

# THE METABOLISM OF EMPIRE: WATERMILLS IN LONG NINETEENTH CENTURY, ONTARIO

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## **Tell us about your field and your professional experiences before starting your current studies.**

My current research is in Science & Technology Studies (STS), particularly where the field intersects with environmental history. I usually describe STS to others as the sociology, history, and philosophy of science and technology – deploying the humanities to study scientists, engineers, and the things they research and develop.

Before starting my doctoral studies, I worked for four years in a small electrical power engineering firm engaged in research and development work, producing power quality systems for industrial facilities, server sites, hospitals, and other places that require immunity from power disruptions. I worked on many different things at the firm, ranging from assembling prototype circuit boards with my own hands; developing highly specialized industrial power devices; programming and purchasing electric components and organizing them in the laboratory.

This gave me an interesting overview of technological development and the various ways it unfolds within a firm functioning under a capitalist economy.

My undergraduate studies were in electrical engineering at Queen's University, and my master's studies were in environmental engineering and international development at the University of Guelph, where I researched microhydro power in rural Nepal. Microhydro

plants are 10-100kW run-of-river (damless) hydropower installations, typically developed to electrify remote villages in the Himalayas, often through international aid funding. I was working on an electronic load controller which regulated voltage for these microhydro systems, and was focusing on a way to channel waste energy in these systems into water pasteurization and slow-cooking applications.

An earthquake in Nepal during the time of my research prevented me from traveling to my research site, but I did have the opportunity to work with a team at the University of Calgary which consisted of several graduate engineering students from Nepal. Since my master's program was in a conjoined engineering and international development program, I was also able to take several humanities courses which I drew upon for a portion of my thesis, making the transition to Science & Technology Studies fairly fluid.

## **Tell us about your dissertation and how it relates to the study of Canada.**

I research the environmental history of watermills in Ontario, and I am especially interested in the way they were connected to British colonialism and empire. I am approaching this history through theories of metabolism. Emerging in the 19th century, modern metabolism concerns itself with movement, flow, and transformation of materials and energy through bodies. While

biochemists trace the basic chemical constituents that flow and are transformed through bodies, I am interested in how the British empire oversaw the movement of basic commodities extracted from Indigenous lands: from the moment of production and transformation by Ontario watermills, on to its circulation throughout growing body of British empire across the globe.

My project focuses on a period that roughly maps onto what Eric Hobsbawm termed the 'long nineteenth century'<sup>1</sup>. This period began with the 1787 "Toronto Purchase" from the Mississaugas of the Credit and continued to the year 1910, when the Hydro Electric Commission of Ontario began exporting electricity from Niagara Falls to neighbouring towns and cities. In the intervening years, watermills spread rapidly along rivers in Ontario processing commodities such as lumber, grain, minerals, textiles, and paper. The proliferation of dam infrastructure and its obstruction of aquatic migration, combined with fast moving waterwheels and industrial pollution, all contributed to the extirpation of Atlantic salmon – a vital food source that the Anishinaabeg depended upon for their livelihoods.

This is not to convey the construction of water infrastructure as inherently harmful. Water infrastructure had existed long before European colonial occupation, including Indigenous fishing weirs and beaver dams that have been built in this area for thousands of years. However, the proliferation of capitalist watermill infrastructure transformed the landscape in drastically different ways than previous water infrastructure had. My project concerns itself with this water-powered machinery which coincided with extractive processes of colonialism. More than the far reaching environmental and political transformations that these mills were

implicated in, they were also enabling settler agriculture and transforming distant lands around them at the nearly imperceptible scale of the chemical.

Also, the immense quantities of waste material discharged into river ecosystems harboured new microbial life worlds and their own set of metabolic pathways that transformed capitalist mill detritus into toxins and explosive methane gas. Scientists in Upper Canada, like Samuel Wilmot and Edward van Cortlandt lobbied the government to do more to stop this pollution and contributed to reports that highlighted the connections between pollution, cholera outbreaks, and dangerous methane explosions<sup>2</sup>. However, these scientists simultaneously reproduced colonial and environmental violence as they advocated for environmental protection and restoration initiatives.

By attending to these dimensions of watermill history, I hope to enliven the histories of Ontario's rivers and underscore a type of agency the rivers had - as more-than-human beings - as they conspired with trees, fish, microbes, and many other more-than-human agents that congregated around this infrastructure. I hope to emphasize how watermills were not simply colonial technologies imposed upon a passive Indigenous landscape, but that Indigenous nations and the rich ecological worlds they fostered were always dynamic actors that interacted with, and responded to, these technologies in varying, surprising, and unexpected ways.

### **How did you come to choose this research topic?**

While researching microhydro power in rural Nepal, I became acquainted with the complicated social and political complexities of rural hydro-electrification. For instance, the cessation of large export-oriented hydro-dam construction backrolled by capital from India

was a central demand of the Maoist insurgency that toppled the monarchy and shifted Nepal's political system towards a form of democracy. While large hydro infrastructure was targeted during the insurgency, decentralized microhydro power was typically left alone. Still, introducing microhydro power to villages came with its own set of complexities, sometimes increasing inequality and creating water-use conflicts between farmers who needed irrigation water and new businesses that depended on electricity.

These complex political and social dimensions of hydropower made me wonder about the history of hydropower development around Mississauga, where I lived and grew up. I began noticing many neighbourhoods, restaurants, art galleries, and subway station names alluding to mills and milling history, but usually in some type of nostalgic way that referred to a bucolic heritage requiring conservation or restoration.

At the same time, I also began noticing numerous references to white pine in Mississauga being used by the Royal Navy for ship masts; and learning about the significant ways mills had degraded fish populations that Indigenous nations depended upon in the area. I was curious as to why there was such a wide disconnect between the nostalgia prevalent in public history accounts of mills and the more troubling history of how these mills were part of both colonialism's dispossession of Indigenous Nations as well as significant environmental transformations such as deforestation and the extirpation of salmon.

As someone whose family was from the former British colonies of Singapore and Malaya, and who grew up with many friends from similar diasporic communities, I was curious if there were connections between the warships built from the lumber processed by Ontario mills

and the distant British colonies our families came from. These were some of the primary questions that compelled me to eventually undertake my dissertation project.

### **What are the main takeaways you want others to come away with?**

**1)** Watermills, though powered by a renewable source of energy and celebrated in nostalgic heritage discourse as emblems of simpler, bucolic times, were also important enablers of colonial and environmental violence in Ontario. It was not water infrastructure in itself that produced these problems as Indigenous fishing weirs and beaver dams had long been constructed along these rivers. Colonial watermill infrastructure functioned as a mechanism to metabolize Indigenous land and water into the body of British empire. I argue this process of assimilation was at the root of drastic environmental changes in 'long nineteenth century' Ontario.

**2)** In the nineteenth century, a scientific way of looking at the bodies of organisms emerged that traced the series of chemical reactions and flows constituting biological life. I call this way of looking at the world, the metabolic gaze, and I argue that it was deeply connected with the colonial gaze that underpinned the extraction, transformation, and movement of basic colonial commodities from Indigenous land and water. Watermills served as key colonial infrastructures that made this imperial metabolism possible, and the vocabulary from this age of industrial watermills is still central to the language of metabolism, as a life science of energy, today.

**3)** Indigenous nations were powerful actors who engaged watermill technology on their own terms, sometimes integrating it into their way of life, and in some cases rejecting it in,

various acts of resistance. A multitude of beings - from fish like local salmon, to microbes like methanogens and vibrio cholerae, and the very mill machinery itself - all exhibited a lively agency that constituted an important part of this history, sometimes conscripted into the cause of empire and sometimes resisting it in explosive ways.

4) Colonial scientists like Samuel Wilmot and Edward van Cortlandt, who are celebrated for attempting to restore fish populations and protect fish from sawmill pollution, were entangled in colonial knowledge-making projects of the more-than-human world, that I argue reproduced colonial power dynamics. Their attempts at environmental protection and restoration were ultimately unsuccessful because it was the project of colonialism itself that was at the root of issues like river pollution and the extirpation of local fish species.

**Tell us about the challenges that you as a researcher are experiencing or had to overcome to do this work.**

Many opportunities open up to you as a student that are not available to you at any other time, and it can become overwhelming to figure out what to take on and what to say no to. I have sometimes overcommitted to things and struggled hard to follow through. It has taken some time to think about accepting research opportunities in terms of their relation to my own research, and determining when they align or do not align with my goals.

I have also struggled to keep my research focused. There are so many fascinating things that connect with my research topic, and ensuring a comprehensible thread runs through my project remains a challenging task at times.

Finally, I am still thinking through how to be

accountable to the Indigenous nations who have lived through these histories and are still impacted by them today. Moreover, I am reflecting on what stories are not mine to tell and focusing on the types of historical research that can be useful to Indigenous communities as they continue their struggles against the ongoing project of colonialism.

**Tell us what you love the most about the work that you do.**

I love finding fascinating things in the archives and connecting my research with everyday things people still encounter around Ontario. I also love listening to other research that connects with mine in some way. It is especially gratifying to encounter people who take an interest in my research, or to encounter someone whose work really fascinates me.

Sajdeep Soomal is a history student at the University of Toronto who I really admire and who is doing some incredible work on the history of chemistry in Ontario<sup>3</sup>. He is rigorously parsing through how colonialism enacted various forms of chemical violence and engaging in a wide range of interesting theory and literature. I love encountering other scholars like him who help me rethink my own research in radical ways, offering opportunities to collaborate on research and inviting participation in exciting scholarly communities. I want to eventually become that type of graduate student during my remaining time in the program.

**What advice/lessons/tips do you have for those starting their academic journey?**

I think the well-worn cliché happens to be true for me; find something you are deeply and truly fascinated and interested in, and the academic journey becomes a lot less taxing

and difficult, and more enjoyable. It is also worthwhile to think about how to explain the research project you want to undertake to someone who has no idea about your field of research. I find this helps clarify your research problem and keep it more focused. I also suggest being open to how your research connects to various things you encounter in everyday life - to places you visit or other people's research. Being able to explain why your research matters to someone can be helpful for rethinking different aspects of your project and clarifying the questions you want to answer.

### What are the next steps in your research?

My main tasks in the coming months are organizing the empirical things I have been encountering in the archives and continuing to write. I managed to do a number of archival visits and field visits to old mill sites, and I still need to organize a sizeable portion of that into my dissertation chapter outlines. Recently, I have been focused on revising two of my chapters, originally presented as conference papers, and working to develop them into publications.

Something that I have found most useful to the writing process is interacting with people who champion my work, are excited about it, or encourage me to publish in specific places. Sajdeep Soomal and supportive professors like Jennifer Bonnell<sup>4</sup> come to mind. That has been a very strong motivator for continuing to work on the next steps of my research. I am grateful for the people who take time to encourage or mentor me in this capacity.

### Notes

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3. Soomal, Sajdeep. University of Toronto Profile: <https://www.history.utoronto.ca/people/directories/graduate-students/sajdeep-soomal>.

Soomal, Sajdeep, Personal Website: <https://www.sajdeep.com/>.

4. Jennifer Bonnell, Faculty of Liberal Arts and Professional Studies, York University. Faculty profile: <https://profiles.laps.yorku.ca/profiles/bonnellj/>.