161</sup> Bush, 28.

<sup>162</sup> Correspondence from R. Byham to G. Mann, March 28, 1830. LAC, WO44, Vol 18, Reel B-1293.

story. For example, in 2012, the federal government announced that the canal's National Heritage Site designation would be expanded to commemorate the workers who perished during the canal's construction. Workers' labour was labelled "contributions" and structures responsible for their deadly working conditions became "challenges."<sup>163</sup> Empire and capital disappeared from the picture.

Furthermore, labourers who died on site left a long-standing mark in the form of graveyards along the canal's route. As Casey Gray's thesis work demonstrated, the graves of canal labourers elicit particularly strong emotional connections to the canal and a slew of social and financial commitments to the preservation of labourer graves and memorials—such as the cemetery in Chaffey's Lock where many were buried.<sup>164</sup> Gray conducted interviews with locals in Chaffey's Lock who spoke of the importance of maintaining the graves, describing their high standards of care, and their community's longstanding push for better stewardship and recognition from heritage authorities.<sup>165</sup> The remains of canal workers anchor those workers, the work they did, and the people who continue to engage with their remains physically or emotionally to North America.

Malaria also appears in the canal's historiography to support grander narratives which underline the canal as a feat of modern ingenuity and architecture to which malaria is an obstacle (such as Robert Legget's monography and Edward Bush's report). Legget, for example, overwhelmingly focuses on how malarial conditions "must certainly have been a great cause of

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<sup>163</sup> "Harper Government Recognizes Rideau Canal Construction Workers," *Marketwire* (Toronto), November 2, 2012: <http://proxy.lib.sfu.ca/login?url=https://www-proquest-com.proxy.lib.sfu.ca/trade-journals/harper-government-recognizes-rideau-canal/docview/1125370206/se-2?accountid=13800>. To this I want to add that internal reports on the canal stress that Harper government-era budget cuts were challenging to the canal's continued survival. See: "Rideau Canal National Historic Site of Canada management Plan," Parks Canada, May 2005.

<sup>164</sup> Casey Gray. "Sites of Grave Meaning: The Heritage of Human Remain Sites on the Rideau Canal," MA Thesis, (Carlton University, 2018), 77

<sup>165</sup> Gray, 46.

worry to those in command” and pivots quickly from the topic of malaria to the frustrating administrative burden it placed on By.<sup>166</sup> This ultimately portrays malaria as an administrative hurdle frustrating the canal’s construction, while also teleologically positioning the success of the project as an inevitability. Malaria becomes another building block of the frontier story that many histories of the Rideau Canal tell.

### **End of construction and legacy**

Construction on the Rideau canal was completed in May 1832. Four days before By was scheduled to sail the length of the canal with his family and other members of the Royal Engineers, he was recalled to England to testify before a Parliamentary Committee and answer for the project’s overall cost. The canal was open to public use before By left, and he also had a hand in selecting the lockmasters and labourers who would take over the day-to-day operational care and management of the Rideau canal—many of whom had served on the canal previously as “skilled” labourers, sapers, or miners.<sup>167</sup> Ultimately, this was also beneficial to colonial authorities by peopling the colony and promoting settlement and growth. While By was ultimately exonerated from any financial wrongdoing by the committee investigating the canal’s papers, the damage to his reputation was never truly undone and the British press remained critical of the project’s expense and use—a topic I will return to in Chapter 2.<sup>168</sup>

In the years since the canal’s construction, it was quickly overshadowed by the growing importance of railways—as many canals in North America were—to the extent that in 1932 serious discussions about its closure circulated.<sup>169</sup> Following Canadian Confederation,

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<sup>166</sup> Legget, Kindle Location 875 and 897.

<sup>167</sup> "Proposed Establishment of the Rideau Canal for the year 1832." John By. LAC. WO44, Vol 20. Reel B-1295.

<sup>168</sup> Legget, Kindle Location 1100.

<sup>169</sup> Legget, Kindle Location 102.

responsibility for the canal passed from the departments of defense and transportation to Parks Canada in 1972.<sup>170</sup> There is a lot to say about the canal within the heritage industry, but I want to highlight Parks Canada's role in two things: generating knowledge about the canal, and securing its UNESCO Heritage Site designation.

First, shortly after taking responsibility of the canal, Parks Canada commissioned a flurry of reports about the canal. These reports drew heavily from the same archival and primary source bases that I am using, and they were intently focused on the history of the labourers who built the canal and whose stories had been ignored by previous studies hyper-focusing on the canal's engineering.<sup>171</sup> Consequently, many Parks Canada studies strived to "save" workers from the historical record while simultaneously decontextualizing them from larger systems of oppression instead of confronting them—including that of empire—to provide a teleological success story in the literal heart of the current nation state's capital. While well-researched, well-written, and deeply informative these reports and working papers were "silent on the question of the structuring influence of settler colonialism and the ongoing theft of Indigenous lands and resources," as Fred Burrill has recently pointed out of Canadian labour history overall.<sup>172</sup>

Secondly, Parks Canada played a key role in uplifting local activism in the 1990s to bring the canal to UNESCO's attention and mobilize expertise and campaigning for canals to figure in UNESCO's criteria of cultural landscapes and universal value.<sup>173</sup> The canal's 2007 UNESCO World Heritage Site designation has frozen in time the ways in which the canal signposted the advent of modernity in British North America: it was the first canal built specifically for steam-

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<sup>170</sup> "Rideau Canal National Historic Site of Canada," Parks Canada, accessed May 10, 2021, [https://www.pc.gc.ca/apps/dfhd/page\\_nhs\\_eng.aspx?id=503](https://www.pc.gc.ca/apps/dfhd/page_nhs_eng.aspx?id=503).

<sup>171</sup> Wylie, 9.

<sup>172</sup> Burrill, 174.

<sup>173</sup> Aurélie Éliisa Gfeller and Jaci Eisenberg, "Scaling the Local : Canada's Rideau Canal and Shifting World Heritage Norms." *Journal of World History* 26, 3 (2015): 491-520.

powered boats, featured the large-scale implementation and use of European technology, and continues to signal a technological success by being the only product of the Canal Age to remain both preserved and functional along its original lines.<sup>174</sup> The designation cements what I call the canal's "afterlife," or the role that it continues to play today as a site of historical memory, recreation, and national memory projecting an ahistorical image of Canada.<sup>175</sup> Gfeller and Eisenberg, for example, characterize the canal's successful designation as a victory for the diversification of world heritage, given their characterization of Canada as a "post settler-state, unencumbered by traditional, Eurocentric perspectives on heritage."<sup>176</sup> That the canal was effectively a European project that worked towards forging a settler colonial state is obscured by the heritage industry's portrayal of the canal. Materially, the heritage industry's role in representing the canal matters because the canal is part of Ottawa's \$2.2 billion tourist industry, along with other local economies along its route.<sup>177</sup> If settler colonialism's role is, as Glen Coulthard wrote, "to shore up continued access to Indigenous peoples' territories for the purposes of state formation, settlement, and capitalist development," the Rideau Canal's transformations into a heritage site signals how tourism can function as an ongoing mode of settler colonial capital accumulation.<sup>178</sup> To this monetary value we can add the emotional attachment settlers have formed with the canal, summed up well by Peter Connroy's description

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<sup>174</sup> "Rideau Canal," UNESCO World Heritage Centre, United Nations Educational, Scientific, and Cultural Organization, <https://whc.unesco.org/en/list/1221/>

<sup>175</sup> I have previously made this argument here: Gabrielle McLaren, "Heritage, Graves, and the Afterlife of Colonial Infrastructure: The Case of the Rideau Canal." *Network in Canadian History & Environment/Nouvelle initiative Canadienne en histoire de l'environnement*. June 15, 2021 : <https://niche-canada.org/2021/06/15/heritage-graves-and-the-afterlife-of-colonial-infrastructure-the-case-of-the-rideau-canal/#Notes>

<sup>176</sup> Gfeller and Eisenberg, 519.

<sup>177</sup> OBJ Staff, "Ottawa Tourism in line for \$5.2M to 'bring visitors back to the National Capital Region,'" *Ottawa Business Journal*, (June 1 2020): <https://obj.ca/article/ottawa-tourism-line-52m-federal-funding-boost>.

<sup>178</sup> Glen Coulthard, *Red Skin, White Mask: Rejecting the Colonial Politics of Recognition* (Minneapolis: University of Minnesota Press, 2014), 125.

of the canal as: “a feature of the national heritage that all Canadians are proud of.”<sup>179</sup> The canal is thus a source of financial and cultural capital for the settler colonial nation-state of Canada.

Overlooking the Rideau Canal’s historiography shows an ongoing reluctance to clearly identify settler colonialism as the structuring force behind the canal’s construction in public and academic contexts. As a result, the literature on the Rideau canal as it stands serves to further Canadian nation-building and settler colonial mythology. This has shaped my methodological approach to this project as a history of settlers, and my interest in how individuals related to the canal and its construction sites.

### **Return to Cranberry Marsh and thesis outline**

Each chapter of this thesis is grounded in a different experience of disease along the Rideau canal during its construction years, and the ways that illness informed understandings of place.

I start with John Mactaggart, who wrote about his time in Canada and his illness in his book *Three Years in Canada*, a natural history of Upper Canada that also functioned as a travel narrative. Because of the nature and genre of the book, Mactaggart was free to represent himself and his time in Canada as he wished to be seen. Malaria was detrimental to the depiction of himself as a capable and resilient explorer and scientist, and the disease’s effect in disrupting Mactaggart’s understanding of himself and his body as a white European man is clear in *Three Years*’ pages and Mactaggart’s conflicting, contradictory feelings about Canada. In Chapter 1, I argue that Mactaggart framed his exposure to malaria and subsequent illness as a sacrifice he made to serve the British Empire and fully know and understand Upper Canada. He highlighted

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<sup>179</sup> Peter Conroy, *Our Canal: The Rideau Canal in Ottawa* (Burnstown: General Store Publishing House, 2002), 8.

the extent of his devotion to the empire by contrasting himself consistently with other settlers in the Canadas, including labourers on the canal.

Meanwhile, John By wrote out of professional duty in military correspondence. Working in land that was literally uncharted by the British military, By was responsible for responding to malaria while also building the canal as economically and quickly as possible. To do this, By relied on traditional European disease management strategies. In Chapter 2, I break By's approach down into three strategies: avoiding sick times, avoiding sick places, and "healing" the landscape that produced illness. By looking at these strategies, I argue that By responded to local disease environments by expanding his vision of the canal so that it effected short and long-term changes to make Upper Canada a healthier landscape, more suited for settlement and development.

These stories show the ways that experiences of and with disease during the canal's construction affected how By and Mactaggart positioned themselves in Upper Canada and understood the colony. My analysis of their experiences highlights the counterintuitive role that disease and environment played in establishing settler colonial infrastructure in Upper Canada, while complicating the task of settlement. In short, the first two chapters of my thesis show the ways that experiences of and with disease during the canal's construction affected how By and Mactaggart positioned themselves in Upper Canada and understood the colony. In the conclusion of my thesis, I turn to the long-term ecological consequences of canal construction on waterways and wetlands in the province of Ontario—one example of which is the marsh I opened my thesis with.

In the end, Lieutenant-Colonel By had his crews build a new dam and flooded Cranberry Marsh. In doing so, he created a much more easily navigable lake to connect to the canal—but

not without some resistance.<sup>180</sup> Local millers denounced the plan to dam Cranberry Marsh, drain it, burn away its remaining vegetation, and reflood it to create a lake; fearing that “if the marsh was left without water, the muddy venom would be set free” and create a health hazard. Settlers on the ground had diverse and complicated ideas about how disease worked and what might make it better or worst. However for Mactaggart, whose main allegiance was to the imperial project, this was a non-issue: “when the marsh in its *present state* stops the progress of the public works during summer, what *worse* thing can it do?”<sup>181</sup> This dedication to the imperial project was central to Mactaggart’s writing, as the next chapter will show.

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<sup>180</sup> Legget, Kindle Location 1917.

<sup>181</sup> Mactaggart, Volume 2, 15.

## Chapter 1

### “We Must Go Forth on Our Business, Whatever It May Be”: Suffering and Surviving

#### Climate in the Service of Empire

The most detailed description of the ‘ague’ along the canal and its symptoms comes from John Mactaggart, surveyor, engineer, and the original clerk of the works. In his 1829 book *Three Years in Canada*, Mactaggart intimately described attacks of:

bilious fever, dreadful vomiting, pains in the back and loins, general debility, loss of appetite so that one cannot even take tea, a thing that can be endured by the stomach in England when nothing else can be suffered . . . the yellow jaundice is likely to ensue, and then *fits* of trembling—these come on some time in the afternoon, mostly, with all. For two or three hours before they arrive, we feel so cold that nothing will warm up . . . the skin gets dry, and then the *shaking begins*. Our very bones ache, teeth chatter, and the ribs are sore, continuing thus in great agony for about an hour and a half; we then commonly have a vomit, then trembling ends, and a profuse sweat ensues, which lasts for two hours longer. This over, we find the malady has run one of its courses...<sup>1</sup>

Mactaggart had come to Canada in 1826 to serve as a clerk and engineer on the Rideau Canal, which he did until 1828. While he suffered a series of health problems in Canada, the most relevant to this chapter is his experience of malaria.<sup>2</sup> Historians writing about the Rideau Canal have valued *Three Years* for the firsthand observations it contains about the canal’s construction, route, and comments on the working and living conditions of canal labourers.<sup>3</sup> However, these observations tend to be extracted from *Three Years* as evidence, with little attention to Mactaggart’s overall positionality as a historical actor and as a gendered and racialized agent of

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<sup>1</sup> Mactaggart, volume 2, 17.

<sup>2</sup> G. S. Emmerson, “MACTAGGART, JOHN,” in *Dictionary of Canadian Biography*, vol. 6, University of Toronto/Université Laval, 2003, [http://www.biographi.ca/en/bio/mactaggart\\_john\\_6E.html](http://www.biographi.ca/en/bio/mactaggart_john_6E.html). Because military correspondence was strictly related to the budgetary logistics of reimbursing physicians and justifying emergency expenses, the specifics of Mactaggart’s ill-health in Canada are unclear but By sought emergency care for him in 1827 (when he fell “dangerously ill”) and in 1828 (due to a leg injury sustained during a fit of apoplexy, a stroke or potentially a misdiagnosed seizure). See: Letter from By to Durnford, October 29 1829. LAC, WO44, volume 18; Letter from John By to Lord Byham, Royal Engineers Office, Rideau Canal, June 1829. LAC, WO44, volume 18.

<sup>3</sup> See: William Wylie, Katherine McKenna, Jamie Valentine, and Dianne Patychuk amongst others.

empire. As such, we lose track of Mactaggart's biases and his concerns about North America's disease environment and their long-term repercussions and implications for the British imperial project he participated in.

Throughout *Three Years*, Mactaggart was careful to signal his competence and excellence as an enthusiastic British subject and agent of empire, explorer, and a man of science. One question that might emerge, then, is how the ill-health I started this chapter by describing fit into the self-image he crafted. Mactaggart wrote that the beautiful scenery "kept the spirits from sinking" in Canada's rough environment, for "if the mind can find nothing interesting, disease and every evil afflict both it and the body; but where it can find plenty of employment, dangers and difficulties are easily surmounted."<sup>4</sup> By his own admission, then, Mactaggart included himself in a common medical tradition that moral constitution and sensibility were as integral to health as physical strength—especially in the case of a diagnostic category as flexible and capacious as fever.<sup>5</sup> So, what did Mactaggart make of his own experience with malaria? How did he retain his authority on all things Canadian if he himself had fallen to its climate?

In her book *Exploring Victorian Travel Literature: Disease, Race, and Climate*, Jessica Howell looks at the strategies employed by five very different travelers to navigate the health risks of traveling as they clashed with imperial ideals, notably the racial and scientific superiority of Britons. This, she argues, underlines both disease's conceptual malleability and the rhetorical potential of subsequent narratives.<sup>6</sup> In this chapter, I use Mactaggart as a case study to demonstrate that malaria was not just a financial and logistical obstacle to the builders of the

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<sup>4</sup> Mactaggart, volume 1, 54.

<sup>5</sup> Candace Ward, *Desire and Disorder: Fevers, Fictions, and Feeling in English Georgian Culture* (Lewisburg: Bucknell University Press, 2007), 153.

<sup>6</sup> Howell, 15. I should note that Howell's case studies concern West Africa and the Caribbean.

Rideau Canal. Disease disrupted settlers' own understanding of their bodies, competence, and the land they were claiming to support and secure the British Empire's presence in North America. In *Three Years in Canada*, this disruption is best observed through the unresolved tension between Mactaggart's projected expertise on Canada and the uncertainty and vulnerability caused by malaria and, by extension, Canada's foreign and dangerous climate. To explore this tension, I start with a brief biography of Mactaggart to contextualize why and how he wrote *Three Years* before outlining some useful analytical lenses for understanding the text. Next, I examine how Mactaggart portrayed his illness in *Three Years*, emphasizing his association of disease with loyalty and service to the empire, two key components of nineteenth-century masculinity. Mactaggart's hypotheses on what caused, and what could cure, malaria in Upper Canada also serve to remind readers of his education and role as a man of science and education with expertise on the colony. Both self-depictions stand in contrast to those he penned of other settlers in the colony, whose ill-health he overwhelmingly attributed to lacks of judgement and inability to survive in Upper Canada. Afterwards, I discuss Mactaggart's views on deforestation—which was necessary for the colony's improvement even as it threatened its health—to show how Mactaggart eschewed responsibility for the questions he could not answer about the colony. Finally, I end by linking the threats malaria posed to the racial and ethnic superiority of British settlers with Mactaggart's understanding of 'Vanishing Indians.'

Ultimately, this chapter explores the variety of narrative strategies that Mactaggart used to discuss British North America's unstable climate and disease environment without compromising the feasibility of settlement in Upper Canada.

## **“Keenly fond of every curious thing”: John Mactaggart and *Three Years in Canada***

Mactaggart (1791-1830) was born to a large farming family in Galloway, Scotland and acquired a piece-meal education in the natural sciences and engineering before making his way to the Rideau Canal. Despite being, as he described, a naturally curious child with a gift for mathematics, he “took a huff at schools and schoolmasters altogether, leaving them both with disgust” at the age of thirteen. He spent his teenage years teaching himself Latin, exploring the countryside, and reading avidly. While he briefly attended and enjoyed his natural history classes at Edinburgh University, the heart of the Scottish Enlightenment and of medical education in the British Empire, he reflected far more fondly on his years of independent studies.<sup>7</sup> He told readers that he gathered “ten times more” from borrowing his neighbour’s *Encyclopaedia Britannica* than he did in Edinburgh, where he was “told nothing but what I had before gathered.”<sup>8</sup> After leaving university, he picked up millwrighting and engineering.<sup>9</sup>

His first publication was the *Scottish Gallovidian Encyclopedia* (1824), in which he inventoried Galloway’s fauna, flora, dialect, customs, and people—including himself and his family. In the introduction, he told his reader that: “From my youngest days I have been a wanderer amid the wilds of nature, and keenly fond of every curious thing belonging to my

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<sup>7</sup> In 1836, five of the sixteen members of Upper Canada’s Medical Board had been educated at the University of Edinburgh, R.D. Gidney and W.P.J. Millar, *Professional Gentlemen: The Professions in Nineteenth-Century Ontario* (Toronto: University of Toronto Press), 13. For more on the Scottish Enlightenment and the influence of Scottish medical knowledge on the Canadas, see: Jock Murray and Janet Murray, "The Seed, The Soil, and the Climate: The Scottish Influence on Canadian Medical Education and Practice, 1775-1875" in *A Kingdom of the Mind: How the Scots Helped Make Canada*, ed Peter E Rider and Hannah McNabb (Montreal: McGill-Queen's University Press, 2006): 183-200.

<sup>8</sup> John Mactaggart, “Mactaggart,” *The Scottish Gallovidian Encyclopaedia* (London: Hamilton, Adams, and Co, 1824), 330-331.

<sup>9</sup> While the ‘when’ and ‘how’ of his engineering training remain unclear both in Mactaggart’s own writing and in David Herschell’s short biography, his expertise and competence was widely accepted and praised. See: Mactaggart, *The Scottish Gallovidian Encyclopedia*, 332 and David Edward Herschells, “John Mactaggart,” *Modern Scottish Poets With Biographical and Critical Notices, Eleventh Series* (Brechin: 1888), 324.

native country.”<sup>10</sup> He also emphasized his lived experience and experiential learning, writing that: “Little of this faulty book of mine was composed in the closet, in the musty library of cobwebs; no, it was gathered by my own eyes and ears, concocted in my own slender intellect . . . and wrote down on scraps of paper as I found it most convenient, in the midst of the works of nature, in the open air, beneath the flaring sun. . .” He placed himself in direct contrast to those scholars who “rummage[d] the archive of yore to satisfy the throbbing heart of the inquirer. I will take the world as it stands, and see what I can find to please myself and other rustics.”<sup>11</sup> The *Scottish Gallovidian Encyclopedia* provided a methodological blueprint for how Mactaggart produced *Three Years in Canada*. Soon after its publication, the *Encyclopaedia* came under fire given an (again unspecified) spat about some of its commentary.<sup>12</sup> Mactaggart moved to London where he engaged in literary speculation, wrote for magazines, and befriended other writers and engineers, including John Rennie, the son of a famous Scottish civil engineer known for his work on canals, who recommended him to the British military.<sup>13</sup> Importantly, going to Upper Canada appears to be Mactaggart’s first travel outside the British Isles.

He arrived in Canada in 1826 and played a key role in amending and clarifying Clowes’s paltry survey for By.<sup>14</sup> By appeared as fond of Mactaggart as Mactaggart was of him, describing him as “the Person constantly with me on this service” in an 1827 letter recommending that

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<sup>10</sup> Mactaggart, *The Scottish Gallovidian Encyclopedia*, x.

<sup>11</sup> Mactaggart, *Encyclopedia*, xii-xiii.

<sup>12</sup> Herschells, 322. In a lecture given at the Stewartry Museum in Scotland, former curator Dr David Devereux surveys the mixed reviews that the encyclopedia elicited upon publication, including John Heron of Ingliston and Keltonhill’s threats to sue Mactaggart over comments on his daughter in an entry titled the ‘Star of Dungyle.’ This is likely what led to the *Encyclopedia*’s hushing up. David Devereux, “Mactaggart Talk” (unpublished lecture, Stewartry Museum Kirkcudbright, 30 September 2014). Thank you to Peter Hewitt from the Stewartry Museum Kirkcudbright for sharing this text with me.

<sup>13</sup> Herschells, 324; “John Rennie,” Scottish Engineering Hall of Fame, The Institute of Engineers in Scotland, March 3<sup>rd</sup> 2022, <https://engineeringhalloffame.org/profile/john-rennie>.

<sup>14</sup> Robert Passfield, “A Wilderness Survey: Laying out the Rideau Canal, 1826-1832” *Journal of the History of Canadian Science, Technology and Medicine / Revue d’histoire des sciences, des techniques et de la médecine au Canada* 7, 2 (1983): 80-97.

Mactaggart's travel expenses be replaced by a pay rise, due to his "bodily exertions being very great, & [his] perseverance highly meritorious" in "one mass of thick forest," where "Our sufferings from the Mosquitoes & black flies are great and many of the men fall sick with fever."<sup>15</sup> After completing his survey, which is reproduced in *Three Years*, Mactaggart became the clerk at the works and took on a variety of other ventures. He was a founding member and explorer for the Hull Mining Company on the Lower Canada side of the Ottawa River.<sup>16</sup> By 1827, his contributions to local newspapers and magazines earned him an invitation as an inaugural member of the Montreal Natural History Society, which George Little has situated amongst international amateur international science networks committed to expanding Britain's knowledge of its imperial periphery to promote settlement and resource extraction.<sup>17</sup> Importantly, these extracurriculars were in no way separate from his work on the canal. The Montreal Natural History Society's secretary, for example, noted that they were both aware of and interested in Mactaggart's "situation on the Canal" and the possibility that it "may afford means of acquiring valuable minerals."<sup>18</sup> While not the focus of this chapter, Mactaggart's career path shows how quickly the Rideau Canal's construction opened opportunities for further resource exploitation in Upper Canada.

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<sup>15</sup> Correspondence from John By to Gother Mann, Rideau Canal, July 6th 1827 "Lieutenant-Colonel By's Report to General Mann on the Works carrying on at the Rideau Canal; dated the 6th July 1827." LAC, RG8 C Series, Vol 44. In his own writing, Mactaggart described By as "a gentleman I shall ever esteem and value" (Mactaggart, volume 1, 56) although some of his other descriptions seemingly run against By's own descriptions of himself. While Mactaggart reinforced By's courage and ruggedness by writing that he "would run rapids that his Indians trembled to look at; and cross wide lakes with the canoe when the Canadians were gaping with fear at the waves that were rolling around them" (Mactaggart, volume 1, 55), By described himself to his superiors as "ignorant of canoeing" (Letter from By to Darling, April 14, 1827. LAC RG8, C-Series, Vol 43).

<sup>16</sup> G. S. Emmerson, "MACTAGGART, JOHN," in *Dictionary of Canadian Biography*, vol. 6, University of Toronto/Université Laval, 2003, [http://www.biographi.ca/en/bio/mactaggart\\_john\\_6E.html](http://www.biographi.ca/en/bio/mactaggart_john_6E.html).

<sup>17</sup> Mactaggart, volume 1, 177 and Geoffrey Little, "An Extensive and Unknown Portion of the Empire: The Montreal Natural History Society's Survey of Rupert's Land, 1827-1830," (MA thesis. Concordia University, 2015), 60.

<sup>18</sup> Letter from A.F. Holmes to John Mactaggart, August 9 1827, reprinted in Mactaggart, volume 1, 177.

Though he was dismissed from his work on the canal in 1828 for inebriation on duty, Mactaggart left the Canadas with warm recommendation from By and other local leaders.<sup>19</sup> He died only a year later, likely of complications from malaria or a relapse of the disease.<sup>20</sup> Before he passed, Mactaggart had planned to write an encyclopedia of Canadian flora and fauna among other books on the colony and produced 5,000 lines of an unfinished poem titled *The Engineer*.<sup>21</sup> However, the only publication that derived from his time in the Canadas was *Three Years in Canada*. A chimerical work by twenty-first century genre standards, *Three Years* is emblematic of two nineteenth-century genres which literary scholars and historians have tied to colonial activity: travel literature and natural history.

Mary Louise Pratt's *Imperial Eyes: Travel Writing and Transculturation* is interested in travel writing's relation to European colonial expansion, both in terms of its evolution as a genre and the core ideologies that power it. By the latter half of the eighteenth century, she notes that European travel writers' moved away from traditional motifs such as survival literature or navigational narratives and embraced the scientific shift to natural history—the observational study of a place's organisms and environment.<sup>22</sup> Travel writers-come-natural scientists became “central agents in legitimizing scientific authority and its global project alongside Europe's other ways of knowing the world, and being in it,” notably by bridging the gap between scientists and broader European audiences.<sup>23</sup> Furthermore, as much as travel writing served natural history,

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<sup>19</sup> I have not stumbled upon, or looked particularly hard, for additional details about Mactaggart's dismissal, but want to note that he himself does not address it.

<sup>20</sup> G. S. Emmerson, “MACTAGGART, JOHN,” in *Dictionary of Canadian Biography*, vol. 6, University of Toronto/Université Laval, 2003–, accessed February 17, 2021, [http://www.biographi.ca/en/bio/mactaggart\\_john\\_6E.html](http://www.biographi.ca/en/bio/mactaggart_john_6E.html).

<sup>21</sup> The manuscript of the poem is currently at the Stewartry Museum, Kirkcudbright, and is several hundred pages long. Former museum curator David Devereux describes it as “essentially a world history of engineering in verse.” Devereux, “Mactaggart Talk.”

<sup>22</sup> Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (New York: Routledge, 1992), 24.

<sup>23</sup> Pratt, 29.

natural history provided a new structuring mechanism for travel writing in which “encounters with nature, and its conversion into natural history, form[ed] the narrative scaffolding.”<sup>24</sup> *Three Years* fits this description beautifully: it is structured by headers whose themes range from place names or specific settlers to more generic topics such as ‘Lakes.’ Mactaggart penned beautiful descriptions of Canadian forests and waterways, peoples, and places across these topics, while also stressing the unique and rough environment in which he found himself—thus underscoring his own agency, competence, and resourcefulness.

To this end, Mactaggart’s work also represents another early nineteenth-century shift in travel literature by embracing the literary devices and tropes of sentimentality. Textual signs of this change include the use of the ‘I’ pronoun, a sustained attention to the traveler’s emotion, a view of nature that is both scientific and divine, themes of suffering and failure, and the foregrounding of a middle-class, white, European, and male voice.<sup>25</sup> These literary devices ultimately help Mactaggart make himself “the protagonist and central figure of his own account,” and structure his travels into a narrative with “an epic series of trials, challenges, and encounters with the unpredictable.”<sup>26</sup> For example, he described clambering with his surveying party “through a dreary country, bitten with insects night and day—with bloody, swelled faces; while the heat of the sun blistered the skin exposed to its rays . . . while the water was perfect poison to drink, and our food far from being plenty...”<sup>27</sup> One particularly evocative scene describes Mactaggart’s surveying party celebrated Christmas 1826 in Dow’s Swamp, “one of the most dismal places in the wilderness,” by sharing grog, huddling for warmth, and taking turns

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<sup>24</sup> Pratt, 51.

<sup>25</sup> See Pratt, “Anti-conquest II: The mystique of reciprocity,” 69-85.

<sup>26</sup> Pratt, 75.

<sup>27</sup> Mactaggart, volume 1, 54.

drinking tea out of the party's single tin mug.<sup>28</sup> These experiences in the bush, Mactaggart wrote, "made more impression on me than others I could detail, fraught far beyond comparison with hardship and difficulty."<sup>29</sup> Implied and celebrated here is Mactaggart's own successful survival and strength. Travel literature thus fulfilled a similar function as fictional adventure narratives by celebrating their protagonist's independence, imperial loyalty, able-bodiedness, and their conquests of hostile environments.<sup>30</sup>

However, Mactaggart's original training as a natural scientist interrupted the adventurous flow of *Three Years*, leading one reviewer to describe Mactaggart as "an able engineer... a man of an intelligent mind and active observation; but unfortunately... a resolute *droll*" given his tendency to describe insects, stones, and other findings in exhaustive detail.<sup>31</sup> In part, this was a tenet of early nineteenth-century inventorial sciences, which Suzanne Zeller described as "the mapping and cataloguing of resources and other natural phenomena which preoccupied the colonists" including geology, zoology, climatology, geography, botany, and whatever other information could help settlers take stock of the imperial periphery.<sup>32</sup> As Zeller notes, "Any individual could add piecemeal to the stock of knowledge and was encouraged to do so"<sup>33</sup>—and Mactaggart often did by reprinting of letters and second-hand information from fur traders, Indigenous peoples, and French-Canadian settlers.<sup>34</sup> In Canada, Mactaggart practiced what he

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<sup>28</sup> Mactaggart, volume 1, 56.

<sup>29</sup> Mactaggart, volume 1, 55.

<sup>30</sup> See: Helen Goodman, "Masculinity, Tourism and Adventure in English Nineteenth-Century Travel Fiction," *Men Masculinities, Travel and Tourism*, ed Thomas Thurnell-Read and Mark Casey (London: Palgrave MacMillan, 2015), 13-27.

<sup>31</sup> Original italics. *Three Years in Canada by John Mactaggart*, *The Examiner*, issue 1119, 1829, 435.

<sup>32</sup> Suzanne Zeller, *Inventing Canada : Early Victorian Science and the Idea of a Transcontinental Nation* (Montreal: McGill-Queen's University Press, 2009), 4.

<sup>33</sup> Zeller 4.

<sup>34</sup> For examples see Mactaggart, volume 1, 59 (where he reproduces a letter from a fur trader) and Mactaggart, volume 1, 183 (in which he recounts Indigenous knowledge about bears and big cats). His frequent confusion between French Canadian and Indigenous peoples and the collapsing of their identities and relationships to Turtle Island/British North America could be the subject of an entirely different thesis on French Canadians, Indigenous

called rummaging, or, “the art of exploring whatever lies in a state of nature . . . a method whereby curiosities are discovered and singular information obtained.”<sup>35</sup> Inventorying Canada was a goal Mactaggart outlined in the book’s introduction, as “the great and growing interests of the Canadas, and the readiness shown by Great Britain to promote the advancement and prosperity of a country of such extent and importance” made an account, or catalogue, of Canada “highly desirable.”<sup>36</sup>

Mactaggart’s growing concern for imperial expansion is further shown in the shift from the local to the global in his work. If the *Gallovidian Encyclopedia* had been dedicated to Mactaggart’s fellow Scots and was “intended from the beginning as a *present* to my native country,” then *Three Years* was a love letter to the British Empire, whose increased and secured power in North America Mactaggart understood to be the canal’s end goal.<sup>37</sup> Years before construction was completed, he envisioned the canal as “the means of opening” and connecting Canada to other parts of the British Empire so that “we may come and go between China and Britain in about two months.”<sup>38</sup> This had also been a long-term commercial and military goal of the British Empire, which would fund Arctic exploration expeditions in the hopes of finding the fabled Northwest Passage connecting the Atlantic and Pacific Oceans.<sup>39</sup> Mactaggart was invested

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erasure, and the creation of a white ‘native’ population in the Canadas but is unfortunately beyond the scope of this thesis.

<sup>35</sup> Mactaggart, volume 1, 44.

<sup>36</sup> Mactaggart, “Preface,” volume I, iii.

<sup>37</sup> Mactaggart, *The Scottish Gallovidian Encyclopedia*, xii. Mactaggart was quite patriotic; he celebrated Scotland at a national level by praising how its intellectual and literary tradition “turned out Euclids and Socrates’s” (x), and at a more familial level. In the autobiographical entry of the encyclopedia he wrote about himself, he highlighted how his grandfather had died fighting against Cromwell’s 1650 invasion (328). He wrote that “there is nothing I am prouder of than that I am a *Scotch-man*” (x), which coloured his impression of Canada. He wrote that “the *chanson de voyageur* has delighted me above all others, excepting those of Scotland” (*Three Years* volume 1, 255), yearned to take advantage of Canada’s icy winters by curling (*Three Years*, volume 1, 62), and praised sugar-maple rum with the caveat that it could not match “*Craigdarroch of Perth*,” a whisky made by a Scottish settler in Perth that was “by far the most excellent spirit distilled in the country.” (*Three Years*, volume 1, 180).

<sup>38</sup> Mactaggart, volume 1, 105 and 169.

<sup>39</sup> Anya Zilberstein, “A Considerable Change of Climate’: Glacial retreat and British policy in the early-nineteenth-century Arctic,” in *Governing the Environment in the Early Modern World: Theory and Practice*, ed. Sara Miglietti

in the canal's potential as an expansion of British imperial commerce, settlement, and power in Upper Canada—and thus in Britain's continued presence and wellbeing in the colony.

*Three Years* also commented on the virtues and flaws of various groups of settlers, both because travel writing had an ethnographic bend, and because Mactaggart understood that a strong imperial presence required loyal and competent settlers on the ground. He frequently critiqued settlers' behavior and gave advice to prospective settlers though he had “no interest in emigration, God knows!” for himself.<sup>40</sup> While amazed by “the natural beauties of Canada . . . not to be matched in the world,” Mactaggart was profoundly dissatisfied with colonial society, writing that “to mingle with [Canadians] is one of the severest punishments that can be inflicted on a feeling heart.”<sup>41</sup> While Mactaggart believed that Canada's environment could have a degenerative effect on immigrant populations, an important point I will return to later, he mostly attributed his long list of grievances about settlers to their origins as “droves of discontented people” leaving Britain “from stress of weather, or more often from bad behaviour” who only met other “tribes of wanderers like themselves” in Canada.<sup>42</sup> He especially took issue with a perceived lack of gratefulness to the Crown for everything from infrastructure to internal improvements, complaining that: “if you have to pass through a swamp, you will hear honest John blamed for not draining it; and if through a settlement made fertile by his influence, not a word to his praise will be uttered.”<sup>43</sup> This, to Mactaggart, pointed to a larger problem in Upper Canada where “the feeling is totally Yankee, and the inhabitants care not a fig for the institutions

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and John Morgan (New York: Routledge, 2017): 148. Anecdotally, in 1827, Arctic explorer Sir John Franklin ceremoniously laid the first stone of the works in Bytown while passing through—likely as he was returning to England after his third Arctic expedition. (Bush, 41).

<sup>40</sup> Mactaggart, volume 2, 251.

<sup>41</sup> Mactaggart, volume 1, 204.

<sup>42</sup> Mactaggart, volume 1, 204-205.

<sup>43</sup> Mactaggart was fond of using national personifications in his ethnographic writing: John (John Bull) was English, Jonathan (Brother Jonathan) was American, Jean-Baptiste was French-Canadian... Mactaggart, volume 1, 205.

of Great Britain.”<sup>44</sup> With the American Revolutionary War relatively recent and the War of 1812 fresher yet, anxieties that only Upper Canada’s most loyal and manly settlers could keep the colony securely within the empire were obviously still at play for Mactaggart.<sup>45</sup>

The last note I want to make about *Three Years* as a source is how deeply gendered Mactaggart’s self-positioning was. Jane McGaughey’s work on manliness in early nineteenth-century Canada (and, more specifically Irish men’s relationships with this masculinity) establishes key masculine virtues, including: loyalty to the Crown, self-reliance, perseverance, and courage.<sup>46</sup> These components of imperial masculinity had been especially tested in the War of 1812, after which support for British institutions became doubly important and the loyalty of pre-1815 settlers could be measured by their wartime behaviour.<sup>47</sup> Peace, order, and good government were thus also staples of the ideal Upper Canadian masculinity.<sup>48</sup> This imperial masculinity was also hegemonic. In R.W. Connell’s words, hegemonic masculinity denotes a type of masculinity that rises to the top of the “complex hierarchies, alliances and oppressions” that divide patriarchies internally.<sup>49</sup> In other words, imperial masculinity was the most prized masculinity and embodying it enhanced both social capital and respectability. Non-hegemonic masculinities were most appreciated if they contained elements of their hegemonic counterparts, including productivity, hard labour, and the work of empire-building in North America. Clare Pentland points out that even the rough and hypermasculine male cultures that grew out of bush

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<sup>44</sup> Mactaggart, volume 1, 208.

<sup>45</sup> See, for example, Cecilia Morgan’s ‘*Virtue and the Meanings of Manliness in Upper Canada*,’ (Proceedings of the Henry Jackman Symposium on Taptoo!. Humanities Initiative Occasional Papers series, Munk Centre for International Relations website. Ed Linda Hutcheon and Carol Clark, University of Toronto), <http://hdl.handle.net/1807/758>

<sup>46</sup> McGaughey, 32.

<sup>47</sup> Cecilia Morgan, “Gender, Loyalty and Virtue in a Colonial Context: The War of 1812 and Its Aftermath in Upper Canada” in *Gender, War and Politics: Transatlantic Perspectives on the Wars of Revolution and Liberation, 1775-1830*, ed. K Hageman, G Mettele, and J Rendall (London: Palgrave MacMillan, 2010): 307-324.

<sup>48</sup> McGaughey, 22.

<sup>49</sup> R. W. Connell, “Men, Masculinities, and Feminism.” *Social Alternative*, 16, 3 (1997), 9.

and camp conditions were tolerated as long as they were embedded in productive, disciplined, and efficient work.<sup>50</sup> Caroline Podruchny makes a similar case that the markers of French-Canadian voyageur and coureur des bois masculinity (a group Mactaggart admired) held practical value in the fur trade.<sup>51</sup> Most of the things that Mactaggart did or portrayed himself as doing in *Three Years*—generating knowledge, exploring new lands, critiquing disloyal or incompetent settlers, roughing it in the wilderness, and participating in work that promoted the empire’s growth and resilience—thus affirmed his own masculinity in turn. As an analytical lens for historians, attending to hegemonic masculinities “keeps patriarchy and other hierarchies of power—based on wealth, sexual orientation, age, race, and physical ability, for example—clearly in focus.”<sup>52</sup> It also makes the question I opened this chapter with personal, as well as professional: how did Mactaggart conserve his authority and expertise on all things Canada while faced with its disease environment?

### **“If we had no occasion to *expose* ourselves”: Imperial labour, sacrifice, and disease**

As I outlined, malaria was already well-documented both as an element of climate and as a risk for British imperial actors. Deborah Neill’s study of Victorian merchant John Holt argues that merchants operating in West Africa strategically linked illness to masculinity so that experiences of illness could reaffirm their middle-class masculinity and achieve manhood “within a

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<sup>50</sup> Pentland, 178.

<sup>51</sup> Carolyn Podruchny, "Tough Bodies, Fast Paddles, Well-Dressed Wives: Measuring Manhood among French Canadian and Métis Voyageurs in the North American Fur Trade" in *Making Men, Making History: Canadian Masculinities Across Time and Place*, ed. Peter Gossage and Robert Allen Rutherford. (Vancouver: UBC Press, 2018), 343. Mactaggart’s praise of coureur des bois and French-Canadian culture more generally is spread throughout volume 1 of *Three Years* especially, as he considered them “by far the most respectable people in the country.” (Mactaggart, volume 1, 207).

<sup>52</sup> Peter Gossage and Robert Allen Rutherford, *Making Men, Making History: Canadian Masculinities Across Time and Place*, 428.

hierarchical and imperial-minded society to justify their status and economic dominance.”<sup>53</sup>

Merchants like John Holt benefited from the imperial masculinity that they could obtain through illness, if disease narratives could be associated with the pursuit of wisdom or manhood. Jessica Howell, reading Richard Burton’s *The Lake Regions of Central Africa* (1860) identifies a similar pattern in which Burton framed his own experience with malaria as both “a sign of heroism and necessary step in colonial exploration.”<sup>54</sup> In his own disease narrative, Mactaggart positioned service to the empire and the fulfillment of his duties in Canada as the reward for enduring the colony’s sickly climate.

Mactaggart, for example, did not write about his illness without stressing that he had fallen ill *while* working. While crafting his book’s introduction, and his reader’s first impression of him, he noted that his “health began to suffer in the summer of 1828, from the malaria of the swampy wastes, to which I was necessarily much exposed” after he had “zealously pursued [his] avocations” as a civil servant.<sup>55</sup> By framing his exposure to illness as a necessity, he also framed himself as something of a martyr—suffering and risking health and body for the canal and, given its role as imperial infrastructure, the empire itself. He takes up this theme again after sharing the nature and severity of his disease, amid a more in-depth discussion pathologizing the Canadian climate. Once again, he highlighted the necessity of exposure in the context of his work as an agent of empire: “If we had no occasion to *expose* ourselves to the weather, it is probably that we should find ourselves enjoying better health than we commonly do; but who can keep from

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<sup>53</sup> Deborah Neill, “Merchants, Malaria and Manliness: A Patient’s Experience of Tropical Illness.” *The Journal of Imperial and Commonwealth History* 46, 2 (2018), 205.

<sup>54</sup> Howell, 65.

<sup>55</sup> Mactaggart, volume 1, iii. Also worth noting here is that Mactaggart claims that he returned to England at that point, “With a view to benefit by the change of climate, and to regulate other affairs” which fails to mention that his employment was in fact terminated.

exposing themselves? We must go forth on our business, whatever that may be.”<sup>56</sup> This rhetorical question highlights Mactaggart’s work ethic and dedication to the imperial project, by which he positioned his labour, and himself, as key to the project’s success. While Mactaggart was admittedly liberal in his use of italics, his italicization of the word “expose” highlighted both the externality of disease and Mactaggart’s own agency. Exposing himself to disease was a conscious choice Mactaggart made in the service of an imperial infrastructure project.<sup>57</sup>

While Mactaggart appealed to his readers’ work ethic by noting that “the majority of mankind must struggle to live, in order to die,” he also clearly highlighted that his position on the imperial periphery made his experience and suffering unique—both because of Canada’s environment and underdevelopment. He appealed to outside sources to note how “The *Fever and Ague* of Canada are different, I am told, from those of other countries” before describing the symptoms I opened this chapter with. Mactaggart thus used disease etiology to emphasize Canada’s otherness, also noting that Canadian malaria was so debilitating that “one cannot even take tea, a thing that can be endured by the stomach in England when nothing else can be suffered.”<sup>58</sup> He also made sure to stress how Canada’s underdevelopment compounded the problem of disease, not only because newness itself was sickly, but also because it forced settlers to expose themselves to disease:<sup>59</sup>

If we can afford to go out and come in when we please, I dare say there is no more to be said against sickness in this climate, than in England; but if we have to wander in the wilderness amongst swamps, as many have—to sleep amongst them, and be obliged to drink bad water—the *Dysentery, Fever and Ague*, and all manner of bilious fevers, are sure to succeed one another.<sup>60</sup>

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<sup>56</sup> Mactaggart, volume 2, 17.

<sup>57</sup> I will return to Mactaggart’s perceived conscientiousness and exposure later.

<sup>58</sup> Mactaggart, volume 2, 17.

<sup>59</sup> Bolton Valenčius, 216.

<sup>60</sup> Mactaggart, volume 2, 17.

The implication that disease would be a non-issue if he “[could] afford” to decide how to interact with his environment once again reinforced his servitude to the empire and Canada’s underdevelopment. These passages all contribute to an ongoing lexical field of duty, dutifulness, and obligation to the empire, through language like: “*have* to wander,” “be *obliged* to drink bad water,” “to *expose* ourselves,” “we *must* go forth” (my italics) ... These verb choices all underline that Mactaggart’s exposure to disease were an unavoidable consequence of securing the empire’s presence in Upper Canada and are tightly connected to the colony’s perceived underdevelopment. After all, that Europeans “*have* to wander in the wilderness” (my italics) was only true because so little was known about Canada, hence Mactaggart’s employment and service.<sup>61</sup> To a British audience—for whom draining swamps and notions of improvement had a deep history of signaling modernity at home and abroad, as Paul Slack among others have argued—this obligation to wander and sleep in swamps fit into larger ideas about the improvement of land, especially in colonial contexts.<sup>62</sup> Mactaggart’s insistence on his service to the empire made his experience with illness both inevitable and admirable, while also performing a key tenet of imperial masculinity.

Crucially, Mactaggart did not associate service and loyalty to every sick, injured, and incapacitated labourer on the Rideau Canal, which is especially obvious in his description of Irish labourers—the bulk of workers and malaria sufferers. Throughout his work, Mactaggart defaulted to the ‘Wild Irish’ stereotypes that followed Irish settlers from the ‘Old World’ to the ‘New,’ generalizing Irish men’s supposed predisposition for murder, violence, vice, and crime.

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<sup>61</sup> That being said, Mactaggart repeatedly reiterated that his work and the exploration of Upper Canada was unfinished, calling towards the end of the book for “this country [to] be well explored, and its great resources examined, not as regards one object, but many; and much will be found of which we yet know nothing.” Mactaggart, volume 2, 269.

<sup>62</sup> Paul Slack, *The Invention of Improvement: Information and Material Progress in Seventeenth-Century England* (Oxford: Oxford University Press, 2015), 259.

This type of racialized undesirable masculinity was both incompatible and counterproductive to the imperial masculinity “focused on market capitalism and the economic potential of both colony and colonist” prized in Upper Canada.<sup>63</sup> Where Mactaggart posited his own sickness as a sign of his loyalty to the empire and servitude, he underlined his view that Irish labourers were “awkward and unhandy” when describing worksite injuries. In one of *Three Years’* most-of-cited passages, he reported being:

often extremely mortified to observe the poor, ignorant, and careless creatures, running themselves into places where they either lost their lives, or got themselves so hurt as to become useless ever after . . . many of them were blasted by pieces by their own *shots*, others killed by stones falling on them. I have seen heads, arms, and legs, blown about in all directions; and it is vain for overseers to warn them of their danger, for they will pay no attention.<sup>64</sup>

While any number of workers were injured given the work’s dangerous nature (and, as Wylie pointed out, poor on-site leadership and cheap, subpar blasting powder), Mactaggart placed the onus for the Irish’s injuries on their own ignorance, carelessness, and inaptitude—even as overseers attempted to interfere and help.<sup>65</sup> Dangerous blasting work aside, Mactaggart wrote that “even in their spade and pickaxe business, the poor Irish receive dreadful accidents.”<sup>66</sup> His message was clear; while accidents were common along the Rideau, the Irish were particularly careless and thus responsible for their own fates.

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<sup>63</sup> McGaughey, 19-20 and 35.

<sup>64</sup> Mactaggart, volume 2, 245. Historiographically, Mactaggart’s descriptions of the Irish were also reproduced uncritically. Clare Pentland, whose work on working-class history served as a blueprint for 20<sup>th</sup>-century Canadian labour historians, quotes Mactaggart wholesale and notes that his descriptions of the Irish “would require very little modification to serve as a description of the labourer’s life on other public works, or even in the cities,” showing the wide reach of Mactaggart’s writing and the uncritical incorporation of his biases in labour histories. (Pentland, 107-108).

<sup>65</sup> William Wylie, “Poverty, Distress, and Disease: Labour and the Construction of the Rideau Canal, 1826-32,” in *Labourers on the Rideau Canal*, ed. Katherine M.J. McKenna (Ottawa: Borealis Press, 2008), 26. For one of the most comprehensive labour histories of canal construction in North America, with an admitted emphasis on the United States, see Peter Way, *Common Labour: Workers and the Digging of North American Canals, 1760-1860* (Cambridge: Cambridge University Press, 1993).

<sup>66</sup> Mactaggart, volume 2, 248.

At times, Mactaggart's description of Irish labourers is directly at odds with his own self-positioning. For example, Mactaggart's condemns Irish labourers making themselves "useless ever after" following work accidents despite acknowledging in his introduction that he was himself returning to England "with a view to benefit by the change of climate" after his own run-in with malaria.<sup>67</sup> In his description of the "dregs of various kinds" that malaria left behind, Mactaggart acknowledge that "those who have had *it once*, will most likely have *a touch* of it every year . . . and when we fairly take it, we are rendered useless for any active business for many months."<sup>68</sup> While the Irish were "making themselves useless," Mactaggart depicted his own long-term sickness as a normal consequence of serving the empire. Another startling comparison is around the issue of drinking "*swamp waters*." Mactaggart described being "obliged to drink bad water [with fevers] sure to succeed one another" while working in remote areas where "the water was perfect poison"<sup>69</sup> to demonstrate his own adventurousness and ruggedness. However, he criticized Irish labourers settling in Corktown for "the disregard they pay to their health, by living as they do, and drinking *swamp waters*, if there be none nearer their habitations, instead of spring or river water, bring on malignant fevers of all kinds."<sup>70</sup> Mactaggart criticized Irish settlers and labourers for behaviours that he himself displayed, framing his behaviours as born of duty and those of the Irish's as signs of carelessness, ignorance, and 'Wildness.' The Irish, outsiders to the imperial project, functioned as a foil while Mactaggart crafted his personae in *Three Years*. While there is more to be said about ethnic conflict along the canal, my point here is to outline that Mactaggart was careful and deliberate in underlining is

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<sup>67</sup> Mactaggart, volume 1, iv.

<sup>68</sup> Mactaggart, volume 2, 18.

<sup>69</sup> Mactaggart, volume 2, 17 and volume 1, 54.

<sup>70</sup> Mactaggart, volume 2, 244.

own sense of duty and loyalty to the empire, by showing that these depictions were not his default descriptions of workers along the canal.

### **Worry of “stumps in a certain state of decay”: Natural science and understanding risk**

In addition to his loyalty and servitude, Mactaggart also made sure to emphasize his scientific background and education while discussing malaria. As Naomi Zack argued, the authority of science was a useful tool for men without property or social ranks (notably the second sons of middle-class families such as Mactaggart) to bolster their social authority and masculinity.<sup>71</sup>

While this may explain Mactaggart’s detailed emphasis on his education in his autobiographical materials, he also made sure to show in *Three Years* that he, unlike other settlers, understood the source of his illness and was actively trying to generate new knowledge about malaria.

An important point to make here is that historians of science and masculinity are increasingly questioning the presumed authority of male scientific authority in eighteenth and nineteenth century Britain where, as Heather Ellis argues, "the man of science remained closely linked to the isolated and effeminate image of the scholar."<sup>72</sup> This gendered link made men of science, and their masculinities, vulnerable to accusations of dandyism and detachment—both outside and within their own organizations and circles. This included the admittedly more outdoorsy and adventurous natural historians, often relegated to the role of “handmaidens to Europe’s expansive commercial aspirations,” as Mary Louise Pratt put it.<sup>73</sup> I make this point to outline that Mactaggart’s scientific training and position were not inherent assets to his personae

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<sup>71</sup> Naomi Zack, *Bachelors of Science: Seventeenth-Century Identity, Then and Now* (Philadelphia: Temple University Press, 1994).

<sup>72</sup> Heather Ellis, *Masculinity and Science in Britain, 1831-1918*. (London: Palgrave Macmillan, 2017), 30.

<sup>73</sup> Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992), 34.

as a traveler; he had to make this narrative work for him. To this end, lived experience with malaria in the Canadian wilderness helped Mactaggart separate himself from, as he put it in his *Encyclopedia*, the “musty library of cobwebs” with which other scientists were associated.<sup>74</sup> Howell outlined a similar strategy in Richard Burton’s travel writing, where Burton’s description of symptoms allowed him to “claim greater insight [on Africa] than would be accorded an external observer,” by virtue of having embodied the disease of Africa’s climate.<sup>75</sup>

Throughout *Three Years*, Mactaggart made sure to emphasize his own self-awareness and knowledge of malaria—both by providing long, first-person descriptions of his symptoms, and by communicating his knowledge of the climate and environment in Upper Canada. In the absence of doctors, settlers were often the best-placed medical authorities available, and Mactaggart emphasized his knowledge and awareness of disease causation—noting that water became “poisonous to drink” around midsummer, and highlighting that the Ottawa River was the healthiest one in the colony, as “the people on its banks are seldom or never sick; and the Lower Province is much freer from distemper than the Upper.”<sup>76</sup> He pinpointed clear environmental dangers to good health such “stumps in a certain state of decay” or what he called lake oil: “an oily substance, of a brown colour, found floating on the surfaces of the lakes in the warm weather.”<sup>77</sup> Similarly, in an early recruitment notice (published in an unnamed local newspaper, sometimes in the winter of 1826-1827 and reprinted in *Three Years*), Mactaggart advertised that surgeons would be “engaged and furnished with medicines for the benefit of the sick; as the swampy wilderness, and swampy waters, may sometimes create distempers.”<sup>78</sup> While such

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<sup>74</sup> Mactaggart, *The Scottish Gallovidian Encyclopedia*, xii.

<sup>75</sup> Howell, 70.

<sup>76</sup> Mactaggart, volume 2, 211 and 21. As a side note, the fact that Lower Canada was much more settled and established than Upper Canada likely explained its lower rates of malaria to settlers.

<sup>77</sup> Mactaggart, volume 2, 21 and 208.

<sup>78</sup> Mactaggart, volume 1, 160.

consideration and care for the labourers did not come to pass, Mactaggart's forethought and his identification of specific risks ("swampy wilderness" and "swampy waters") showed his awareness of the environmental conditions in which he was operating.<sup>79</sup> As in earlier examples, this awareness showed that his brush with illness was by no means accidental or negligent; Mactaggart not only took the risk of exposure deliberately, in order to further the imperial project in Upper Canada, but he had a detailed understanding of this risk. This understanding became more specific and place-based as he gained experience with illness and in the colony. For example, his description of Cranberry Marsh outlined how "in a hot season, a *blue mist* seems to stick to it morning and evening, but vanishes with the mid-day sun, when a *quivering atmosphere* appears" accompanied by a "very nauseous" smell.<sup>80</sup> This description allowed Mactaggart to show his own place-specific knowledge about malaria, and also act as a guide for other Europeans who may need to navigate Upper Canada's disease environment.

While in the colonies, Mactaggart also tried to generate new knowledge about malaria, including hypotheses about disease causation, cures, and treatments other than quinine. He hypothesized that the lack of fresh air and saltwater inland, and particularly in the woods, "operates against health." He came to this conclusion by contrasting Canadian and British geography and linking salt to a more rapid decomposition of animal and vegetable waste (and, by extension, the release of more potent miasmas). His own sensorial experience and sensibility to the climate seemed to confirm the importance of salt to fresh and healthy air, in keeping with miasma theory's sensorial appeal. He shared, for example, "how happily we quaff the sea-breeze

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<sup>79</sup> It is also possible that Mactaggart, knowing the conditions of his own middle-class employment along the canal, originally assumed that the security net that was being offered to him as a civil servant would extend to all those employed in the works.

<sup>80</sup> Mactaggart, volume 2, 16.

after being immured for a time in the wilderness!”<sup>81</sup> Furthermore, in his description of Lake Oil, Mactaggart rejected the idea that it was “an antidote against the *lake fever*” as some apparently thought by classifying it as “a poisonous, *fresh* effluvia, which is exhaled from the lake in the hot, still, summer weather.” Empirical observation and knowledge of the land also led him to this conclusion, as he described that “when there is no wind, and a powerful sun, I have frequently found this vapour [to] annoy the organs of sense.”<sup>82</sup> Instead of Lake Oil as an antidote, Mactaggart recommended that those ill with malaria be treated with water from salt springs, noting their abundance in Canada.<sup>83</sup> He reached this conclusion by combining European and Indigenous knowledge:

The Indians tell me of valuable fountains with which they are acquainted in the wilds. It is generally conceived that a country liable to diseases has also some things in it for a remedy. These mineral wells may be, and I believe are found to answer well with the invalid long afflicted with the fever and ague. If this one which I found at the falls proves to have any healing virtues, these, and the lovely situation of the place, may induce multitudes to frequent it.<sup>84</sup>

While Mactaggart relied on Indigenous knowledge here, he also invoked long-time European ideas that an illness and its cure would providentially come from the same place—which is perhaps what led him to search for a ‘Canadian’ cure for ague in the first place.<sup>85</sup> This kind of hypothesis could only be generated by someone who had both a European education and lived experience in the Canadas. While Mactaggart never shared whether his quest for medicinal waters was a success (or failure), by suggesting that a place capable of healing malaria “may induce multitudes to frequent it” he also showed his entrepreneurial attitude towards Upper

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<sup>81</sup> Mactaggart, volume 1, 31.

<sup>82</sup> Mactaggart, volume 2, 208.

<sup>83</sup> Mactaggart, volume 2, 208.

<sup>84</sup> Mactaggart, volume 1, 179.

<sup>85</sup> Boumedienne, 63.

Canada's landscape and roped the colony into an increasingly commercialized (and common) brand of nineteenth-century medical tourism.<sup>86</sup>

Once again, Mactaggart used other settlers as foils to underscore his own knowledge and awareness of disease. To be fair, Mactaggart did associate some of the ignorance with which he characterised new settlers to the poor quality of information circulating in Britain. As he explained, settlers in Canada inviting others to emigrate “extol the *absence of taxes*, the salubrity [health] of the climate, the pleasures, amusements, pastimes, &c. They must not say a word about *the difficulty of clearing the woods*, the toils of the hatchet, the heavy lifts, rheumatic complaints, &c...”<sup>87</sup> However, Mactaggart ultimately held emigrants who arrived in Canada and threw themselves into settlement enterprises they were unequipped to handle responsible for their fates, writing that:

I have seen them hurrying into the woods with a very indifferent hatchet, a small pack on their back, followed by a way-worn female and her children, there to live for a time *on air*, (and if that rise out of he swamps, none of the best either;) —we have met them again crawling out,—and where is the heart that would not melt at the sight? —some of the children, most likely, dead, and the rest bit and blindfolded by mosquitoes [sic]!<sup>88</sup>

Mactaggart's play on words shows how little he thought other settlers understood the problem of disease in Canada. While settlers were right to expect that they would have to rough it in their first few months in the wilderness, or “live on air,” Mactaggart pointed out that they would be out of luck if the air itself was toxic—as the diseased air of swamps and other malarial parts of Upper Canada certainly was, in his view. His descriptions of settlers “hurrying into the woods” also connote haste and recklessness, which shifts blame back onto individual settlers for the ill-

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<sup>86</sup> See: Jennifer Wallis et al, “Unhealthy Economies: Illness and Infection in British Coastal Resorts” in *Anxious Times: Medicine and Modernity in Nineteenth-Century Britain* (Pittsburgh: University of Pittsburgh Press, 2019): 89-118.

<sup>87</sup> Mactaggart, volume 2, 256.

<sup>88</sup> Mactaggart, volume 2, 254. The note on mosquitoes here is unrelated to his note on sickness; Mactaggart depicted insects and their bites as a consistent annoyance in the Canadas without connecting them to malaria.

preparation that leads to failed settlement. The contrast between ignorant settlers and Mactaggart's own knowledge and observations, as well as his deliberate exposure compared to settlers' negligent forays into malarial environments, run throughout *Three Years in Canada*. Settlers, as Mactaggart described them, thus reinforced his own position as a man of science and helped Mactaggart maintain his expertise and competence even in an unknown and dangerous disease environment.

### **“We cut down the beautiful umbrellas that Nature has prepared”: Deforestation and anthropogenic climate change**

Mactaggart managed to reconcile his own illness with his self-representation as a competent and loyal expert on the Canadas. Another contradiction in Mactaggart's work, brought on by Canada's insalubrious climate, was his enthusiasm for settlement and industrialization in Upper Canada on the one hand, and his anxieties about environmental change on the other. These are easiest to see in a section of *Three Years* on deforestation titled “The Forest.” “Our wish seems to be to despise the good things which the country naturally affords in abundance, and to introduce into it, with much care and labour, those things which we and our forefathers were accustomed to,” he lamented to his reader.<sup>89</sup> The introduction of “those things which we and our forefathers were accustomed to” into the Canadas is rather straightforwardly what Alfred Crosby would call ecological imperialism, culminating in the creation of a Neo-Europe—a place that Europeans have made to look like their place of origin, or conform to their ideals.<sup>90</sup> However,

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<sup>89</sup> Mactaggart, volume 1, 94.

<sup>90</sup> Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge: Cambridge University Press, 2004).

Mactaggart's concern was not the changing landscape itself, though he did eventually consider the effects of European land use on Indigenous people—a point I will circle back to. Rather, Mactaggart worried about the changing landscape's effect on settlers' health.

Mactaggart was especially concerned with the health implications of deforestation given that trees “serve to allay the severity of the climate, [which] is surely one of the use for which they are intended; it neither being so hot amongst the trees in summer, nor yet so cold in winter, as it is in the cleared country.”<sup>91</sup> Because trees' foliage protected soil from sunshine, cold, rain, and thus helped to regulate both temperature and moisture, Mactaggart thought there was a chance that “the rivers and lakes will become affected differently, if once these immense territories are shorn of their trees.”<sup>92</sup> Since disease was so tightly linked to climate, there were consequences to this kind of radical ecological change: “The laws of Nature, when too much disturbed by the hand of man, are apt to retaliate to is injury; disease and sickness seem to follow those, or their descendants, who annihilate the stately forest.”<sup>93</sup> His verbiage foreshadows praise of the canal he offers later in the text, as “perfectly different from any other in the known world, since it is not ditched or cut out by the *hand of man*.”<sup>94</sup> These passages show that for Mactaggart, the best way to settle and improve Canada was to work *with* the natural world, not against it—quite possibly because he was unclear about whether or not that was a fight that settlers would win.

While this is a sentimental view of Nature that draws on old, established ideas about ecological balance, Mactaggart's emphasis on the risk to *descendants* of those who change the

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<sup>91</sup> Mactaggart, volume 1, 91.

<sup>92</sup> Mactaggart, volume 1, 92.

<sup>93</sup> Mactaggart, volume 1, 92.

<sup>94</sup> Mactaggart, volume 1, 162.

natural world is particularly salient given the sustained concern for settler futurity Mactaggart showed in his work. It also left Mactaggart with a problem. On the one hand, Canada needed to be settled and industrialized to secure Great Britain's presence in the area and enable agriculture, commerce, and all other things modern and modernizing. But on the other, this posed a risk to settlers. This tension was not unique: naturalists operating in the British empire had long held conflicting views on deforestation's effect on climate: while deforestation eroded topsoil, it also created new agricultural and economic prospects. Some observers noted that it mellowed harsh climates while others feared that deforestation would make British North America colder and inhospitable in the long run.<sup>95</sup> Mactaggart was well surrounded in his incertitude.

Mactaggart substantiated his concerns about deforestation and ill-health by looking across the border, as "the United States of America were more salubrious sixty years ago."<sup>96</sup> As a result of deforestation and other changes, Americans were in Mactaggart's view "not a healthy people; they are evidently much degenerated and degenerating; so are those in the cleared townships of Canada. What a difference between them and the athletic Indian of the wild!"<sup>97</sup> Putting a pin in the 'noble savage' trope at play here: degeneration, or the fear of racial degradation due to climate exposure, was a common cause of concern to Europeans in the nineteenth century. Even if Europeans survived acclimatization, concerns remained for the racial purity of Europeans who survived their new disease environments at the risk of their moral health and racial degeneration. While most of the literature on racial degeneration is about warmer, tropical climates these concerns were also applicable to cooler climates. Mactaggart, for example, considered that what had happened in the United States would happen in the colonies

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<sup>95</sup> Zilberstein, Kindle Location 3033 and Locations 3369-33524.

<sup>96</sup> Mactaggart, volume 1, 92.

<sup>97</sup> Ibid.

as well. In fact, it had already started happening to women in the Canadas, as “the climate robs them of their complexions...leaving behind the sallow, dun, and yellow.”<sup>98</sup> This degeneration, he feared, would only get worst. As he concluded: “the more Canada gets shorn of her forests, the more unsettled the weather becomes—the hatchet may diminish the degree of cold, but will not improve the climate.” He repeated the fact that “the United States, fifty years ago, were blessed with a more salubrious and settled atmosphere, than they are now,” which speaks to his concern about Upper Canada’s future.<sup>99</sup> Settlers in Canada, Mactaggart thought, were on track to corrupt Canada’s climate and healthfulness just as their neighbours had given the pace of deforestation.

That being said, for all his concerns about deforestation Mactaggart was an advocate of the quality and usefulness of Canadian trees for shipbuilding and other facets of the timber industry.<sup>100</sup> Thus, Mactaggart offered no practical solution to the problem of anthropogenic climate change. Likely, the alternative of slower, less destructive, and more careful settlement would have been distasteful both to Mactaggart and to his readers—especially given British North America’s importance in furnishing Britain’s timber, and the *longue durée* of colonial wood, wood scarcity, and the fear it inspired.<sup>101</sup> Suggesting a slower development would also have been incommensurable with Mactaggart’s self-fashioning as a dedicated servant of empire, even as he worried about deforestation’s long-term effects. To resolve this, Mactaggart shifted the onus of climate change adaptation onto settlers.

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<sup>98</sup> Mactaggart, volume 1, 39. The stakes were quite high on this front for Mactaggart, who reported that he had “endeavoured to fall in love once or twice . . . but the frost, or something or other, would not allow [Cupid’s] arrows to penetrate.” Tragically, though Scottish women in Canada remained good company, “they had no pretensions to beauty.”

<sup>99</sup> Mactaggart, volume 2, 12.

<sup>100</sup> Mactaggart, volume 2, 207.

<sup>101</sup> Harris, 309. For an Atlantic history of these concerns that touch on Great Britain, if not British North America, see: Keith Pluymers, *No Wood, No Kingdom: Political Ecology in the English Atlantic* (Philadelphia: University of Pennsylvania Press, 2021).

If Canada's improvement would modify its climate in potentially dangerous ways, Mactaggart determined that its settlers needed to be especially robust, as well as attentive to and knowledgeable of Canada's climate. I suggest this given his previous discussion on the degenerations of Americans: while Mactaggart is vague about what exactly shows that the Americans had "much degenerated" from their European roots, he complained about Americans for a variety of reasons elsewhere in *Three Years*.<sup>102</sup> One of his complaints, in a section about "Settlers and Squatters" is that: "There is generally a settled kind of sulkiness about the Americans . . . they appear to hold a constant warfare against the laws of nature, so that they will neither feed, clothe, nor house themselves according to the climate."<sup>103</sup> Mactaggart had a similar qualm with the recently-arrived Irish immigrants he met in Corktown, complaining that:

They will not provide in summer against the inclemencies of winter. Blankets and stockings they will not purchase; so the frost bites them in all quarters, dirt gets into the putrid sores, and surgical aid is not called in by them, until matters get into the last stage. In summer, again, the intolerable heat, and the disregard they pay to their health, by living as they do, and drinking *swamp waters* . . . bring on malignant fevers of all kinds.<sup>104</sup>

Mactaggart's sentence structure emphasizes that settlers who were unwilling to adapt to the climate would be unsuccessful, as he wrote that the Irish "*will not provide*," "*will not purchase*," and medical help "*is not called in by them*" (emphasis added). Because they did not understand and adapt to Canada's seasons and the impact it could have on human health, Mactaggart estimated that one tenth of Irish immigrants died within two years.<sup>105</sup> Whether or not this is true is besides the point: working with the climate, to Mactaggart, was key to successful settlement in the Canadas. Similarly, while anti-Irish stereotypes are at play in this paragraph, Mactaggart's

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<sup>102</sup> For example, Mactaggart remained concerned with the continued threat of invasion posed by Americans, with the War of 1812 in recent memory and acting as the Rideau Canal's *raison d'être*. See: Mactaggart, volume 1, 35.

<sup>103</sup> Mactaggart, volume 1, 195.

<sup>104</sup> Mactaggart, volume 2, 244-245.

<sup>105</sup> *Ibid*

specific exasperation here was about climatic adaptation. If settlers in North America could not adapt to and work with its climate, then how could settlement truly thrive?

Elsewhere in the text, Mactaggart noted that it was impossible to get the Irish labourers who founded and lived in Corktown “to dress decently,” which was becoming an increasingly important medical practice to regulate the body’s exposure to its environment.<sup>106</sup> The medicalization of clothes led to specific recommendations for Europeans in North America, such as wearing flannel undergarments to soften acclimation and avoid malaria.<sup>107</sup> Mactaggart made this point again when comparing Americans, in the passage above, to French Canadians who in his view successfully worked *with* and “pay great attention to” Canada’s climate. As a result, Mactaggart thought they “live in comparative happiness. Those who emigrate from Britain ought to follow their example.”<sup>108</sup> For Mactaggart, then, good settlers were settlers who could handle the climate and the changes that deforestation, settlement, and improvement caused. Because the onus of adapting to anthropogenic climate change in North America, and subsequent changes to its disease environment, was on settlers, Mactaggart did not need to conclusively resolve his questions and anxieties about climate change.

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<sup>106</sup> Mactaggart, volume 2, 244 and Jankovic, 96-97.

<sup>107</sup> Bolton, 28. In 1830, the Deputy Inspector of Hospitals in Canada recommended that soldiers be dressed in flannel, as many surgeons and quarter masters had advised. Letter from Deputy Inspector of Hospitals, Quebec, 23 June 1830. LAC. RG8, C Series. Volume 299. See Page 350 of Mikan record 105012: <https://www.bac-lac.gc.ca/eng/discover/mass-digitized-archives/british-military-naval-records-documents/Pages/item.aspx?PageID=1355400>.

<sup>108</sup> Mactaggart, volume 1, 195.

## **Conclusion: “Wretched is the lot of the poor savage”**

Throughout both volumes of *Three Years in Canada*, John Mactaggart portrayed himself as a loyal servant to the British Empire and a knowledgeable and innovative natural scientist. This deeply gendered self-representation enabled him to maintain his expertise on British North America even as he sickened from its climate, while mitigating malaria’s impact on his understanding of himself, his competence, and the place he inventoried and described at length. When this self-representation was tested by the challenge of addressing his anxieties about imperial activity’s effect on the colony’s climate and health, Mactaggart placed the blame for adapting to climate change and disease onto other settlers in North America.

Ultimately, these narrative strategies also helped Mactaggart reconcile his vulnerability in Canada with his identity as an agent of empire, which was a racialized issue in the nineteenth century. As Howell writes, "to figure one's own race as biologically as well as culturally superior is a common colonial strategy; however, climate also can indicate white constitutional weakness, a subtext to which Victorian readers were very well attuned."<sup>109</sup> Developing rhetorical strategies to work around this problem was key “both to establish belonging and also thereby to claim ownership and possession. A speaker’s belief that his or her body is suited to the land implies that he or she is capable of conquering it.”<sup>110</sup> With this in mind, I want to close this chapter by turning to Mactaggart’s scattered views on Indigenous peoples. While Canada’s climate threatened the superiority of settlers in North America Mactaggart made it clear that though

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<sup>109</sup> Howell, 5.

<sup>110</sup> Howell, 45.

Indigenous people seemed “never troubled” by malaria, they were not a challenge to settlers for dominance of the continent.<sup>111</sup>

Mactaggart invokes Indigenous people here and there throughout the text most often as sources of information on Canada, or as benchmarks for the excellence and adaptability of settlers.<sup>112</sup> For example, one of the testaments to By’s courage that he offered was that By “would run rapids that his Indians trembled to look at.”<sup>113</sup> In one bizarre tangent, Mactaggart suggested that if Great Britain secured the border with the United States with telegraph stations, “Indians would be delighted to manage them: they would do it for nothing almost in time of peace; and in war, of course, we find it our interest to watch them ourselves.”<sup>114</sup> While there is much to be said about the strangeness of this plan (including the likelihood of Indigenous People providing free labour to settlers, and the bundle of beliefs and presumptions embedded in this suggestion), one way of reading this is by contextualizing advances in telegraphy as modern technologies and indicators of progress—much like canals.

Misguidedly and presumptuously, Mactaggart wondered how Indigenous people could be incorporated into his vision of a modernizing and increasingly settled Upper Canada. He was unclear on whether assimilation was possible. “Whether or not [Indigenous People] will be obliged to lay their ‘hands to the plough’ after a few years, and become honest farmers, is difficult to answer,” he wrote. “They seem rather disposed to hold out and suffer extirpation, than betake themselves to planting and reaping, by artificial means, the fruits and roots of the

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<sup>111</sup> Mactaggart, volume 2, 18.

<sup>112</sup> For example, he relies specifically on Indigenous peoples’ knowledge of Canada’s fauna. Mactaggart, volume 1, 183.

<sup>113</sup> Mactaggart, volume 1, 55.

<sup>114</sup> Mactaggart, volume 1, 318

earths.”<sup>115</sup> His uncertainty about Indigenous People’s survival seemed to stem from his association of Indigenous people with Upper Canada’s ecology more generally. When he discussed deforestation’s effect on wildlife, for example, he asked: “Where are the herds of deer, and flocks of turkeys now? —they are retired with their friend the Indian to the remote territories.”<sup>116</sup> As he subsequently grappled with Europeans’ wish to remake North America, he evoked the now-familiar trope of the ‘noble savage’:

We are taking, and have taken, large domains from him for the purpose of extending our race and multiplying it over the face of the earth; in fact, we are labouring to extirpate a set of people as good as ourselves, even much superior, and thus evidently subverting the order of Nature. . . Wretched is the lot of the poor savage, according to you, both, here and hereafter: but many others besides me have met with him in this world, more happy and contented than you are, with all your refinements and exquisite comforts; and, as far as humble mortals can judge, as befitting subjects as any of us for entering the kingdom of Heaven.<sup>117</sup>

After this, Mactaggart changes the topic abruptly, beginning the next paragraph by simply “laying these speculations aside” and promptly redirecting his reader’s attention to the botanical composition of Canadian forests—including their suitability for different construction projects, Royal Navy shipbuilding ironically amongst them.<sup>118</sup> Mactaggart noted the problems that European settlement were causing for Indigenous people, namely along the lines of land that “we have taken, and are taking,” but offered no alternative practice or recommendations as he did for so many other topics. For Mactaggart, Indigenous people—much like the herds of deer and flocks of turkeys—would eventually vanish themselves.

If we think of the trope of the ‘Vanishing Indian’ as Jean O’Brien does—as a narrative strategy to legitimate the presence, longevity, and modernity of settlers in a given place—

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<sup>115</sup> Mactaggart, volume 2, 137.

<sup>116</sup> Mactaggart, volume 1, 93.

<sup>117</sup> Mactaggart, volume 1, 92-93.

<sup>118</sup> Mactaggart, volume 1, 95.

Mactaggart's understanding of Indigenous Peoples' disappearance matters in a broader story about disease.<sup>119</sup> For Mactaggart, the right kind of settlers—himself included—could survive in Canada if they worked hard and adapted to a new environment; Indigenous People would not survive these changes to their lands. In the next chapter, I turn from Mactaggart to discuss John By who did not write and hypothesize about the changes settlers were making to the land and their chances of survival, but who was explicitly tasked with making these changes a reality.

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<sup>119</sup> O'Brien, xv.

## Chapter 2

### **“With a View to Prevent Sickness”: John By and the Rideau Canal as Healing Infrastructure**

John By first sickened with malaria in April 1829 but wrote to his superior that “owing to the prompt assistance I received from Mr Tuthill, the ordnance surgeon at this station, I was enabled to resume my duty in a few days, and I went through the whole line of the Canal with Colonel Dunford within a fortnight of my attack.” While acknowledging his disease, By emphasized his quick return to work and the completeness of his recovery. He described a second bout of malaria that November very similarly: “although my life was despaired of in consequence of a severe attack of the lake fever . . . I was sufficiently recovered to go up again on the 9<sup>th</sup> of November, and, although exposed to very great hardships . . . I have not suffered, and trust my health is so re-established as to permit me to continue my arduous duties until this great work is completed.”<sup>1</sup> In these letters, By framed malaria as an obstacle to overcome in order to improve Upper Canada through public work. While John Mactaggart made similar claims, By did not have the luxury of waiting until he returned home to incorporate disease into an adventurous resume and travel log. As the commanding officer on the Rideau Canal, By was responsible both for responding to the location conditions he and his soldiers and staff faced, and for the success of the canal as an imperial project overall.

In this chapter, I argue that in response to the local disease environment By expanded his vision of how to build the canal so that it effected short and long-term change to heal Upper Canada’s sick landscape. While I mentioned previously that Europeans in the Americas mapped

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<sup>1</sup> Correspondence from John By to Gother Mann, Royal Engineer’s Office, Rideau Canal, 31 December 1829. LAC. WO44, Volume 18, Reel B-1294.

Hippocratic understandings of human health onto landscapes, unlike John Mactaggart By had the power to implement changes to the environment and effectively heal Upper Canada of its perceived ills. Again, this approach to disease was not unique to By: in England, efforts to target disease at its core, through sick environments, dated to the early modern era, during which swamp and marshland drainage had long aimed to reduce the amount of stagnant water and rotting vegetable matter from which miasmas could possibly arise.<sup>2</sup> By himself came from a place that was a product of such improvements: the middle-class family he was born into in 1799 lived and worked as watermen in Lambeth, a suburb of London built on a drained marsh. William James, who was responsible for the draining project, wrote about the “violent fever arising from exposure over Lambeth Marsh, and on the river [Thames]” which complicated his endeavour. While there is no definitive evidence, Mark Andrews (a biographer of By and an engineer himself) hypothesizes that By may have been exposed to malaria during his childhood.<sup>3</sup> Lambeth Marsh is one consequence of the specifically British concept of improvement that Paul Slack among other historians have described as taking shape in the seventeenth century. Improvement denoted and promoted “gradual, piecemeal, but cumulative betterment” of a far-range of individual, societal, and environmental circumstances, and abilities.<sup>4</sup> The drive for improvement both drew on and promoted urbanization, agricultural innovation, and colonization—the latter being especially relevant to this chapter. In addressing the problems of Upper Canada’s sick landscape, By was informed by considerable ideological baggage and precedent.

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<sup>2</sup> Mary J. Dobson, “Marshlands, Mosquitoes, and Malaria” in *Contours of Death and Disease in Early Modern England* (Cambridge: Cambridge University Press, 2009): 287-367.

<sup>3</sup> Andrews, 25.

<sup>4</sup> Slack, 1.

To make this argument, I look at the military correspondence that By left behind, copies of which are held by Library and Archives Canada. In these letters, reports, and financial estimates By attempted to explain to his superiors why the canal's construction costs climbed endlessly and what kinds of challenges he faced on the ground with mixed success. The challenges of working in a malarial environment feature prominently in this writing, and the first three sections of this chapter represent different strategies By used to reconcile orders from London or Montreal with the conditions he faced in Canada: avoiding sick times, avoiding sick places, and modifying Upper Canada's landscape to heal it of its miasmas. I then turn to a variety of writing by settlers in Upper Canada to show how By's attempts to make the canal a healing presence were accepted by the settlers who inherited the modified landscape. This further shaped how they promoted settlement to the colony both explicitly, and implicitly in their discussions of civilization, settlement, and agriculture.

The argument I have outlined does two things. First, it shows the way that By had to balance place-based priorities with imperial priorities. These did not exist in a strict binary; keeping soldiers and labourers alive in the swampy Cataraqui watershed (a local problem) was crucial to canal construction (an imperial priority). However, it was By's responsibility to facilitate these goals and explain their importance to his superiors, including those who had never set foot in Upper Canada. By regularly corresponded with other officers in Canada and the Inspector General of Fortifications General Mann (who, although based in London, had experience in the Canadas). However, his expense reports made their way back to the Colonial Office, Treasury Department, and House of Commons in London.

Secondly, since nineteenth-century disease management could take place through environmental change, infrastructure projects such as the Rideau Canal which modify the

environment intensely can be conceived of as preventative health care projects to create a healthier landscape for future settlers and other imperial agents. In both cases, my understanding of the canal through By's correspondence problematizes Canadian historians' common framing of the canal as a military defence structure that was never used as originally intended. Thinking of the canal through the lenses of health and disease mitigation show the extent to which the Rideau Canal's role was to secure settler futurity in Upper Canada. At the same time, this chapter helps to trouble the certainty and progressiveness with which settlement in North America has been retrospectively understood given the lengths to which By had to go in order to make canal construction possible.

### **First strategy: Avoiding sick places**

By was already familiar with the Canadas, and with malaria, when he was sent to oversee the Rideau Canal's construction in 1826. He had graduated from the Royal Military Academy in 1799 and was first sent to Lower Canada with the Royal Engineers in 1802. There, he worked on the defences of Quebec and the Cascade Canal that was part of the increasing canalization of the St. Lawrence at the turn of the century.<sup>5</sup> By was recalled to England during the Napoleonic Wars and spent most of them in Spain, notably participating in the 1811 sieges of Badajoz. Malaria was one of many medical complaints during the war, including at Badajoz. Towards the end of the siege, By was pulled from the front due to an unspecified health problem.<sup>6</sup> More generally, military regulations across the British Empire increasingly focused on improving hospital design

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<sup>5</sup> Robert F. Legget, "BY, JOHN" in *Dictionary of Canadian Biography*, vol 7, University of Toronto/Université Laval, 2003. [http://www.biographi.ca/en/bio/by\\_john\\_7E.html](http://www.biographi.ca/en/bio/by_john_7E.html).

<sup>6</sup> John Lynch, "The Lessons of Walcheren Fever, 1809," *Military Medicine* 174, 3 (March 2009): 315-319; Andrews, 67.

and ventilation to deal with disease during the Napoleonic Era.<sup>7</sup> While much can and has been said about malaria's effect on military activity and the role of empire in creating knowledge on malaria, my point here is simply to outline that when By returned to the Canadas in 1826, he was bringing to the canal experience acquired throughout the British Empire and reinforced relatively recently.<sup>8</sup>

One of the British military's oldest strategies for managing malarial encounters in colonial contexts was simply avoiding the places where disease emanated from. There were general rules of thumb about which places were healthy and which were not: higher altitudes were typically considered healthier, and marshes were notoriously sickly. Settlers in Upper Canada had long been warned to stay away from swamps and marshes if they could, though many could not take on the high initial costs of clearing and draining elevated land on rich soil.<sup>9</sup> However, acquiring specific place-based knowledge was the surest way to pinpoint healthy and unhealthy locations. By understood the importance of this local environmental knowledge in the colonies, as shown by his desire to hire "respectable persons, well acquired with the Country" to build the canal. However, disease remained relatively uncharted for settlers.<sup>10</sup> To this end, the knowledge that By and his team gathered about Upper Canada's landscape and healthfulness was in itself an important tool for future settlement.

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<sup>7</sup> Erin Spinney, "'To be kept open so as at Night gentle to move the Flame of a Candle:' Ventilation and the Role of Nurses in Creating a Built Healing Environment" in "Naval nursing in the British Empire 1763-1830." PhD Diss. (University of Saskatchewan: 2018): 79-117.

<sup>8</sup> See, for example: John R McNeil, *Mosquito Empire: Ecology and War in the Greater Caribbean, 1620-1914* (Cambridge: Cambridge University Press, 2010) for an especially in-depth environmental history of yellow fever and malaria's impact on European imperialism in North America; and Douglas M. Haynes, *Imperial Medicine: Patrick Manson and the Conquest of Tropical Disease* (Philadelphia: University of Pennsylvania Press, 2001) for a history of British imperialism's role in the emergence of tropical medicine as a field.

<sup>9</sup> Cole Harris, "Upper Canada" in *The Reluctant Land: Society Space, and Environment in Canada Before Confederation* (Vancouver, University of British Columbia Press, 2008), 324.

<sup>10</sup> By, "Extra Work Jones Falls."

As time went on and he grew more familiar with the disease, By came to associate the Southern parts of the canal with disease, notably in the Cataraqui and Gananoque River Watersheds. Uncoincidentally, Southern Ontario was—at least prior to 1800—a landscape characterized by wetlands, with 50-85% of the region covered in wetlands prior to 1800.<sup>11</sup> Three out of the six *Anopheles* mosquito species currently in Canada breed in marshes and range in Southern Ontario.<sup>12</sup> Thus, our current knowledge of mosquitoes in Canada—limited as it is—helps to explain why the Cataraqui watershed encompasses most of the construction sites where malaria proved especially problematic, including the Isthmus.

I take the time to describe the Isthmus at length because it was the most consistently difficult site along the canal's route.<sup>13</sup> Resultingly, the most substantial change By made to the canal's route was designed to avoid working there more than strictly necessary.<sup>14</sup> While By could not avoid the Isthmus altogether, he did minimize the amount of time spent there. The worksite was abandoned by its first contractor, William Hartwell, in October 1828 and taken up by its next contractor John Stevenston. When confusion over what work had been completed by each of the two men led to errors in payment, Hartwell wrote directly to James Kempt, the Governor in Chief of British North America, to defend his work. He blamed his abandoned contract on how “the last summer was so unfavourable and sickly that it was impossible for [my] men to continue

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<sup>11</sup> Ducks Unlimited Canada, *Southern Ontario Wetland Conversion Analysis* (Barrie: Ducks Unlimited Canada, 2010), 7.

<sup>12</sup> Canada. Department of Agriculture. “The Mosquitoes of Canada (Diptera: Culicidae).” *The Insects and Arachnids of Canada Part VI*. D.M. Wood, P.T. Dang, R.A Ellis et al. Hull: Minister of Supply and Services. 1979. While almost 50 years old, Wood et al's survey was the last (and most comprehensive) survey of mosquitoes in Canada, prompted by an outbreak of St. Louis encephalitis virus.

<sup>13</sup> While ‘isthmus’ refers to any point of land connecting two bodies of water, in this context the Isthmus was a specific construction site where workers excavated the mile-and-a-half stretch of land that had formerly needed to be portaged to cross from Rideau Lake into Mud Lake, and then another short portage into Indian Lake. Legget, *Kindle Location 647*.

<sup>14</sup> ‘Isthmus’ is a general geographic term for a narrow piece of land separating two bodies of water, the Isthmus was a construction site where workers cut through 1.5 kilometers of land to connect Mud Lake (now Newboro Lake) and Rideau Lake.

their labours on this part of the work.” Hartwell insisted that because he had been misled on the nature of the rock that was to be excavated and the Isthmus’ overall healthfulness, he had both sacrificed his own property and his health.<sup>15</sup> When Hartwell’s successor gave up his contract in 1829, he cited sickness as well.<sup>16</sup> Without a contractor, the Isthmus became the only site along the canal’s route supervised directly by the British military. The 7<sup>th</sup> Company of Royal Sappers and Miners was stationed there for most of its time in Upper Canada, and By was heavily involved in the site’s operations.

Because of increased military presence, the Isthmus became one of the most well-documented sites, and one where we can see labourers avoiding disease too. Drawing on this documentation, Katherine McKenna produced a report for Parks Canada and a book chapter describing life at the Isthmus, emphasizing throughout just how pervasive disease was. Aside from Bytown, it was also the only worksite with a hospital (albeit an under-furnished one, according to the military’s 1830 Inspection of Hospitals).<sup>17</sup> Still, the site remained difficult and unpleasant. Construction sites flooded as workers chipped away at the isthmus connecting Mud and Upper Rideau lakes, which in turn made excavation harder and required pumping necessary around the clock.<sup>18</sup> Because workers were spending more and more time working in water, they

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<sup>15</sup> Katherine M.J. McKenna, *Working Life at the Isthmus, Rideau Canal, During Its Construction, 1827-31: The Human Cost of a Public Work* (Microfiche Report Series No. 34, Parks Canada, Ottawa, 1981), 8.

<sup>16</sup> McKenna, *Working Life at the Isthmus*, 11.

<sup>17</sup> The inspector general of hospitals, allowing for the impermanence of the hospital of the Isthmus, found it understocked and in need of several repairs, though he was sensitive that “local circumstances there rendered it exceedingly difficult to procure any supplies.” He recommended that especially ill patients be transported to Bytown, where a more permanent and functional hospital stood, and made sure to note that he found “nothing was wanting on the part of the medical officers.” Skey to Cower, Quebec, October 7, 1830. LAC. RG8, C Series. Volume 299. See Page 405 of Mikan Record 105012: <https://www.bac-lac.gc.ca/eng/discover/mass-digitized-archives/british-military-naval-records-documents/Pages/item.aspx?PageID=1355400>.

<sup>18</sup> John By, “Extra Work Isthmus” in “Estimates and items of the works,” April 26, 1830. LAC. WO44, Volume 18;

were likely in closer contact with malaria-bearing mosquitoes which perpetuated the Isthmus's main problem: disease.

Importantly, the 7<sup>th</sup> Company's deployment highlights the part that By played in determining who was able to avoid disease and who was not. Back in 1827, when Mann informed him that two companies of Royal Sappers and Miners would be sent to assist with construction, By invoked health while explaining where the companies would be stationed. He wrote: "I consider the first 20 meters of the Rideau Canal from the Ottawa to be the most difficult part in all the Canadas from which men can desert; and as it is the most healthy I propose employing the Sappers and Miners . . . as near the Ottawa [River] as possible."<sup>19</sup> Unlike the 7<sup>th</sup> Company, the 15<sup>th</sup> Company remained in the healthful safety of Bytown during its entire stay in Canada.<sup>20</sup> By's decision to preserve the health of soldiers by carefully choosing their postings shows the extent to which By's decisions shaped the extent to which workers, contractors, and soldiers were exposed to disease—and whose lives and wellbeing By valued most. This point also underscores the fact that avoidance was not a strategy available to everyone along the canal corridor. While By's correspondence does not mention how soldiers of the 7<sup>th</sup> Company reacted to their deployment to Isthmus, of the 35 deserting sappers and miners recorded in the corps' history, most fled the Isthmus.<sup>21</sup> McKenna counts 16 deserters between July 1827 and October 1828 alone.<sup>22</sup> While most deserters were never caught and their reasons for deserting never recorded,

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<sup>19</sup> Correspondence from By to Mann, 7 July 1827. WO44, Volume 18. Anecdotally, the site now called Parliament Hill used to be named Barrack Hill, in reference to where these companies set their barracks.

<sup>20</sup> Legget, *Kindle Location* 743.

<sup>21</sup> T. W. J. Connolly, *History of the Royal Sappers and Miners, Volume 1 (of 2) From the Formation of the Corps in March 1712 to the date when its designation was changed to that of Royal Engineers* (London: Longman, Brown, Green, Longmans, and Roberts, 1857), 287.

<sup>22</sup> McKenna, *Working Life at the Isthmus*, 22. As she explains, the soldiers at the Isthmus were paid a fixed cost and were, unlike labourers who abandoned construction sites where work was dangerous, unpleasant or healthy, essentially stuck at the site. In a way, they had less agency in this regard than the labourers I will turn to shortly.

that soldiers deserted the Isthmus specifically signals that may have been a way for soldiers to avoid disease on their own terms when their orders put them in harm's way.

Labourers had more freedom of movement than soldiers, and labour retention was a massive problem at the Isthmus. By noted that “to induce Labourers who were dispirited from the place having been so extremely healthy in the year 1828 to return, I had accommodations built for them, and provisions of every description provided for their comfort, the circumstances of the case imperatively calling for a deviation from the general mode of carrying on the Works.”<sup>23</sup> McKenna found that workers at the Isthmus were paid an additional shilling a day compared to other sites as incentive, and that by 1832 “men working in water” (manning the pumps at the excavation site) were also given extra provisions of rum and clothing.<sup>24</sup> Sickness at the Isthmus, and the fact that workers interfaced directly with the British military instead of with contractors whose responsibilities and expenses were capped by the contracts they signed, gave canal labourers an opening to negotiate better living conditions and wages for themselves and their families. The same was true at Brewer's Mill, where By wrote that it had “been proved that men could not work in situations above described with impunity but that the consequences would, inevitably be severe sickening, if not death itself.” As a consequence of “the unhealthy nature of the locality, and offensive description of the Mud to be removed Labourers could not have been procured, unless a very high rate of wages had been offered as an inducement.”<sup>25</sup> By also recorded cost increases at Kingston Mills given “the high rate of wages demanded by

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<sup>23</sup> John By, “Extra Work Isthmus” in “Estimate and items of the works,” April 26, 1830. LAC. WO44, Volume 18. I cannot be sure of the extra costs occasioned by these accommodations and provisions since they are lumped together with the building of an engineer office, barracks and a hospital for the soldiers, and stores at £977-5-11.

<sup>24</sup> McKenna, *Working Life at the Isthmus*, 21. Worth noting is that in a remote site such as the Isthmus, extra provisions were likely as welcomed as payment in cash or cheque.

<sup>25</sup> John By, “Extra Work Brewer Lower Mills” in “Estimates and items of the works,” April 26, 1830. LAC. WO44, Volume 18.

Artificers and labourers in consequence of the great Sickness which prevails in the vicinity.”<sup>26</sup> Because labourers could and did use avoidance as a strategy to manage disease’s presence, By had to offer material incentives to secure workers in sickly places.

While the cost of labour was an additional incentive to avoid sickly sites along the canal’s route, at Maitland Rapids: “the effluvia arising from the soil was so offensive, and of such a malignant nature as to occasion great sickness, so much so that the Labourers refused to continue the necessary clearing and grubbing which had been partly executed.”<sup>27</sup> Securing willing labour was only one of the problems at Maitland Rapids, where the military had planned to permanently flood a pre-existing flood channel to cut across a bend in the Rideau River. These original plans fell apart because of sickness, errors in previous surveys about the nature of the ground to be excavated (By had expected soft mud but found “very large boulders”), and the presence of a previously unnoticed swamp that effectively rendered dam construction useless and likely accounted for the illness among labourers.<sup>28</sup> By decided that his best option was to avoid the site altogether and shift the route; he made several technical adjustments to the locks and dams at the site in order to flood a set of rapids before “abandoning the snie” where labourers had first worked to make a different cut across the riverbend. While there were multiple factors at play behind these changes in plan, By opened the report in which he explained the changes by vividly describing the site’s effluvia and citing labourers’ refusal to work. “I considered myself authorized in deviating from the original plan,” By explained, “the more particularly as it did not

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<sup>26</sup> John By, “Extra Work Kingston Mills” in “Estimates and items of the works,” April 26, 1830. LAC. WO44, Volume 18.

<sup>27</sup> John By, “Extra Work Maitland Rapids” in “Estimate and items of the works,” April 26, 1830. LAC. WO44, Volume 18.

<sup>28</sup> Ken Watson, “Kilmarnock Lock 24.” *Rideau Info*. <http://www.rideau-info.com/canal/history/locks/h24-kilmarnock.html>

appear that the alteration would be attended with an increase on the Estimate.”<sup>29</sup> By accounted for but did not dwell on the lost capital and time that had already been sunk into the original plan for Maitland Rapids in his report. When he moved away from the swamp and bedrock alike, workers followed seemingly with no further labour complications.<sup>30</sup>

While By could not avoid the Isthmus altogether, he did find ways to minimize the amount of work to be done at the site—and by consequence his costs and the degree of exposure to disease. In an 1830 letter to General Mann, By justified the addition of an additional lock between Mud and Rideau Lakes as well as raising the dams and locks at Kingston Mills and Davis’s Mill, because doing so allowed By to raise the Upper Rideau Lake four feet over its usual surface level. Doing this helped to “do away with the necessity” of excavating about a mile and a half-long section of the Isthmus. “This is a great point gained,” By explained, “for such are the dreadful effects of the Lake Fever, that it is impossible to calculate the expense that would otherwise have been incurred in removing this four feet; and I trust that these altercations will be the means of great saving, both in life and money.”<sup>31</sup> Sticking to the original plan, he wrote, “would have been attended with a heavier expense” given “the unhealthy nature of the Country.”<sup>32</sup> That By preferred avoidance, an expensive but established disease mitigation strategy, as opposed to wagering on an “impossible to calculate” costs shows two things: his awareness that the canal’s finances needed to be as transparent and economical as possible, and his preference for avoiding disease altogether. That By promoted his plan as one that would lead to “great savings in both life and money” also shows By’s awareness that his superiors would not

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<sup>29</sup> Watson, “Kilmarnock Lock 24.”

<sup>30</sup> Watson, “Kilmarnock Station 24.”

<sup>31</sup> Letter from By to Mann, Rideau Canal, 15 March 1830. LAC. WO44, Volume 18.

<sup>32</sup> Letter from By to Mann, Rideau Canal, 15 March 1830. LAC. WO44, Volume 18.

be swayed by disease mitigation on its own. He had to continuously balance local interests, such as the wellbeing of those in the Canadas, with the Treasury's agenda.

Furthermore, By emphasized that the work as originally planned at the Isthmus was both technically possible and potentially desirable—but only “should it be found advisable at any future period, on the Country becoming more healthy.”<sup>33</sup> It was not that By could not execute the work; he was choosing not to expose soldiers and labourers (including himself) to the Isthmus. That By envisioned “the Country becoming more healthy” in the future is also a key point. Here, By thought of Canada as a suitable candidate for the kind of improvements that infrastructure and settlement could make to the health of a place. Resultingly, he must have imagined himself and the Rideau Canal as steps in the region's progress and improvement.

### **Second strategy: Avoiding sick times**

Because of malaria's etiology, avoiding disease could take place on two levels: spatial and temporal. The latter is explained by the ways that seasonal fluctuations and environmental changes impact the life cycles and population density of *Plasmodium* parasites, the mosquitoes responsible for vectoring the disease, and the behaviour of human hosts. Malariologists today include seasonality in their research to establish disease patterns, manage the allocation of health resources, and target antimalaria interventions at the environmental level (including insecticide spraying, more commonly called Indoor Residual Spraying or IRS) or in health care practices (such as chemoprevention drug regimes amongst vulnerable populations).<sup>34</sup> At a basic level: if

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<sup>33</sup> John By, “Extra Work - Isthmus” in “Estimate and items of the work,” 26 April 1830, WO44, Volume 18.

<sup>34</sup> For an example of this kind of research, see Michele Nguyen, Rosalind E Howes, Tim CD Lucas et al, “Mapping Malaria Seasonality in Madagascar Using Health Facility data.” *BMC Medicine* 18, 1 (2020), and Ellis F. McKenzie,

mosquitoes like *Anopheles freeborni* emerge from hibernation in early spring and begin to seek blood meals as the breeding season begins, hosts and vectors alike are more likely to come into contact with the *Plasmodium* parasite that will either cause malaria or infect the source of their next blood meal.<sup>35</sup>

Even without knowing this twenty-first century background on disease transmission, By learned that environmental illness had its own seasonality in Upper Canada as it did elsewhere. After malaria's first appearance in 1828—the first full summer during which canal construction took place—it quickly became clear that malaria would slow canal construction to a crawl. By wrote to the Earl of Dalhousie in October 1827 that he had finished his first construction season “with greater satisfaction than I could anticipate, as I had not flattered myself.”<sup>36</sup> When the 1828 construction season came to a close, By remained optimistic but acknowledged that “unexpected events” had made him less productive, notably “the sickness among my men and officers, which created a sad stagnation in the works.”<sup>37</sup> That By described malaria's effect on canal construction as a “stagnation” is in itself interesting, given the word's connotation with a problem that slowly worsened over time. Canada's sick season interfered with the timeline of European engineers, and settlers learned to overlap the sick season with Upper Canada's other seasons. By not only associated the coming of disease with changes in the seasons but understood changes in temperature to cause disease. As he explained in an 1830 letter, in Brewer's Upper Mill miasma

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Gerry F Killeen, Jon C Beier, and William H Bossert, “Seasonality, Parasite Diversity, and Local Extinctions in *Plasmodium falciparum* Malaria.” *Ecology* 82, 10 (2001): 2637-81.

<sup>35</sup> Wood, 80.

<sup>36</sup> John By to the Earl of Dalhousie, October 26 1827. LAC, RG8, C Series, Microform C-2618. See Page 449 of Mikan Record 105012: <https://www.bac-lac.gc.ca/eng/discover/mass-digitized-archives/british-military-naval-records-documents/Pages/item.aspx?PageID=1355400>

<sup>37</sup> John By, “Report upon Matters relating to the Rideau Canal,” November 20, 1828. LAC. WO44, Volume 18. The second event By referred to here were the orders he received to cease construction while the Bryce Committee investigated the canal's finances and the proposed enlarged locks.

“arise from the lands on each side of the [Creek] being periodically flooded and remaining so until rendered dry by the heat of the Summer.”<sup>38</sup> Canada’s seasons, which had long shocked Europeans by their intensity, were part of what generated disease.

Another important aspect of Upper Canada’s sick season was understanding its relationship to Canada’s four other seasons as By learned through the collapse of the Hog’s Back Dam on the Rideau River. The first dam’s failure on April 3, 1829, marked the single largest infrastructural failure during the canal’s construction. As By explained, he had mobilized both companies of Royal Sappers and Miners at his disposal to finish the dam ahead of the seasonal flooding promised by springtime thawing. Despite making “every exertion to complete the dam before the spring flooding commenced,” engineers lost control of a leak that had sprung in the last week of Marc and almost a third of the dam collapsed, causing somewhere between £3-4,000 in damages but no casualties.<sup>39</sup> This was not an altogether unexpected complication: from his time in Montreal By knew of precedents in which seasonal changes impacted colonial infrastructure.<sup>40</sup> Writing to Mann the day after the dam’s failure, By was optimistic that he could rebuild the dam—he just wasn’t sure *when* he could do it. To avoid seasonal flooding and

“prevent a recurrence of a similar event to that which has just taken place, it appears evident that the whole of this work must be carried to its required height in one summer; but as the prevailing sickness renders all operations uncertain, before I commence reconstructing the dam, I propose again exploring the wilderness to the right and left, and

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<sup>38</sup> By, “Extra Works Brewer’s Upper Mill.”

<sup>39</sup> Letter from By to Mann, April 4, 1829. LAC, WO44, Volume 18. This letter also provides daunting imagery of By, standing with his men on the dam, feeling “a motion like an earthquake” under his feet and ordering his men to run, “the stones falling from under my feet as I moved off.” In a letter from By included in Cowper’s April 23, 1829 “Report on the Failure of the Dam at Hog’s Back on the Rideau Canal,” By reports (almost cartoonishly) telling his barrack-master, seconds before the dam fell, “You see what perseverance will do, the dam is saved!”

<sup>40</sup> In the following letter he gave the example of a bridge that was swept away by a springtime flood in 1806: Correspondence from John By to Gother Mann, 6 July, 1827. LAC. RG8, C Series. Microform c-2618. See Page 348 of Mikan Record 105012: <https://www.bac-lac.gc.ca/eng/discover/mass-digitized-archives/british-military-naval-records-documents/Pages/item.aspx?PageID=1355400>

taking fresh sections, with the hope of finding some way by which this bold undertaking may be avoided...”<sup>41</sup>

The pinpointed window in which the dam could be built, from July to November, overlapped so dangerously with the sick season that By considered abandoning the dam altogether. Because sickness structured the working patterns on the Rideau seasonally, it complicated any other seasonal and environmental constraints—effectively compounding the already demanding environment in which the military floundered. Ultimately, as By suspected “from the many examinations I have already given this country,”<sup>42</sup> nothing came of searching for an alternate route and the Hog’s Back dam was rebuilt in the same place—where it still stands, thanks to the reinforcements provided by the addition of a second timber crib and the enlargement of the original waste weir.<sup>43</sup> Nonetheless, the Hog’s Back’s failure shows the extent to which By’s understanding of Upper Canada as a place was shaped by sickness, and the tentacular ways in which malaria compounded the difficulties of canalization. Not only was epidemic disease physically and medically dangerous, but its repercussions created further problems for By to manage.

Lessons learned at the Hog’s Back were applied elsewhere along the canal route. At First Rapids By adapted the canal’s original plan to “allow [the] whole breadth of the River to serve as a Waste Weir, to lessen the rush of the Spring Floods” and in Jones’ Falls, and he made sure to highlight that expensive deviations in the plans at Jones’ Falls would also “affor[d] a passage for the Spring Floods.”<sup>44</sup> Another important note is that the Hog’s Back Dam was rebuilt by the Royal Engineers themselves—not local contractors and labourers.<sup>45</sup> This was a sign of the

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<sup>41</sup> Letter from By to Mann, April 4, 1829. LAC, WO44, Volume 18.

<sup>42</sup> Letter from By to Mann, April 4, 1829. LAC, WO44, Volume 18.

<sup>43</sup> Andrews, 128.

<sup>44</sup> By, “Extra Work First Rapids” and “Extra Work Jones Falls.”

<sup>45</sup> Legget, Kindle Location 744.

difficulty By associated with this particular construction project which also showed that By considered the military to have the most expertise in handling Upper Canada's climate.

In time, By came to avoid the sick season altogether by working through the winter at particularly sickly sites. He explained his decision to work at the Isthmus during the coldest and harshest season of the year, acknowledging that "owing to the intense frost [this adds] considerably to the expense, yet such is the dreadfully offensive smell arising from the decayed vegetable matter in these excavations that I am apprehensive of the breaking out of the fever afresh."<sup>46</sup> Here, By preferred the established cost of winter labour to the volatility of the sick season. Because of malaria's seasonality, Upper Canada's ecology was both a spatial problem and a temporal puzzle for By to solve. However, avoiding disease was not always possible, nor was it a long-term solution to the problem that a sick colony posed to Upper Canada's development.

### **Third strategy: Changing the land**

The site-specific nature of By's correspondence on the canal, and his estimates of construction cost, make it possible to pinpoint two things: the places By understood as healthy or unhealthy (such as Dow's Swamp), and the places where By spent additional resources to remedy unhealthy landscapes (such as the Isthmus). Especially useful here is Document K: an appendix By wrote in April 1830 to break down the extra costs of the canal's construction by worksite. Considering the scrutiny his expenditures were under, By took careful notes and included the

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<sup>46</sup> Letter from By to Mann, Rideau Canal, 15 March 1830. LAC. WO44, Volume 18.

justification for increased costs in his estimates. This helps to differentiate between the work necessary for canalization and the work By ordered explicitly for health-related reasons.<sup>47</sup> In Document K, By documented changes from the original construction plans made explicitly in response to illness in 11 of the 21 sections into which he broke down the canal's route.

The most frequent intervention he described concerned ventilation. By often “had a greater space cleared on either side of the works than actually required for Canal purposes, to obtain [sic] a free circulation of air.”<sup>48</sup> In doing so, By was replicating well-established military and medical practices learned at home and applied around the British Empire: increasing air circulation to allow miasmas to pass without infiltrating human bodies.<sup>49</sup> Even in the metropole, British subjects were becoming increasingly attuned to the necessity of maintaining air circulation to promote healthiness—a process which Vladimir Jankovic associates with colonial experiments with new climates around the world.<sup>50</sup> In addition to being tried and tested, disease management at this scale was attractive for two other reasons: the change it effected was long-term, and it allowed By to address the risks to the health of hundreds of labourers and soldiers instead of caring for individual bodies.

From a patchwork of correspondence, William Wylie estimated that the air circulation corridors on both sides of the canal could have been as long as 250 feet.<sup>51</sup> The cost of land clearance depended on the site and the nature of the rock or soil being excavated: at the Isthmus,

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<sup>47</sup> There is an argument to be made here that this is something of a false binary since improvement, settlement, and civilization overall were understood to improve a place's healthfulness and salubrity. I am making this differentiation for two reasons: By himself does so, and it illustrates the degree to which malaria added to the financial burden of canal construction.

<sup>48</sup> John By, “Extra Work Brewer's Upper Mill Section 19” in “Estimate and items of the work,” 26 April 1830, WO44, Volume 18.

<sup>49</sup> Del Roy, 141.

<sup>50</sup> Jankovic, 126.

<sup>51</sup> Wylie, *Labourers on the Rideau Canal 1826-1832: From Work Site to World Heritage Site*, 35.

the cost of rock excavation went up to 8 pounds and 6 shillings per cubic yard in 1830, and By reported that the clearances related to air circulation at the site amounted to around £182.<sup>52</sup> This was significant, since the site was £157 over the estimate he had previously submitted.

While presenting these costs to his superiors, By framed land clearance and disease prevention as necessary prerequisites to canal construction. By explained that he had ordered additional land clearances at Kingston Mills, for example, “with the hopes of mitigating the sickness which prevails periodically in the Kingston Sections of the Canal, and without which expense having been incurred, the works could not have been executed.”<sup>53</sup> By was clear that even if disease management was not included in his orders, it was an essential step in ensuring the canal’s construction. By used the language of disease prevention and mitigation again to describe additional clearances at Brewer’s Lower Mill, Brewer’s Upper Mill, Chaffey’s Mills, Clowes Quarry, the Isthmus, and Old Sly. The formulation By used to describe the other sites was almost always the same: “to prevent sickness” or “to mitigate sickness” appear in the entries of those sickly sites. By also wrote that it was “found necessary to enlarge a clearance for circulation of air” at First Rapids without mentioning sickness outright, and at Clowes Quarry By mentioned additional clearances twice: once about the site in general, and also specifically on “some low flat land at the Head of the Lock.” Air circulation and disease prevention were cited in both instances, but By was likely referring to the lockhouse when he more specifically referenced the head of the lock. Since the canal’s locks were to be operated by dedicated lockmasters who lived on site, this would have signaled the long-term health and safety of the lockmaster. In all these cases, just as the canal was modifying Upper Canada’s waterways, By

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<sup>52</sup> John By, “Extra Work Isthmus.” A rough currency conversion places that cost at around \$35,100 CAD in 2022.

<sup>53</sup> John By, “Extra Work Kingston Mills” in “Estimate and items of the work,” 26 April 1830, WO44, Volume 18.

found it necessary “to promote,” “to obtain,” or “to give” the builders of the canal more air. Managing Upper Canada’s diseases and securing the colony both required By to manipulate the colony’s environment.

By was also aware that vulnerability to disease could change over time. In Document K, By factored acquired immunity to malaria into his description of some miasma, such as those at Kingston Mills “of so malignant a description, that only those seasoned by long residence can possibly escape its effects, and which has been but too clearly demonstrated from the number of Labourers, who have fallen victim to disease.”<sup>54</sup> Today, malariologists know that while it is impossible to develop sterilizing (total) immunity to malaria, repeated infection over the course of several years can build up an immune response to the disease—though it is slow to acquire, easy to lose, and only targets certain parasites at certain life stages.<sup>55</sup> Crucially, this means that even someone who may have acquired immunity to a certain kind of malaria in childhood—like By—could have little to no immunity when exposed to a new malarial parasite. These understandings of differential immunity were racialized; immunity to malaria and yellow fever increased the demand and value of African slaves on the North American continent in the early days of the plantation economy.<sup>56</sup> For Europeans, a lack of immunity also raised serious concerns and anxieties about the fitness of white bodies.<sup>57</sup> Immunity could, however, be acquired through acclimation or seasoning: the slow, painful process in which an animal, plant or person removed from its home environment became used to its new environment and climate. For settlers in North America seasoning was a necessary and crucial rite of passage from the ‘Old

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<sup>54</sup> John By, “Extra Work Kingston Mills” in “Estimate and items of the work,” 26 April 1830, WO44, Volume 18.

<sup>55</sup> Carolina López, Yoelis Yepes-Pérez, Natalia Hincapié-Escobar, et al. “What Is Known about the Immune Response Induced by Plasmodium vivax Malaria Vaccine Candidates?” *Frontiers in Immunology* 8 (2017), URL=<https://www.frontiersin.org/article/10.3389/fimmu.2017.00126>.

<sup>56</sup> McNeil, 46.

<sup>57</sup> See, for example: Bolton Valenčius, “Racial Anxiety,” 277-298, and Howell, “Introduction” 1-25.

World’ to the ‘New.’<sup>58</sup> Analytically, understanding the logic of seasoning helps us understand how modifying the environment to create better workplaces and homes for Europeans and their descendants also did the work of Europeanizing Indigenous landscapes and preparing them for settlement.

One way to read By’s description of the labourers “fallen victim to disease” is as bodies yet-to-be-seasoned, who were going through the process of becoming *of* Canada. When By acted “with the hopes of mitigating the sickness” of Canada, he was effectively attempting to mitigate the growing pains of seasoning and make Canada a safer place for labourers and settlers. The canal was thus playing a role in creating a landscape that settlers could safely inhabit—which they happily did. Of the 160 Sappers and Miners that came to Upper Canada, only 31 returned to England. 71 remained in Upper Canada after being discharged: 34 in Bytown, and 37 at the Isthmus.<sup>59</sup> By had promised them to disincentivize desertion; the fact that a majority of the soldiers stayed and claimed the land they were promised shows their faith in the seasoning process or their satisfaction with the newfound health of Upper Canada. Furthermore, some towns such as Newboro (the ‘new borough’ created by the labourers at the Isthmus) and Bytown emerged as a direct by-product of canal construction, and other pre-existing settlements and townships grew exponentially in the post-canal era.

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<sup>58</sup> Conoverly Bolton Valencius, “New Country” in *The Health of the Country*: 15-52.

<sup>59</sup> Connolly, 287.

## **“Ample space and choice for all”: Settlers’ assessment of Upper Canada’s post-canal health**

After the canal’s construction, settlers in the region happily wrote about the difference By had made to Upper Canada’s health, either by invoking the canal directly or by speaking more generally to the region’s improvement, in which the canal played a key part. Many settlers linked settlement, the clearance of trees, and other environmental modification to healthy climates without specifically referencing the Rideau Canal, as Dr John Jarron did in his “Sketches of the Endemic Fever of Upper Canada,” where he noted the role of improvements in “rendering the diseases of the climate less frequent and severe.”<sup>60</sup> An anonymous pamphleteer wrote in an 1834 guide for emigrants that the climate was generally salubrious, though it was “only within these few years that this province has began to emerge from a state of nearly universal forest.”<sup>61</sup> “As in most new countries there are unwholesome agueish situations,” they admitted, but enough had been done to improve the state of Upper Canada to ensure that there was “believe me, ample space and choice for all, without any necessity for running, with open eyes, into *Malaria*.”<sup>62</sup> This view of Upper Canada as healthy, even if only for the purposes of promoting immigration, contrasts distinctly with the reports that came from the canal’s construction sites, when emphasis was placed on its complete state of isolation and wilderness. Furthermore, the shift in responsibility here is striking: less than a decade earlier, By had endeavoured to justify the expense of disease mitigation to his superiors. Here, the pamphleteer’s tone paired with his claim that there was not “any necessity” to run into malaria shifts the blame for disease from Upper

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<sup>60</sup> John Jarron, “Sketches of the Endemic Fever of Upper Canada.” *The Upper Canada Journal of Medical, Surgical and Physical Science* 2, 1 (1852), 7. Also worth noting is that Jarron cited his time tending to workers along the Welland Canal with his knowledge of the specifics of Upper Canada’s brand of fever.

<sup>61</sup> *A Cheering Voice From Upper Canada; Addressed to All Whom It May Concern, In a Letter From an Emigrant* (London: T Griffiths, 1834), 10.

<sup>62</sup> *A Cheering Voice From Upper Canada*, 16. The only disease in the colony that the anonymous pamphleteer acknowledged was cholera, which they insisted had come from Europe and passed; “God be braised the country is now again in as healthy a state as ever, and the doctors only complaining.” (16)

Canada (a place which creates disease) to settlers (individuals who are responsible for protecting themselves from and avoiding disease). As settlement increased, so did the colony's healthfulness and the responsibilities of individual settlers.

The topic of health also came up during an 1831 Parliamentary committee hearing on the mounting costs of the canal. There are common themes across the testimonies of the six witnesses the committee interviewed: a general sense of confusion about which department was responsible for what, various understandings of how By should have managed the contracts he was tasked with forming, and—for those who had been in North America—observations on the colony's growth. Sir Charles Ogle, for example, had sailed down the canal sometime between 1829-1830 and told the committee that he was “visibly struck with the number of towns which had sprung up in a very short time, and with the fine forests of oak and other timber which had, by means of the Canal, become valuable, which before were useless.”<sup>63</sup> However, Lieutenant-Colonel Joseph Bouchette's testimony is the most salient here.<sup>64</sup>

Born in Lower Canada and having resided in Upper Canada, Bouchette was Lower Canada's Surveyor General, and he supported the canal's construction “both in a military and a commercial point of view.” His technical and lived experience in the Canadas made him an important witness, and he walked the committee through topographical maps of the Canadas to explain the canal's scale and value and answered the committee's questions about the

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<sup>63</sup> Great Britain, Parliament, House of Commons. Select Committee on the Rideau Canal. *Report from the Select Committee Appointed to Take into Consideration the Accounts and Papers Relating to the Rideau Canal* (London, April 22, 1831), 25. Ogle was then the Commander-in-Chief for the Royal Navy's North American Station, which included British North America and the West Indies.

<sup>64</sup> The other witnesses whose testimony formed the report's backbone are Lieutenant-Colonel Edward Fanshaw who worked on the line; inspector-general of fortifications Sir Alexander Bryce; secretary to the Master General of the Ordnance Colonel George Couper; and the undersecretary of state Robert Wilmot Horton.

environment it traversed.<sup>65</sup> One of the follow-up questions he received concerned the “extent of the country drained or otherwise benefited by the Rideau Canal.” Bouchette’s answer emphasized both the canal’s scale, and its positive effect on Upper Canada’s landscape. As he explained, the canal:

bounds or traverses eighteen townships, and may be said to drain and otherwise benefit 3,000 superficial square statute miles of territory . . . Most of the lands traversed by the Canal are fit for cultivation, and are making rapid advances in settlement; many of the shaking swamps and bogs have been laid under water by the action of the dams producing a reflux of water, and many others have been drained by the Canal.

Bouchette’s testimony to the committee emphasized not only how the canal increased Upper Canada’s productivity through agriculture and settlement, but also emphasized that swamps and bogs—unproductive and, crucially, disease-causing ecosystems—had been satisfyingly drained or flooded by the canal. While I will return to the issue of wetlands in my conclusion, the 1831 report shows that By was not the only officer to tout the canal’s healing influence on the colony.

Most explicit in connecting this increasingly healthy landscape to the Rideau Canal was Edward Barker, a Kingston-based doctor and newspaper publisher.<sup>66</sup> Barker wrote that because the canal and its locks raised water levels and kept them stable, “intermittents have not been so prevalent as in former days, when the old creek used to rise and overflow its banks, which it generally did every spring and fall. The country was then so unhealthy as hardly to be habitable.” This transformation from unhealthy wilderness to habitable abode, Barker claimed, was true of “other parts of the Canal, where the same result, that of healthfulness, has been produced...”<sup>67</sup>

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<sup>65</sup> For example, Bouchette clarified that nearby American canals would not threaten the Rideau Canal commercially since they would equally be affected by winter closures. Select Committee on the Rideau Canal, 22.

<sup>66</sup> John W Spurr, “BARKER, EDWARD JOHN.” In *Dictionary of Canadian Biography*, vol. 11. University of Toronto/Université Laval, 2003. [http://www.biographi.ca/en/bio/barker\\_edward\\_john\\_11E.html](http://www.biographi.ca/en/bio/barker_edward_john_11E.html)

<sup>67</sup> Edward John Barker, *Observations on the Rideau Canal* (Kingston: Office of the British Whig, 1834), 18.

He reinforced this anecdotally, writing that when he sailed down the canal in the summer of 1834, he “did not see nor hear of a single case of sickness.”

He took particular care when recounting his trip through the Isthmus to note that while that spot had been “very unhealthy” during the canal’s construction, since then “the place has nearly lost its character for insalubrity.” He noted the increase in settlements in the area at the same time, including its “thriving state” and promising “future prosperity.” “Indeed,” he wrote, “there are few places on the Rideau Navigation to which a preference could be given with propriety by the merchant, lumberer or agriculturist.”<sup>68</sup> In this passage most blatantly, Barker not only linked the canal to healthiness, but in turn linked this state of health to increased industry, commerce, and productivity for the colony overall. Barker’s brief travel log even made sure to rescue Corktown, the Irish slum that had grown alongside Bytown like something of a parasite in the military’s point of view.<sup>69</sup> Once the canal’s construction was done, it had gone from “one continued swamp, and the land . . . not worth having” to a cleared and improved space for settlers just as good as Bytown’s more prestigious Upper town.<sup>70</sup> By situating very specific sites and changes to the land, Barker praised the Rideau Canal’s effect in healing Upper Canada’s landscape and creating a much more favourable destination for settlers.

In fact, Barker—citing Kingston’s particularly deadly 1833 malaria epidemic—proposed that the canal be further modified or used to flood “the low marshy, sedgy lands which are now partially overflowed, through which the canal winds its way, and from which during the hot

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<sup>68</sup> Barker, 29.

<sup>69</sup> Another one of the unforeseen expenses listed in Document K was the construction of fences in Bytown, “in the immediate vicinity of the Barracks, Hospital . . . to prevent the Labourers from Building Shanties there upon.” “Extra Work General Contingencies” in “Estimate and items of the work,” 26 April 1830, WO44, Volume 18.

<sup>70</sup> Barker, 48.

summer months a poisonous miasma arises.”<sup>71</sup> Thus, the good that the canal had done to the health of Upper Canada could in Barker’s view be expanded even further by extending the colony’s existing infrastructure. However, in this passage Barker was careful while admitting to sickness’s continued presence to emphasize that the problem was actively declining and mostly residual. Malaria in Upper Canada as “an evil that is gradually diminishing as the trees are cut down or die themselves; and as the country becomes more settled.”<sup>72</sup> To Barker, the canal had not only produced a healthier and settler-friendly landscape, but its impact on the land could, and should, be reproduced across the young colony. In fact, places where settlement still lagged despite the newfound health of the landscape, and their “gloomy and desolate appearance” irked Barker as “the total absence of human life inspires anything but pleasure.”<sup>73</sup> To Barker, peopling the now-healthy landscape was the final step in the landscape that the canal shaped. While Barker was the most explicit in connecting the Rideau Canal to the improving healthfulness of Upper Canada, the canal fit into a logic of improvement and healed landscapes that settlers were both willing and excited to embrace.

### **Financial scandal and By’s post-construction life**

By had some success in communicating the environmental contingencies he faced while building the Rideau canal to his supervisors. Dunford wrote to Mann in April 1830, shortly after By sent in the most recent (and highest) estimate for the canal, that “it is but mere justice to Lieutenant-Colonel By to observe, that in water works of such magnitude and variety, the usual allowance

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<sup>71</sup> Barker, 16.

<sup>72</sup> Barker, 19.

<sup>73</sup> Barker, 19.

for contingencies appears to be inadequate, and that casualties may yet be expected over which he can have no control.” The canal’s unprecedented scale and form entitled By, in his superiors’ view, to a certain leeway. Dunford specifically, and unsurprisingly, evoked the issue of sickness, which “has already been a serious obstruction, and consequence cause of expense,” and, he suspected, may escalate the price tag of the canal yet. Still, he promised that this would not be “attributable either to Lieutenant-Colonel By, his officers or contractors, of whose unremitting assiduity and perseverance I cannot speak too highly.”<sup>74</sup>

But ultimately, someone had to be held responsible for the canal’s expenses. By found out it would be him when he returned to England and first saw the Treasury Minute describing his work as negligent and calling for “immediate steps for removing Colonel By from any further superintendence over any part of the Works for making Canal Communication in Canada, and, for placing some competent person in charge of those Works, upon whose knowledge and discretion due reliance can be passed.”<sup>75</sup> That the Treasury Board issued this minute only six days after receiving By’s final estimate (in which he projected that the canal would be £216,023 over the last estimate approved in 1828) has not gone unnoticed by canal historians, with Legget suggesting that this decision was rushed.<sup>76</sup>

It is also telling that the blame was placed on By, not on the Ordnance Department or the superiors he was reporting to, since the 1831 select committee on the canal’s costs noted that By had consistently communicated the inadequacy of previous estimates and hurdles he faced in Canada. In their opinion, By’s communications “ought to have induced the Government to pause

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<sup>74</sup> Letter from Dunford to Mann, Royal Engineer Office Québec, 24 April 1830. LAC. WO44, Volume 18.

<sup>75</sup> “Rideau Canal: Copy of Letter from the Secretary of the Ordnance, dated 21<sup>st</sup> May 1832, respecting the Expenditure upon the Works of the Rideau Canal in Canada; together with a Copy of the Treasury Minute Thereon.” London: HMSO, 1832. <https://www.canadiana.ca/view/oocihm.90818/3?r=0&s=4>

<sup>76</sup> Legget, Kindle location 1083.

. . . Your Committee cannot refrain from expressing some surprise, that after such communications had been received, an Estimate for £168,000 for this work should have been laid before the House in May 1827.”<sup>77</sup> The committee laid the responsibility for miscommunicated estimates not on By, but on the Colonial Office and Ordnance Department who were responsible for communicating with the House of Commons. “The consequences of not doing so, coupled with improvident haste in undertaking this Work on an insufficient Estimate, has been, that the House was not in a condition, as it ought to have been . . . to institute a fair comparison between the value of the objects proposed to be accomplished and the amount of money required for their execution.”<sup>78</sup> The committee went on to make several recommendations to the House about precautions to be taken in future public works projects, including that officers be responsible for conducting surveys and estimates.<sup>79</sup> Nevertheless, in 1832 By as an individual bore the brunt of the canal’s financial scandal.

Four days before By was scheduled to sail the length of the canal with his family and other members of the Royal Engineers, he was recalled to England to answer for the project’s overall cost. The canal was open to public use before By left, and he also had a hand in selecting the lockmasters and labourers who would take over the day-to-day operational care and management of the Rideau canal—many of whom had served on the canal previously as “skilled” labourers, sapers, or miners.<sup>80</sup> The two bands of Royal Sapers and Miners were discharged at the canal in December 1831 ahead of its completion; of the 71 discharged soldiers, 41 of them petitioned for land to remain in Upper Canada; all but four of them succeeded in

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<sup>77</sup> Select Committee on the Rideau Canal, 5.

<sup>78</sup> Select Committee on the Rideau Canal, 6.

<sup>79</sup> Select Committee on the Rideau Canal, 11.

<sup>80</sup> "Proposed Establishment of the Rideau Canal for the year 1832." John By. LAC. WO44, Vol 20. Reel B-1295.

securing land, something By had promised to discourage desertion though ultimately, by putting settlers on the ground, these land grants were also beneficial to colonial authorities.<sup>81</sup>

As Mark Andrews pointed out, spending for the military defense in the colonies became unpopular in the wake of the 1832 Reform Act. The political context in which the Rideau Canal's finances were scrutinized was therefore an unfriendly one for By.<sup>82</sup> By himself was not called upon or given the chance to defend himself, which troubled him for years to come. In fact, By was not even in England during the last official hearing on the subject of the canal's cost. Making matters worse witnesses from Canada who had come to testify in his favour never made it to Parliament when their ship, *The President*, sank.<sup>83</sup> Ultimately, By was not charged with any misconduct, financial or otherwise. However, the damage to his reputation was never truly undone and the British press remained critical of the project's expense and usefulness.<sup>84</sup>

By died four years after returning to England, likely of a stroke. His post-canal life had been a quiet one following his forced retirement: he had been active in his church, had managed the various estates he owned to support his family, and was occasionally called upon by the Royal Engineers or lockmasters for his opinion on the canal's maintenance. The memorial on his grave described him as: "Zealous and distinguished in his profession, tender and affectionate as a husband and a father" prior to his death following "a long and painful illness, brought on by his indefatigable zeal and devotion in the service of his King and Country, in Upper Canada."<sup>85</sup> That Esther By chose to highlight malaria in the epitaph she chose for her husband emphasizes how

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<sup>81</sup> Bush, 132 and 14.

<sup>82</sup> Andrews, 165.

<sup>83</sup> Legget, "JOHN BY" and *Rideau Waterway*, Kindle Location 1091.

<sup>84</sup> Legget, Kindle Location 1100.

<sup>85</sup> Legget, Kindle Location 1178.

important she understood By's service in Canada to have been to him—and how detrimental she understood Canada to have been to his health.

Historians of the Rideau Canal have emphasized the injustice of By's scapegoating, with the notable exception of George Raudzens, which is perhaps unsurprising as he discusses By within a larger institutional history of the Ordnance Department. Raudzens frames By's vision for an enlarged canal as an ego-boosting project.<sup>86</sup> While acknowledging the canal as an engineering accomplishment, Raudzens insists on "weigh[ing] his technical achievement against his administrative sins" and ties these sins to the frontier conditions in which By operated. He characterizes By as "a single officer in the Canadian wilderness [who] had been levying taxes on the British public without serious question," and also suggests that By was given too much slack from fellow officers "kindly disposed toward a fellow officer with a difficult job in the wilderness."<sup>87</sup> For Raudzens, who does not spend much time on the question of illness in his overview of the canal's construction, "wilderness" functioned to shield and enable By as much as it hindered the canal's construction. In his view, By ultimately damaged the Ordnance Department's credibility.<sup>88</sup>

However, the historiographical consensus skews largely in By's favour. Bush claims that the stress of the inquiry on the canal shortened By's life,<sup>89</sup> while Legget's portrayal of By is that of a tragic hero, scapegoated and robbed of the honour that should have come with completing a challenging infrastructural project, possibly even a knighthood.<sup>90</sup> "No doubt," Legget laments,

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<sup>86</sup> George Raudzens, *The British Ordnance Department and Canada's Canals, 1815-1855* (Waterloo: Wilfrid Laurier University Press, 1979), 53.

<sup>87</sup> Raudzens, 91 and 79.

<sup>88</sup> Raudzens, 99.

<sup>89</sup> Bush, 7.

<sup>90</sup> Legget, Kindle Location 1100 and 1188. Chapter six of Legget's book "John By: Soldier and Administrator" is a biography of By to which Legget adds extrapolations about By's private character, Christianity, appearance, and family life. These details, some of which are loosely grounded in the sources while others appear fictionalized, add

“his exposure to fevers, rough living conditions, and the rigours of six Canadian winters were the cause of his last long illness, but disappointment must also have broken his spirit.”<sup>91</sup> Andrews accepts the notion that By’s time in Canada weakened his health but rejects the broken-hearted By of Legget’s portrayal, writing that: “To die of physical exertion and of wilderness diseases as a result of work on the Rideau Canal, yes, but never of a broken heart.”<sup>92</sup> These depictions of By’s death centered on long winters, roughing it in Canada, and “wilderness” diseases seem lifted from the text Esther By wrote in the nineteenth-century. In other words, they show both the lack of serious inquiry and understanding of malaria in Canada and a lack of curiosity about how By may have understood his own illness or mobilized resources to safeguard his health and that of others in Canada.

In this chapter, I argued that By’s vision of the Rideau Canal’s role and function in Upper Canada expanded to include healthcare in response to local disease environments and concerns. By drawing on By’s correspondence, I highlighted three main disease management strategies in response to the malarial conditions he met in Upper Canada: avoiding sick places, avoiding sick seasons, and—most frequently—modifying the environment that generated disease in the first place. This last strategy was understood to change the colony’s health in the long-term to benefit settlers and enable further settlement, agriculture, and trade in the province—as evidenced in the military correspondence By penned, and in promotional and travel literature written by settlers after 1832. While many of the changes to the land that By effected were understood to improve the health of settlers, the reverse was not necessarily true for the health of Upper Canada’s

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to the hero worship in Legget’s book. Legget also wrote By’s entry in *The Dictionary of Canadian Biography*, where he is described similarly but more concisely as “a broken man in poor health” following the canal’s completion. Robert Legget, “BY, JOHN” in *The Dictionary of Canadian Biography*, vol 7, University of Toronto/Université Laval, 1988, [http://www.biographi.ca/en/bio/by\\_john\\_7E.html](http://www.biographi.ca/en/bio/by_john_7E.html)

<sup>91</sup> Legget, Kindle Location 1188.

<sup>92</sup> Andrews, 171.

ecosystems, fauna, and flora. Thus, the *longue durée* of the canal's environmental modifications is what I turn to in the conclusion of my thesis.

## **Conclusion: From One Climate Crisis to Another**

In this thesis, I have argued that malaria played an important role in shaping how settlers understood and placed themselves in Upper Canada, using John By and John Mactaggart as case studies. Understanding nineteenth-century conceptions of malaria as a by-product of sickly landscapes was key to contextualize the logics with which settlers approached the disease and its management. John Mactaggart saw and experienced malaria's consequences firsthand in the Canadas, but his writing about the Rideau Canal best demonstrates how he dealt with malaria rhetorically, as he attempted to make malaria fit into a larger narrative about his competency and expertise in the Canadas. Mactaggart portrayed his exposure to malaria as a sacrifice he knowingly and bravely made to serve the empire, and contrasted himself to other, lesser settlers in the Canadas whose illness was brought on by negligence and ignorance. Thus, Mactaggart managed to narrate his experience of malaria without compromising his personae as a devoted and competent imperial agent.

Malaria also destabilized John By's construction plans for the Rideau Canal, adding yet another challenge to a complicated engineering project he had been ordered to accomplish with limited funds in a place that the British military knew little about. Unlike Mactaggart, By was not responsible for dealing with malaria conceptually but materially, as the disease affected thousands of labourers and soldiers, jeopardizing his ability to carry out his orders. By responded to the disease's presence by avoiding places along the canal's route that were particularly sickly, adapting the schedule on which he operated with Canada's own sickly season, and expanding the Rideau Canal's already capacious role so that it could act as healing infrastructure to alleviate sickness through air circulation, land clearances, and wetland drainage.

In their own ways, both By and Mactaggart returned to environmental knowledge, disease management strategies, and narratives about disease that were known and familiar across the British Empire. Thus, malaria links Canada to the British Empire environmentally, since the disease was brought to the Americas as part of the Columbian Exchange, and intellectually given the circulation of knowledge about the disease, its effects, its management, and surrounding rhetoric within the British Empire. Ultimately, By and Mactaggart's visions of the canal as key to furthering settlement, development, and resource extraction in Upper Canada bled into their understandings of disease. Both men were concerned with how to make Canada a safer, healthier home for settlers—Mactaggart offered suggestions in his book on how it might become such a place, and By used his authority and resources in the Canadas to induce such changes by healing the landscape he faced. In discussing By and Mactaggart's disease narratives, my thesis has drawn attention to the settler futurity at stake in nineteenth-century disease management, as well as the interconnectedness of environmental and medical history. While disease management was an imperial concern in the nineteenth-century, settler colonial Canada has reaped the benefits of the British imperial project, including the canal as a piece of infrastructure, a staple of Canada's heritage industry, and its cultural capital in settler identity formation. We have also inherited the consequences of the changes to the land involved in malaria management.

The Rideau Canal remains “a heavily managed and engineered ecosystem” whose management is complicated by the quantity of stakeholders involved in its maintenance and stewardship.<sup>1</sup> This ecosystem is not without its problems: Parks Canada's 2005 Management Plan for the canal pinpointed water quality, invasive species, soil erosion, pollution from urban

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<sup>1</sup> Robyn P. Walker et al, “Evaluation of the aquatic habitat and fish assemblage in an urban reach of the historic Rideau Canal, Ottawa, Canada: Implication for management in an engineered system,” *Urban Ecosystems* 13, 4 (2010), 563. Isha Mistry goes over the variety of stakeholders in the canal in her MA thesis: “Collaborative governance in the Rideau Canal: barriers and opportunities,” (MA thesis, University of Ottawa, 2020).

land drainage, sewage treatment, agricultural use, and recreational activity as concerns for the wellbeing of the canal ecosystem.<sup>2</sup> While that report also noted that the availability of environmental data as an obstacle to conservation, that has somewhat changed in recent decades. Sediment coring in Colonel By Lake has linked canal construction and ensuing settlement to eutrophication, soil erosion, decreases in biodiversity, and the shift from a wetland system to a shallow, lake-like environment.<sup>3</sup> Mercury concentration in fish from Indian, Upper Newboro, and Upper Rideau Lakes surpassed recommended consumption guidelines for children and pregnant people, largely as a result of canalization and human activity.<sup>4</sup> None of these are negligible, especially if—to follow the titular thesis of Max Liboiron’s book—pollution is a form of colonialism, in its entitlement to and impact on Indigenous land and resources.<sup>5</sup> But because this thesis is concerned with health, I want to focus on wetlands.

A wetland is exactly what its name implies: an ecosystem that develops in inundated conditions and whose soils, fauna, and flora are adapted for permanently or frequently water-dominated conditions.<sup>6</sup> Wetlands are, in Catherine Owen Koning and Sharon Ashworth’s words, “the ugly duckling of landscapes.”<sup>7</sup> Mactaggart and By’s descriptions of wetland resonate with Owen Koning and Ashworth’s description of popular attitudes about wetlands today, as:

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<sup>2</sup> Parks Canada, Rideau Canal National Historic Site of Canada Management Plan (May 2005), 24.

<sup>3</sup> E.P. Sonneburg, J.J. Boyce, and E.G. Reinhardt. “Multi-proxy paleoenvironmental record of colonial land-use change in the lower Rideau Canal system (Colonel By Lake), Ontario, Canada,” *Journal of Paleolimnology* 42, 4 (2009): 515-532.

<sup>4</sup> Shannon S.M. Stuyt, E. Emily V. Chapman, and Linda M. Campbell. “Lake and watershed influences on the distribution of elemental contaminants in the Rideau Canal System, a UNESCO world heritage site,” *Environmental Science and Pollution Research* 22, 15 (2015): 11558-11573.

<sup>5</sup> Max Liboiron, *Pollution is Colonialism* (Durham: Duke University Press, 2021).

<sup>6</sup> Paul A. Keddy, *Wetland Ecology: Principles and Conservation*, second ed. (New York: Cambridge University Press, 2010), 2. Ecologists break down wetlands into more specific categories (marshes, swamps, fens, bogs, mangroves...) but in the context of this project, and for following the logic of nineteenth-century actors, this basic definition of a wetland as an ecosystem that has evolved to be permanently or frequently water-dominated suffices. I refer to “wetlands” in the following pages to avoid convoluting nineteenth- and twenty-first-century definitions and qualifications.

<sup>7</sup> Catherine Owen Koning and Sharon M. Ashworth, *Wading Right In: Discovering the Nature of Wetlands* (Chicago: University of Chicago Press, 2019), 220.

place[s] to circumnavigate, an obstacle to overcome . . . They get in the way, they block the path, they are neither open water or dry land. You can't build on them, and you can't swim in them. They are the places in between, the borders of the lake, the low spots collecting water between hills. They are the places often disregarded completely or altered unrecognizably, made into more familiar and 'useful' kinds of terrain. To many, wetlands are just *in the way*.<sup>8</sup>

Wetlands were all of this in the nineteenth century, where they were also understood to be unhealthy.

I opened this thesis with the story of Cranberry Marsh: that “infernal place” riddled with miasmas as per John Mactaggart. While Mactaggart was unsure about deforestation’s potential harm to the health of settlers and thus had mixed feelings, he was certain of the marsh’s unhealthiness. As a result, he supported By’s plan to flood the marsh despite local protests because, as he wrote, “when the marsh in its *present state* stops the progress of the public works during summer, what *worse* thing can it do?”<sup>9</sup> While Mactaggart’s main qualm with the marsh was its unhealthiness, he also noted that it was logistically a difficult site to work in, “as labourers could not dig the bushes with spade and shovel, and as their stalks and roots were extremely tough and could not be cut or dragged out of the way.”<sup>10</sup> Part of what made the marsh difficult to convert, and thus unpleasant for settlers, was the very thing that made the marsh a functioning ecosystem: the long, tough, resilient roots of the plants that thrived there. Local settlers had already raised Cranberry Marsh’s water levels by erecting sawmills and dams, but the Rideau Canal’s builders—and their increased focus on settlement, growth, and health—destroyed the marsh completely.

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<sup>8</sup> Owen Koning and Ashworth, 7.

<sup>9</sup> Mactaggart, volume 2, 15.

<sup>10</sup> Mactaggart, volume 2, 14.

Wetlands were frequently more difficult (and consequently more expensive) places to access and work for the canal's builders, and they were often destroyed as a result. At Jones' Falls, Kingston Mills, and Nicholson Rapids, By described "Swamps [that] were almost impenetrable," "marshes totally impassable in Summer," and "the thickness of the woods and swamps." Difficulty of access had concrete consequences on the quality of the levels and estimates that By had been working with.<sup>11</sup> Even once construction had started, wetlands continued to make Upper Canada's landscape unpredictable—as in Maitland Rapids, where By relocated labourers to avoid disease and wetland alike. At Smith Falls, By wrote that "the impenetrable state of the swamps" made it difficult to determine how much land would be flooded and how large a waste weir would be needed should the original plans be followed. Furthermore, swampiness jeopardized the "ultimate security" of the works and By foreshadowed "casualties of various descriptions and...endless expense in order to keep [works built on wetlands] in good repair."<sup>12</sup> Even the first build on a wetland could be expensive: the wetland at Maitland Rapids was on average 800 yards wide, and By concluded that building "an embankment across the same would have been attended with so great an expense that I propose to allow the swamp to be flooded."<sup>13</sup> While controlling the flow of water was no easy task, By's willingness to flood the swamp can be contrasted with the expensive alterations he made to enlarge the dam at Nicholson Rapids as "a much greater extent of cultivated land would have been flooded than provided for."<sup>14</sup> The potential for agriculture, a key industry in Upper Canada both locally and in the eyes of the British Empire, was factored into By's decisions about what land could be sacrificed to canal construction and what land should be preserved. Wetlands did

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<sup>11</sup> By, "Extra work Jones' Falls."

<sup>12</sup> By "Extra Work Smith Falls."

<sup>13</sup> By, "Extra work Maitland Rapids."

<sup>14</sup> By, "Extra Work Nicholson Rapids."

not fare well in these equations. That the swamp at Maitland Rapids was near a site whose soil “occasion[ed] great sickness” almost certainly increased By’s willingness to flood it.<sup>15</sup>

Even earlier in the canal’s construction, in March 1829 By started filling in Dow’s Great Swamp near the entrance valley of the canal, now the South of Ottawa.<sup>16</sup> The swamp was gone by November of that year, and By was so pleased with the progress that it “place[d] beyond all doubt the practicability of converting that unhealthy swamp into a fine sheet of water, and does away with the original idea of forming an aqueduct in the centre of the said mound, and a considerable saving will be made in consequence.”<sup>17</sup> The difference in tone between By’s descriptions of the original “unhealthy swamp” and the subsequent “fine sheet of water” speak to the benefits and value of swamp conversion in By’s view, even before he outlined the financial benefits—which were always welcome during the Rideau Canal’s construction. That By’s main descriptor of the swamp is “unhealthy” also reveals that the health of the landscape was at least one motivation to convert the swamp in addition to canalization.<sup>18</sup>

This concern with the unhealthiness of the swamp was carried through in local histories; H Beaumont Small, in writing his 1903 *Medical Memoirs of Bytown*, started his description of Bytown by describing its swampy origins.

The land was swampy and wet. Dow’s Swamp was much more extensive than at present, and extended from the Rideau to the Ottawa River, by what is now Preston Street; the land around Patterson’s Creek was a swamp; Slater and Maria Streets were a swamp; what is now the Canal Basin was a wet beaver meadow, and from it, extending across lower town to the Rideau River, was low, wet land. Although malarial fever is unknown

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<sup>15</sup> By, “Extra Work Nicholson Rapids.”

<sup>16</sup> Cowper, “Abridged Statement of the Progress of the Works of the Rideau Navigation under the superintendence of Lieutenant-Colonel By, Royal Engineers, taken 1<sup>st</sup> March 1829.” LAC, WO44, Volume 20.

<sup>17</sup> Correspondence from By to Mann, 28 November 1828. LAC, WO44, Volume 18.

<sup>18</sup> Today, residents of Ottawa and the city’s many visitors may know this place as Dow’s Lake: a man-made lake on the canal equipped with a marina, a handful of restaurants, and paddleboards, kayaks, snow shoes or skate rental services depending on the season. Dow’s Lake Pavillion is, according to its website, “an ideal location for the enjoyment of Ottawa’s historic Rideau Canal.” See: “The Pavilion.” Dow’s Lake Pavilion. June 20, 2022. [https://www.dowlake.com/about\\_the\\_pavillion.php](https://www.dowlake.com/about_the_pavillion.php)

to us, we are not surprised to learn that ague in its more severe form became prevalent, and that the labourers engaged in excavating the canal were soon attacked by this disease.<sup>19</sup>

As a result of By's efforts in draining the swamps on which Bytown was built, residents of Ottawa less than a century later could map a list of long-gone swamps over the geography of the city they knew. Obviously, the destruction of wetlands on what is now Ottawa cannot be attributed entirely to canalization or to the choices that By made—or, for that matter, to the British military which effectively controlled the town until the 1850s.<sup>20</sup> To do so would be to ignore the agency of individual actors on the ground and the fault lines in the British military's control and authority. However, it was under By's authority that the process of wetland conversion in Bytown and the city's construction began. Ultimately, it was because By expanded the canal's infrastructural purpose into disease mitigation that "malaria fever [was] unknown" to Beaumont Small and his contemporaries—and that Dow's Great Swamp disappeared.

The first major survey on wetland loss in South of Ontario was undertaken by Elizabeth Snell in 1987 for Environment Canada. Using soil maps, Snell reconstructed former wetlands in Southern Ontario based on soil saturation.<sup>21</sup> Comparing maps of Ontario's wetlands in 1978 with these new maps allowed Snell to estimate wetland losses and gains, and her research was expanded by the conservation organization Ducks Unlimited in 2010 to chart wetland gains and losses until 2002.<sup>22</sup> Researchers have expanded that report's criteria even further to reconstruct wetlands covering less than 10 hectares. In their 83,810 km<sup>2</sup> area of study, these researchers found that in the "pre-settlement" era (which they place at before 1800) around 24,984 km<sup>2</sup> had

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<sup>19</sup> "Medical Memories of Bytown" by H. Beaumont Small (1903). LAC, Hill Collection, Volume 30, MG21-I9.

<sup>20</sup> Richard Reid, "The End of Imperial Town Planning in Upper Canada." *Urban History Review* 19, 1 (1990), 39

<sup>21</sup> Elizabeth Snell, "Wetland Distribution and Conversion in Southern Ontario" (Working Paper 48, Environment Canada. 1987).

<sup>22</sup> Ducks Unlimited. "Southern Ontario Wetland Conversion Analysis." (Final report, Barrie, 2010)

been wetlands. An easier figure here might be to estimate that around 30% of Southern Ontario's total land cover was wetland. By 2002, only around 11,032 km<sup>2</sup> of those wetlands remained.<sup>23</sup> 56% of Southern Ontario's pre-1800, and pre-canal, wetlands are gone. Only 16% of the canal's shoreline is composed of wetlands.<sup>24</sup>

The extent of this loss is perhaps more visually accessible through the Geographic Information System (GIS) map produced by Ducks Unlimited, which shows pre-settlement wetlands in red and wetlands that were still standing in 2002 in blue.<sup>25</sup> The sections of the map below show Ottawa and Kingston, the start and end points of the Rideau Canal respectively, but interacting with the map digitally is a different experience altogether. When I first found this map, I followed the canal's route across Ontario and the red spots that framed Colonel By Lake, covered Kingston Mills and Brewer's Mills, speckled Mud Lake, blocked the part of the Isthmus that opened into Upper Rideau Lake, followed the banks of the Rideau River from Merrickville to Burritt's Rapids up until the Black Rapids, and finished with the blotch that crossed Ottawa from Dow's Lake to the Ottawa River.

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<sup>23</sup> Eunji Byun, Sarah A. Finkelstein, Saron A. Cowling, and Pascal Badiou. "Potential carbon loss associated with post-settlement wetland conversion in Southern Ontario, Canada." *Carbon Balance and Management* 13, 6 (2018).

<sup>24</sup> Parks Canada, Rideau Canal National Historic Site of Canada Management Plan (May 2005), 23.

<sup>25</sup> Mallory Carpenter. Wetland Loss in Southern Ontario [Map]. Ducks Unlimited, 2015. <http://www.ducks.ca/your-province/ontario/programs-projects/wetland-conversion-analysis/>

Figure 2: Wetlands in Southern Ontario pre-1800

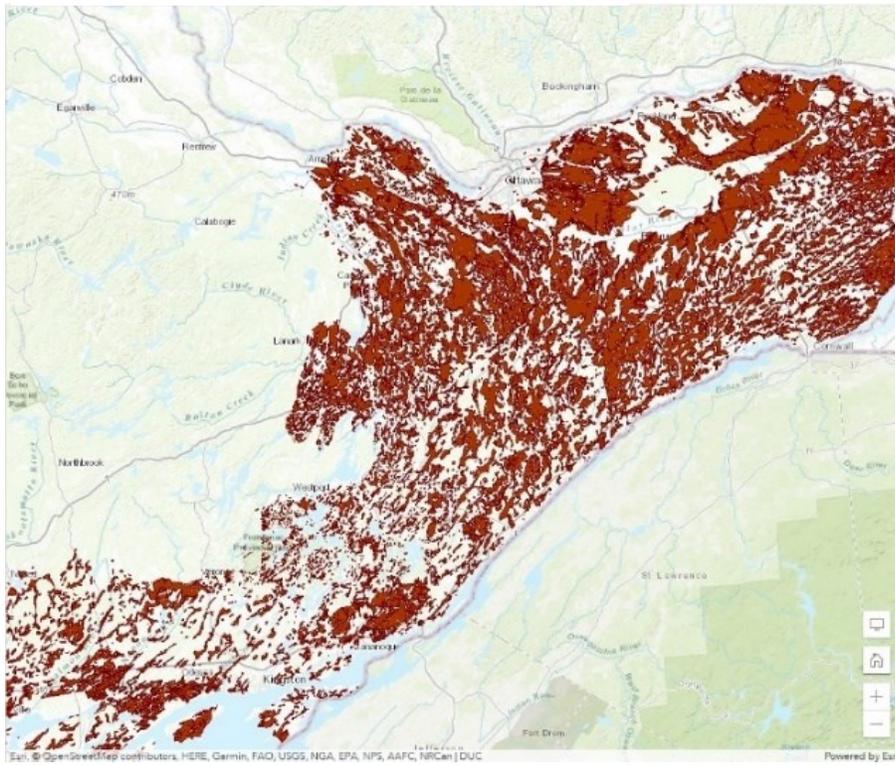
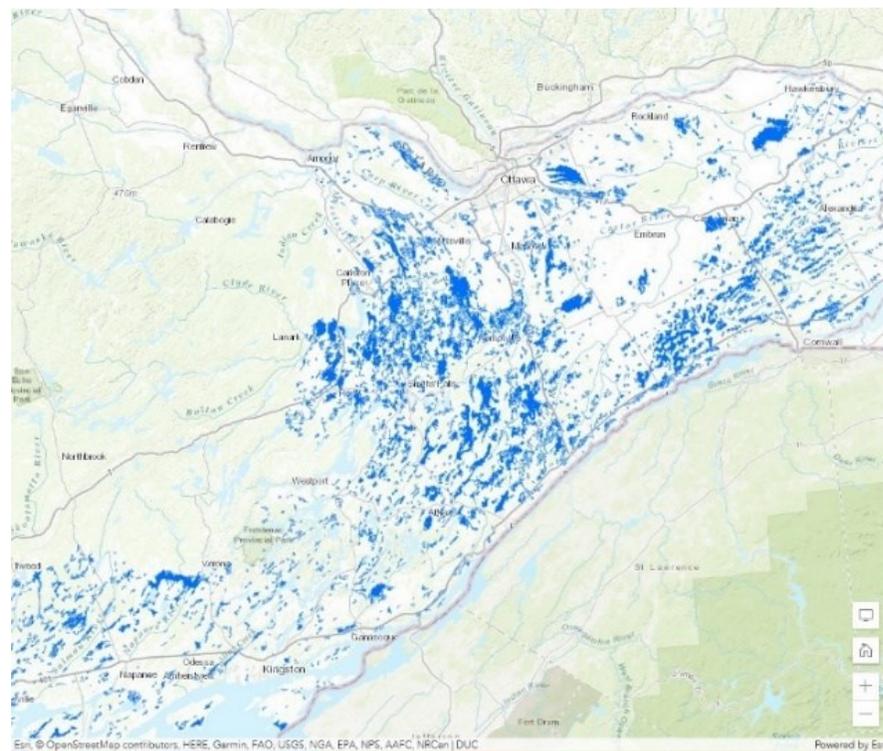


Figure 3: Wetlands in Southern Ontario, 2002



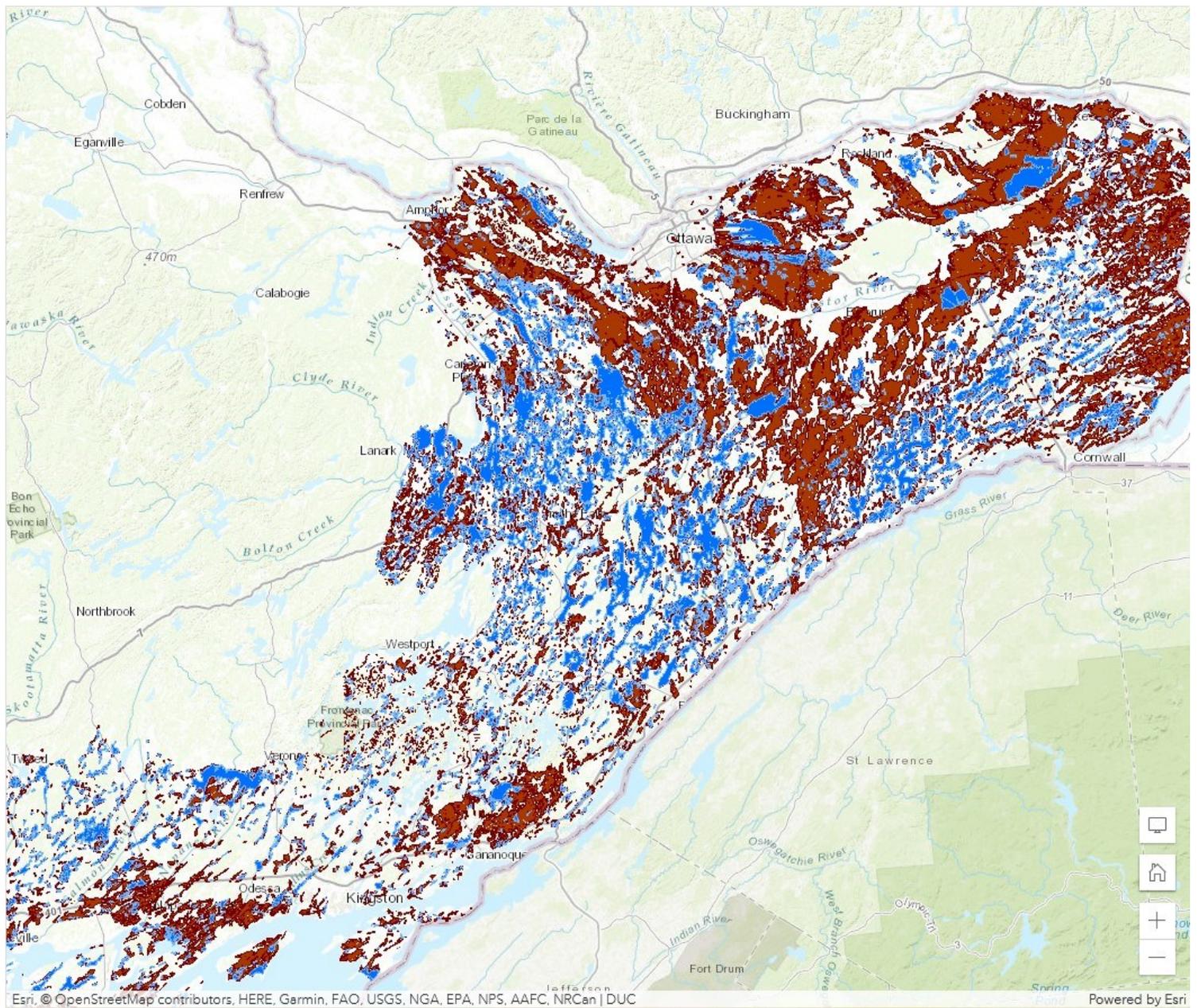


Figure 4: Wetland loss in Southern Ontario, 1800-2002 (Figures 1 and 2 layered)

The conversion of wetlands into land suitable for settlement, agriculture, and urbanization are well-documented reasons for wetland conversion in Ontario and elsewhere, along with infrastructural development and water withdrawal (for example, through drainage).<sup>26</sup> Wetland loss comes with a list of consequences as long as the list of benefits that wetlands bring, the latter including access to freshwater, water purification, recreational spaces, and flood abatement. When wetlands are lost, so are the fauna and flora they support—including, if we think of Southern Ontario, fish, cranberries, wild rice, and other species important to Indigenous communities and their lifeways.<sup>27</sup>

Perhaps most importantly in the context of the Anthropocene is the role of wetlands in climate change mitigation. Because wetlands can act as carbon sinks (natural reservoirs that can hold as much or even more carbon than they produce), climate change mitigation policies are increasingly focused on restoring wetlands and enhancing their ability to store greenhouse gases. This also means that wetland destruction releases the greenhouse gases stored in wetlands' soil and flora into the atmosphere.<sup>28</sup> The same team that tracked the extent of wetland loss in Southern Ontario concluded that around 1.9 PgC of carbon was released over the last two centuries (in other words 1.9 gigatonne, or one billion metric tons, of carbon). Wetland destruction in the Anthropocene is a self-perpetuating problem given the sensitivity of wetland

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<sup>26</sup> Susan Galatowitsc, “Natural and anthropogenic drivers of wetland change” in *The Wetland Book II: Distribution, Description, and Conservation* ed C.M. Finlayson, Mark Everard, Kenneth Irvine, et al (Springer, 2018), 359

<sup>27</sup> Paula Sherman, Omàmiwinini writer, activist and educator, identifies the protection of manoomiin (wild rice) in the face of development as a key factor in the resurgence of her community. Sherman, 18. A different project on the canal's construction with a different scope could have spent more time on the resource loss that the canal's construction caused to Indigenous communities.

<sup>28</sup> Michael Allaby, “Sink” in *A Dictionary of Ecology* 5 ed, Michael Allaby (Oxford University Press, 2015) and Max Finlayson, “Climate Change and Wetlands.” in *The Wetland Book I: Structure and Function, Management, and Methods*, ed C.M. Finlayson, Mark Everard, Kenneth Irvine, et al (Springer, August 2016), [https://doi-org.lib-ezproxy.concordia.ca/10.1007/978-94-007-6172-8\\_126-1](https://doi-org.lib-ezproxy.concordia.ca/10.1007/978-94-007-6172-8_126-1). Unsettlingly, corporations have increasingly capitalized on this ecological function of wetlands through greenwashing schemes, in which wetland preservation is quantified through carbon credits. See: Catherine Owen Koning and Sharon M. Ashworth, *Wading Right In: Discovering the Nature of Wetlands* (Chicago: University of Chicago Press, 2019), 208.

ecosystems and the vulnerability of their fauna and flora to changing water regimes and temperatures, among other factors.<sup>29</sup> In the place now called Canada, wetland loss accelerated with nineteenth century settlement and the ecological transformations that settlers caused, knowingly or not.

I recognize that I am at risk of being anachronistic here: the problem of wetland loss is not unique to Canada, nor were its consequences understood by or anticipated by the Rideau Canal's builders. Still, I have two reasons to highlight the destruction of wetlands as part of this thesis's conclusion on the long-term environmental changes precipitated by the Rideau Canal. First, the canal's construction shows that colonization and health are part of the story of wetland loss, and thus of environmental change and history more broadly. This bears noting especially in the context of Canadian history where, as I highlighted earlier, the "health of the land" as a historical problem has been taken for granted and understudied. Furthering our understanding of how historical associations of wetlands with ill-health and backwardness were formed is important to contemporary conservation efforts since, as Ashworth and Owen explain, "one of the first steps in caretaking is the gradual development of a new attitude" about wetlands.<sup>30</sup> Here, they draw on Joy Zedler's conception of a "wetland ethic," or a growing and shared social responsibility for the well-being and ecological significance of wetlands.<sup>31</sup> Enacting a wetland ethic is impossible without understanding why wetlands are devalued, and health is part of this story. Furthermore, an ahistorical understanding about what wetlands are, how wetlands

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<sup>29</sup> Finlayson, "Climate Change and Wetlands."

<sup>30</sup> Ashworth and Owen, 220-222.

<sup>31</sup> Joy Zedler, *A wetland ethic?* (Madison: Arboretum Leaflets), Leaflet 36, 2014.

function, and who is impacted most by their destruction and degradation fails to address the imperfect nature of wetland restoration.<sup>32</sup>

Finally, I want to end by pointing to the historical irony that in attempting to mitigate malaria as a crisis of climate and place, the builders of the Rideau Canal played a small role in worsening the climate crisis we face 200 years later. While there are risks to treating the past as a vault of lessons for the present and future, the Rideau Canal's construction can remind settlers of the transient nature of our understandings of health, climate, and infrastructure's ability to resolve their interactions.

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<sup>32</sup> While neither of these are key themes of this thesis, for more on the technical challenges of wetland restoration, see Owen and Ashworth 205-218. A good summary of their discussion on wetland restoration's limitations would be Robert Ashworth's comparison of wetland restoration as "trying to put burger back on the cow" (205). For an example of environmental racism and harm to Indigenous lifeways and subsistence caused by non-intersectional wetland restoration by Ducks Unlimited, see: Alex Wilson, Owen Toes, and Kevin Settee, "Against the Duck Factory," *Briarpatch Magazine*, March 1, 2021: <https://briarpatchmagazine.com/articles/view/against-the-duck-factory>

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