

The Science of Settler Colonialism: A Canadian History of the Thrifty Gene Hypothesis

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ABSTRACT

This dissertation interrogates the history of the thrifty gene hypothesis, or the idea that Indigenous bodies are genetically predisposed to type-II diabetes. Though the hypothesis has been rejected by the scientific community at large as well as the very scientists who invented it, it continues to inform Canadian state literature and clinical guidelines in 2018. Thus, in an attempt to historicize (rather than debunk) the failed but long-lived hypothesis, I trace its origins through four successive chapters focused singularly on major figures in its production. All of these figures are white male scientists who travelled to Indigenous communities, made scientific observations, and contributed to a colonialist discourse of Indigenous disappearance by suggesting that ‘Indians’ or ‘Aboriginal people’ were biologically unfit to survive contact with (settler) colonial societies despite centuries of evidence to the contrary. Thus, while my main critique in this dissertation concerns the reproduction of a baseless and racist hypothesis within the registers of Canadian healthcare administration, I am also heavily exercised with documenting a history wherein southern settler scientists have travelled to northern Indigenous communities, extracted blood, bone marrow, and other biological materials, and used their scientific observations to cast Indigenous bodies – rather than settler structures – as the root cause of high-rates of chronic disease across the Canadian north. Troublingly, I note that the University of Toronto’s Sioux Lookout Project was deeply embedded in these histories of settler colonial science. Thus, on the basis of the history reviewed in this dissertation, I argue that the post-war professionalization of Canadian genetics, endocrinology, epidemiology, as well as nutritional and metabolic sciences has as a historical condition of possibility the settler colonial creation of the reserve system and the production of an ‘isolated’ Indigenous population that faces chronically high rates of nutrition-related diseases.

TABLE OF CONTENTS

Abstract	ii
Table of Contents	iii
Introduction	1
Chapter One: Theorizing the Science of Settler Colonialism.....	24
Chapter Two: The Transit of Charles Darwin.....	51
Chapter Three: Percy Moore and the Scientization of Colonialist Interventions in Canada.....	77
Chapter Four: James V. Neel and the Invention of the Thrifty Gene.....	113
Chapter Five: Robert Hegele and the Re-Invention of the Thrifty Gene Hypothesis.....	133
Concluding Thoughts on the Science of Settler Colonialism.....	160
Bibliography	172

Introduction

Thunder Bay and the Social Origins of Scientific Myths

*I feel compelled to speak about my relations
before writing of other things.¹*

- Janice Acoose

*The historical book or article is
together a result and a symptom of the
group which functions as a
laboratory... [it] is bound to the
complex of a specific and collective
fabrication more than it is the effect
merely of a personal philosophy or the
resurgence of a past 'reality.' It is the
product of a place.²*

- Michel de Certeau

I consider it good scholarship and even standard practice for historians to situate themselves in their own work and to tell readers at the outset who they are and how they relate to the topic at hand. To that end, my topic of research in this dissertation is the history of the thrifty gene hypothesis, or the idea that Indigenous peoples are genetically predisposed to type-II diabetes. I focus on the thrifty gene hypothesis because it continues to be a popular and powerful explanation for high rates of type-II diabetes in First Nations and Inuit communities despite its rejection by its originators and the scientific community at large. The social and cultural function of this scientific racism has been to shine a spotlight on supposed Indigenous pathologies rather than the widely documented forms of structural and systemic violence that overdetermine the

¹ Janice Acoose, *Iskwewak Kah' Ki Yaw Ni Wahkomakanak: Neither Indian Princess Nor Easy Squaws* (Toronto: Women's Press, 1995), p. 1.

² Michel de Certeau, *The Writing of History* (New York: Columbia University Press, 1988), pp. 64.

health of First Nations communities by denying them access to clean water, shelter, affordable and nutritious food, as well as medicine and healthcare.³ In this way, the thrifty gene hypothesis bolsters a racist national discourse that geneticizes a medical condition that has very well-established socio-economic and colonial configurations; however, I suspect that the hypothesis is nowhere more popular than in my hometown of Thunder Bay, Ontario.

Thunder Bay, a city infamous for anti-Indigenous racism, was described by the BBC as “one of the last urban outposts on the way to Ontario's vast north, which is mostly inhabited by [I]ndigenous people on reserves.”⁴ Accordingly, Thunder Bay (in addition to Sioux Lookout and Winnipeg) is an urban locale to which First Nations people must travel if they wish to receive healthcare beyond what very limited and under-served nursing stations can provide on-reserve (I review the making of this healthcare provision schema in Chapter Five).⁵ Thus, while the reserve system and federal Indian policy has been generally effective in enacting Indigenous erasure in Canadian cities, thereby making it difficult for settlers to see the impacts of structural violence, Thunder Bay is a different kind of place: the settler colonial project sends Indigenous

³ See, for example, Mary Jane McCallum, “The Last Frontier: Isolation and Aboriginal Health” in *The Canadian Bulletin of Medical History*, Vol. 22, No. 1 [2005]: pp. 103-120; Robert Robson, “Suffering an Excess Burden: Housing as a Health Determinant in the First Nations Community of Northern Ontario”, *Canadian Journal of Native Studies* Vol. 28, No. 1 [2008]: pp. 71-87; Pamela Palmater, “Stretched Beyond Human Limits: Death by Poverty in First Nations”, *Canadian Review of Social Policy*, Vol. 65, No. 66 [2011]: pp. 112-127; Kristin Burnett, Kelly Skinner, Joseph LeBlanc, ‘From Foodmail to Nutrition North Canada: Reconsidering Federal Food Subsidy Programs for Northern Ontario’ in *The Canadian Journal of Food Studies* Vol. 2, No. 15 [2015]: pp. 141-156; Kristin Burnett, Lori Chambers, and Travis Hay, “‘A Tragedy to Be Sure’: Heteropatriarchy, Historical Amnesia, and Housing Crises in Northern Ontario” in *Understanding Atrocities: Remembering, Representing, and Teaching Genocide: Special Anthology on Genocide*, ed. Scott Murray (Calgary: University of Calgary Press, 2017), pp: 145-167; finally, see Lori Chambers and Kristin Burnett, “Jordan’s Principle: The Struggle to Access On-Reserve Healthcare for High Needs Indigenous Children in Canada” in *The American Indian Quarterly*, Vol. 41, No. 2 [Spring 2017]: pp. 101-124.

⁴ For example, see “Dealing With Racism Against Aboriginal People in Thunder Bay”, *TorStar News Service*, Dec. 8th, 2015; available online at: <http://www.metronews.ca/news/canada/2015/12/08/dealing-with-racism-against-aboriginal-people-in-thunder-bay.html> [accessed Dec. 29th, 2016]. Also, see Wayne Rivers, “Racism a Common Theme at Thunder Bay Inquest Looking into Deaths of 7 Students”, *APTN National News*, Nov. 23rd, 2015; available online at: <http://aptn.ca/news/2015/11/23/racism-a-common-theme-at-thunder-bay-inquest-looking-into-deaths-of-7-students/> [accessed Dec. 29th, 2016].

⁵ See Lesly McBain, “‘Pulling Up Their Sleeves and Getting On With It’: Providing Healthcare in a Northern Remote Region” in *Canadian Bulletin of Medical History*, Vol. 29, No. 2 [2012]: pp. 309-328.

bodies marked by diabetes to Thunder Bay.⁶ Accordingly, the structural violence of Canadian federal Indian policy is impossible to ignore on the streets of Thunder Bay, as Indigenous peoples with missing limbs are highly visible due to the high incidence of diabetic amputations in the region.

I grew up in Thunder Bay. My father was a police officer and my mother managed multiple wine stores throughout the city. I also have a brother and three uncles who are firefighters, a cousin who is a police officer, and another cousin who is a paramedic. Because we are a relatively liberal family compared to others in Thunder Bay, our professionalization in the provision of alcohol and emergency services produced a kind of tension and inevitably structured our perception of Indigenous peoples in a significant and even foundational way. It was for these exact reasons, I believe, that the ‘firewater myth’ became such a popular topic of discussion around our dinner tables, camp fires, and card games. The mythology holds that Indigenous peoples metabolize alcohol differently than European – sometimes Celtic – peoples because their bodies have not adapted or evolved to handle liquor in the same way as ours. As readers are hopefully already aware, many scientists and social scientists have long identified this account of Indigenous biological susceptibility to alcoholism as little more than fiction.⁷ However, to read the firewater myth as uttered by my family as a truthful statement would fail to interrogate the

⁶ See Kristin Burnett, Lori Chambers, and Travis Hay, “Settling the Table: Northern Food Subsidy Programs and the (Re)Colonisation of Indigenous Bodies” in *Special Issue of Critical Race and Whiteness Studies: The White Man’s Burden After Race*, Vol. 11, No. 1 [2015]: pp. 1-18; also, see Kristin Burnett, Travis Hay, and Lori Chambers, “Settler Colonialism, Indigenous Peoples, and Food: Federal Indian Policies and Nutrition Programs in the Canadian North since 1945” in *The Journal of Colonialism and Colonial History*, Vol. 17, No. 2 [Summer 2016]. Finally, see Maureen Lux, *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s* (Vancouver: UBC Press, 2016).

⁷ For scientific treatments of the firewater myth, see L. Bennion and T.K. Li, “Alcohol Metabolism in American Indians and Whites” in *The New England Journal of Medicine*, Vol. 294 [1976]: pp. 9–13 and C. Garcia-Andrade, T.L. Wall, and C.L. Ehlers, “The Firewater Myth and Response to Alcohol in Mission Indians” in *The American Journal of Psychiatry*, Vol. 154, No. 7 [July 1997]: pp. 983-988; for a fuller critique of the firewater myth from a social science perspective, see James Waldram, *Revenge of the Windigo: The Construction of the Mind and Mental Health of North American Aboriginal Peoples* (Toronto: University of Toronto Press, 2004), p. 137-143.

affective assemblage of settler social relations that cause good, rational, liberal Canadians to take myths for truths.

When she came to Thunder Bay in 2006, Sherene Razack said the following to a room composed mostly of local settlers: “you do have a problem with Aboriginal bodies in the city - not least because they will remind you what kind of place you’re in. *The fiction of the settler state falls apart because these are bodies that bear the imprint of colonial power.* You can’t continue to tell the same stories of being good and being peaceful with these bodies. So these bodies become the space of the greatest disorder: the point at which the official story is contested.”⁸ Razack’s words resonated with me as a young man from my social location who grew up hearing the firewater myth. While Razack was, on the face of it, harshly criticizing Thunder Bay for participating in a broader discourse of Canadian purity and benevolence that coheres itself around constructions of Indigeneity as abject and damaged, I found in her words an empowering and nuanced understanding of the myths that settlers circulate when confronted with the embodied violence of Canadian settler colonialism. Though they were indeed sinister and based in myth, these stories about the natural propensity of Indigenous peoples to alcoholism were attractive to my family precisely because of their liberal leanings and discomfort with their professional proximities to down-and-out Indigenous peoples. With this story of the firewater myth, a colonial occupation was rendered into an apolitical story wherein Indigenous peoples were losers of a genetic lottery and not the targets of a genocidal settler system of land-theft of which we were the benefactors.

⁸ See Sherene Razack, “Reading Bootprints on the Chest: Inquests into the Deaths of Aboriginal People in Custody,” Lakehead University, 25 January, 2011; this talk is available online: <http://www.youtube.com/watch?v=Gv9RIIeqapM> [accessed June 12th, 2016].

I do not mean to pathologize my family nor construct them as less racist than other families in Thunder Bay. Similarly, I do not want to construct Thunder Bay as somehow *more* colonial than the city of Toronto, where I lived as I wrote the majority of this dissertation; however, I do want to make an analogy between the way my family came to understand Indigenous alcoholism and the way Canadians have come to produce knowledges about what is often called ‘Aboriginal diabetes.’ Like the firewater myth, the thrifty gene hypothesis was a scientific sounding evolutionary metanarrative that biologized high rates of type-II diabetes on-reserve as a function of Indigenous susceptibility rather than settler structural violence. It is a mythology that settlers continue to invest in not because it is scientifically true but because it is politically useful in quelling liberal tensions that arise when settlers encounter Indigenous bodies damaged by diabetes.

Thus, in pursuing this history of the thrifty gene hypothesis, I am moving from a particular social experience and rootedness in my location as someone born and raised to a settler family in Thunder Bay, which is Robinson-Superior Treaty (1850) territory.⁹ I want to be critical of the way in which settlers (particularly scientists) have talked about ‘Aboriginal Diabetes’ as if it represented a separate biosocial phenomenon from other forms of diabetes. Further, I want to flag the way in which these scientific discourses about the assumed genetic and evolutionary difference between settlers and Indigenous peoples continue to conceal the violent complex of socio-economic relations that binds settlers and First Nations people together within the claimed boundaries of the Canadian state. At the same time, however, I want to be critical of Canadian settler colonialism in a way that does not create a monster or external enemy that I first construct

⁹ For a brief review of this settler colonial city’s history, see Travis Hay, “How Thunder Bay Was Made: The 1905 Forced Relocation of Fort William First Nation,” *Active History*; available online at: <http://activehistory.ca/2017/01/how-thunder-bay-was-made/> [accessed 9 May 2018].

and then seek to write out of existence. Indeed, the main purpose of the story shared in the above is to admit that the problems with which this dissertation is exercised are not just Canadian problems, but problems that exist at the level of the community I call home and the family members that I love. Simply put, I am embedded within these histories. I cannot (and do not wish to) speak objectively about these matters. In fact, I derive my authoritative voice (at least in the context of settler mythologies) from this embeddedness in social location and acknowledgement of the interiority of settler coloniality as a primary facet of my own historical subjectivity. And though my method is historical in the broad sense, my purposes are unapologetically presentist in nature, as I want settlers to stop pretending that Indigenous peoples are genetically predisposed to type-II diabetes and to confront in a meaningful way the colonial realities that make-up families like mine, cities like Thunder Bay, and settler societies like Canada. With this in mind, it is to the content and context of the thrifty gene hypothesis that I shall now turn.

Foundational Definitions and Debunkings

Diabetes mellitus is not a single disease but a complex set of metabolic disorders associated with the regulation of blood sugar via the hormone insulin. Insulin, which is secreted by beta cells in the pancreas, assists in the uptake of sugar through the bloodstream. Public health and government websites typically refer to diabetes mellitus as split between three types: gestational, type-I, and type-II. Gestational diabetes refers to metabolic complications associated with episodes of elevated blood sugar during pregnancy. Individuals with type-I diabetes mellitus produce very little to no insulin, and therefore must rely on external sources of the hormone to properly regulate their blood sugar. For that reason, this form of diabetes mellitus is often referred to as insulin-dependent diabetes mellitus (IDDM). IDDM differs from *non*-insulin dependent (type-II) diabetes mellitus (NIDDM) – in that the pancreas of type-II diabetics

continues to produce insulin; however, type-II diabetics develop resistance to the insulin their body produces, which prevents a healthy and homeostatic regulation of blood sugar that can lead to hyperglycemia (read: high blood sugar). Over extended periods of time, episodes of hyperglycemia can cause serious and often irreparable damage to nerves and blood vessels in the feet, eyes, kidneys, and heart. Diabetes mellitus is therefore associated with a hardening of the arteries (atherosclerosis), which qualifies it as a condition that puts one at higher risks of coronary heart disease, peripheral vascular disease, heart attacks, and strokes. Further, risk factors for diabetes mellitus lie in both the environmental and biological realms, and a full understanding of its causative structure has yet to be secured by contemporary science. As Michael Montoya explains, “diabetes is caused by an as yet unknown combination of factors that include lifestyle, diet, physical activity, and an array of physiological triggers, among which it is presumed that genetic susceptibility plays a part.”¹⁰ The thrifty gene hypothesis was invented at a time when ‘genetic susceptibility’ was privileged as the most productive domain of scientific study and epidemiological knowledge production to the exclusion of more dynamic or multifactorial models.

The hypothesis was originally formulated in 1962 by the American geneticist James V. Neel, who proposed that the food procurement strategies of what he termed ‘primitive hunter-gatherers’ left them chronically underfed and almost always hungry. Within Neel’s fanciful narrative framework, the constant selection pressure of food shortages shaped Indigenous bodies all over the world to be metabolically ‘thrifty’ in terms of fat storage, caloric intake, and insulin regulation; however, under conditions of colonial modernity, Neel hypothesized, these ‘thrifty

¹⁰ Michael Montoya, *Making the Mexican Diabetic: Race, Science, and the Genetics of Inequality* (Berkeley: University of California Press, 2011), p. 3.

genes' became maladaptive and began contributing in a serious or foundational way to high rates of type-II diabetes in Indigenous communities. In this way, Neel viewed the Indigenous body as shaped by an evolutionary struggle to secure food and to hold onto calories whenever possible. Put more bluntly, "Neel imagined Indigenous Peoples as camel-like beasts with an inherited ability to over-eat during times of plenty so as to produce a storage pouch of abdominal fat that could be drawn on in times of famine and food scarcity."¹¹

Following his invention of the thrifty gene hypothesis in 1962, Neel spent the rest of the decade travelling through Brazil, Venezuela, Costa Rica, and Panama collecting Indigenous blood, bone marrow, breastmilk, urine, faeces, milk, saliva and other biological materials in an effort to find a thrifty gene, or at least some evidence to vindicate his hunch regarding Indigenous bodies and their differential metabolism. Though he was unsuccessful (due to the baselessness of his hypothesis which we will soon cover), Neel did successfully entangle himself in what is probably the biggest scandal in the history of American anthropology. In *Darkness in El Dorado*, Patrick Tierney accused Neel of purposefully spreading diseases amongst Indigenous populations during his 1960s research trips in South America for the purposes of scientific study.¹² M. Susan Lindee (a somewhat more reliable source) suggested that Neel persisted in research efforts in the midst of epidemics, and tempered Tierney's accusations when she wrote that "blood samples remained a very high priority for Neel, even as those around him were dying."¹³ Regardless of the ethics involved in his research trips, Neel was not prepared to stand behind the thrifty gene hypothesis. In 1989, for example, he wrote that "the data on which that

¹¹ Mariana Leal Ferreira and Gretchen Chelsey Lang, "Introduction: Deconstructing Diabetes" in *Diabetes and Indigenous People*, eds. P. Stewart and A. Strathern (Durham: Carolina Academic Press, 2006), pp. xx.

¹² Patrick Tierney, *Darkness in El Dorado: How Scientists and Journalists Devastated the Amazon* (New York: W.W. Norton and Company Publishing, 2000).

¹³ M. Susan Lindee, "Voices of the Dead: James Neel's Amerindian Studies" in *Lost Paradise and the Ethics of Research and Publication* (New York: Oxford University Press, 2004), pp. 28.

(rather soft) hypothesis was based has now largely collapsed.”¹⁴ Ten years later, shortly before he passed away, Neel insisted that there was “no support to the notion that high frequency of Non-Insulin Dependent Diabetes Mellitus (NIDDM) in reservation Amerindians might be due simply to an ethnic predisposition.”¹⁵ And yet, the thrifty gene survived long after the passing of its originator.

In 1999, a team of Canadian scientists led by the geneticist Dr. Robert Hegele published a paper claiming to have located a thrifty gene contributing to type-II diabetes in Sandy Lake First Nation – an Indigenous community located in northwestern Ontario.¹⁶ The finding was a newsworthy one for scientists in Canada as well as globally; for example, the *Canadian Medical Association Journal* ran an article with the title “Gene Defect Driving Diabetes Epidemic on Ontario Reserve”, whereas the *British Medical Journal* reported that “a study conducted in a reservation in northern Ontario has identified a genetic mutation that seems to have allowed the Indians there to survive famines in the past but to have triggered diabetes when food became plentiful and their lives became sedentary.”¹⁷ A Chinese news agency also found the study newsworthy, reporting in March of that year: “Canadian researchers have found that a ‘thrifty’ gene, or genes, may account for the world's third highest rate of diabetes in the Ojibway-Cree native reserve at Sandy Lake in Northern Ontario province of Canada.”¹⁸ As Jennifer Poudrier noted in her foundational critique of the thrifty gene hypothesis, moreover, the extremely popular

¹⁴ James V. Neel, “Update to ‘The Study of Natural Selection in Primitive and Civilized Human Populations’” in *Human Biology*, Vol. 61 [Dec. 1989]: pp. 811–823.

¹⁵ James V. Neel, “The ‘Thrifty Genotype’ in 1998” in *Nutrition Reviews* Vol. 57, No. 5 [1999]: S2-S9.

¹⁶ See Robert Hegele, Henian Cao, Stewart Harris, Anthony Hanley, and Bernam Zinman, “The Hepatic Nuclear Factor-1a G319S Variant Is Associated with Early-Onset Type 2 Diabetes in Canadian Oji-Cree” in *The Journal of Clinical Endocrinology and Metabolism*, Vol. 84, No. 3 [1999]: pp. 1077-1082.

¹⁷ See Greg Basky, “Gene defect driving diabetes epidemic on Ontario reserve” in *The Canadian Medical Association Journal*, Vol. 160, No. 12 [June 1999]: p. 1692; also, see David Stergeon, “‘Thrifty Gene’ Identified in Manitoba Indians” in *The British Medical Journal*, Vol. 318 [March, 1999]: pp. 828.

¹⁸ “Canadian Researchers Uncover Genetic Link for Diabetes”, Xinhua News Agency, March 9th, 1999.

television show *The Nature of Things* reported on the Sandy Lake study in 2005, further securing its popularity in both the national and international realms.¹⁹

Like Neel before him, however, Hegele eventually developed doubts about his findings on the thrifty gene: in 2008, he wrote that “the modern revolution in molecular genetics and biology has focused our attention on the genetic component of disease, at the expense of the environmental component,”²⁰ In 2011, Hegele told the *Globe and Mail* that “newer genetic data suggest it’s incorrect to pin the blame for type 2 diabetes on a single gene in any population” and that “the whole thrifty-gene idea seems to me not to capture the subtlety and complexity... of type 2 diabetes in First Nations communities.”²¹ Elsewhere, Hegele has explained that while “the ‘thrifty gene’ hypothesis might have seemed like a good idea many years ago... current research suggests that in most cases a single mutation in a single gene is unlikely to predispose an entire group of people to a complex outcome like type 2 diabetes.”²² Thus, both Neel and Hegele have been clear that the thrifty gene hypothesis is a misrepresentative and problematic way to think about and approach the biosocial reality of type-II diabetes in Indigenous populations both in Canada and globally. Further, the Canadian Research Chair in the Epidemiology of Type-II Diabetes since 2006, Dr. Anthony Hanley (himself involved in the Sandy Lake study as a graduate student), was generous in his time with me in the summer of 2017, and patiently explained to me the ways in which the science of type-II diabetes in Indigenous, and indeed, all populations, has moved far beyond what are sometimes colloquially referred to as ‘snip studies.’

¹⁹ Jennifer Poudrier, “The Geneticization of Aboriginal Diabetes: Adding Another Scene to the Story of the Thrifty Gene” in *The Canadian Review of Sociology and Anthropology*, Vol. 44, No. 2 [2007]:pp. 237-261

²⁰ Robert Hegele and Rebecca Pollex, “Genetic Susceptibility” in *Health Transitions in Arctic Populations*, eds. T. Kue Young and Peter Bjerregaard (Toronto: University of Toronto Press, 2008): p. 243.

²¹ Robert Hegele quoted in Carolyn Abraham, “The Life and Death of a Seductive Theory,” *The Globe and Mail*, Feb 26, 2011.

²² Robert Hegele quoted in *Indigenous Peoples’ Food Systems and Well-Being: Interventions and Policies for Healthy Communities* (Rome: Food and Agricultural Organization of the United Nations Centre for Indigenous Peoples’ Nutrition and Environment, 2013), p. 14.

In these studies, scientists seek to associate the onset of type-II diabetes in a given population with a particular single nucleotide polymorphism (SNP) located on the human genome. If the diabetics in a given group share a SNP or set of base-pair changes that is not present in the unafflicted members of the group, geneticists identify these particular loci as possible diabetes-associated variants. Importantly, the 2012 Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans cited “genetic research on diabetes in a First Nations community” as an example of a scientific study that is “unlikely to benefit the community in the short term.”²³ To review, then, the scientists involved with the invention and research of the thrifty gene hypothesis have since abandoned it in response to their own further research; further, the insights of the genomic era of molecular biology have refined and added to gene sequencing and variant-linkage studies to the extent that ‘snip’ studies on diabetes are seen as outmoded. Finally, the hypothesis and the studies it advocates have been identified by various research councils as drawing attention away from more pressing areas of research in addition to promising little to no benefit to Indigenous communities.

As numerous critics have pointed out, a foundational problem with the thrifty gene hypothesis was its tendency to construct Indigenous peoples as a kind of monolithic category and diabetes as a singular biosocial phenomenon; for example, the biological anthropologist Emöke Szathmàry went so far as to say that “the thrifty gene hypothesis [was] based on the old 15th-century view that, if you’ve see one American Indian, you've seen them all.”²⁴ Further, Ozanne and Hales explained in *Diabetologia* that “the original hypothesis was misconceived by

²³ Canadian Institute of Health Research, Nation Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, *Tri Council Policy Statement: Ethical Conduct for Research Involving Humans*, December 2012.

²⁴ Emöke Szathmàry, quoted in Carolyn Abraham, "The Life and Death of a Seductive Theory," *The Globe and Mail*, Feb 26, 2011.

regarding all diabetes (insulin-dependent diabetes mellitus and NIDDM) as one condition.”²⁵ To be clear, this problem characterizes iterations of the thrifty gene hypothesis made well after 1962: in their own study on type-II diabetes in Sandy Lake First Nation, Hegele et. al. asserted “that the allele and genotype frequencies in Sandy Lake are representative of the approximately 16,000 aboriginal residents of Northwestern Ontario.”²⁶ Further, Hegele cited the fact that the community was “isolated and accessible for most of the year only by air” as a factor in explaining the relative genetic homogeneity in Sandy Lake as opposed to more accessible urban locales.²⁷ This use of Sandy Lake as a stand-in for all other northern communities, in combination with the claim that ‘isolation’ could be used as a meaningful category for population genetics in the context of Canadian public health research, was called into question by Jennifer Poudrier in 2003. It is necessary to quote Poudrier at length in this regard, and to underscore that Poudrier – a non-scientist – was able to voice this critique long before experts in the field caught up to her high-octane interventions on the thrifty gene hypothesis:

This isolation is assumed to translate into a very slight degree of genetic diversity. However, the contemporary notion of isolation (determined by air travel) certainly does not account for other possible means of travel before the existence of mechanized vehicles. Did the people of Sandy Lake historically travelled by boat, by foot, or by any other means? It is also reported [in Hegele’s paper] that ‘the ancestors of the current residence of this region lived a nomadic, hunting- gathering subsistence.’ What did that ‘nomadic’ existence contribute to possible intertribal marriage or adoption and, therefore, the homogeneity of the community gene pool? Are there more complex and local histories of family lineage that might be relevant?²⁸

²⁵ S. E. Ozanne and C. N. Hales, “Thrifty yes, Genetic no” in *Diabetologia* Vol. 41 [1998]: pp. 486.

²⁶ Hegele et. al., “The Hepatic Nuclear Factor-1a G319S Variant Is Associated with Early-Onset Type 2 Diabetes in Canadian Oji-Cree”, 1077.

²⁷ Robert Hegele, “Lessons from Genetic Studies in Native Canadian Populations” in *Nutrition Review* Vol. 57 [1999]: S

²⁸ Jennifer Poudrier, “Racial Categories and Health Risks: Epidemiological Surveillance among Canadian First Nations” in *Surveillance as Social Sorting: Privacy, Risk, and Digital Discrimination*, ed. David Lyon (New York: Routledge Publishing, 2003), pp. 128.

In this passage, Poudrier identifies a particular instance in which local knowledges and histories were given no epistemic weight in the creation of public health interventions (which drew mainly on a failed hypothesis that had no empirical evidence). Notably, the trope of ‘isolation’ was used in the Sandy Lake study to construct all Indigenous peoples across the provincial north as biologically and essentially different than settler populations. Instructive here is the research of Mary Jane McCallum, whose exhaustive review of the *Canadian Medical Association Journal* demonstrated that “notions of isolation influenced how Aboriginal bodies were depicted as ‘primitive’ and ‘susceptible’” by Canadian scientists and healthcare professionals.²⁹ Clearly, the thrifty gene hypothesis in general and its Canadian iteration specifically signal the monolithic and even unscientific constitution of Indigeneity as an essentialized biological condition associated with susceptibility to disease. In this way, it differs in form *but not in function* from earlier attempts to biologize the death of Indigenous peoples from tuberculosis as a consequence of racial susceptibility.³⁰

The second main shortcoming of the thrifty gene hypothesis was its assumption that Indigenous peoples were unable to secure steady supplies of food through non-western food procurement strategies. In his 1962 paper which originally articulated the thrifty gene hypothesis, Neel wrote that “it must be remembered that during the first 99 per cent or more of man's life on earth, while he existed as a hunter and gatherer, it was often feast or famine.”³¹ This passage is interesting not only because it invokes what is now known as the ‘myth of forager food

²⁹ See Mary Jane McCallum, “The Last Frontier: Isolation and Aboriginal Health” in *The Canadian Bulletin of Medical History*, Vol. 22, No. 1 [2005]: pp. 103-120.

³⁰ Patrick Brantlinger offers a good history of these ‘extinction discourses’; see *Dark Vanishing: Discourse on the Extinction of Primitive Races, 1880-1930* (London: Cornell University Press, 2003). Also, see See Christian W. McMillen, “‘The Red Man and the White Plague’: Rethinking Race, Tuberculosis, and American Indians, ca. 1890–1950” in *The Bulletin of the History of Medicine*, Vol. 82, No. 3 [Fall 2008]: pp. 608-645.

³¹ James V. Neel, “Diabetes Mellitus: A ‘Thrifty’ Genotype Rendered Detrimental by ‘Progress’?” in *The American Journal of Human Genetics*, Vol. 14, No. 4 [December 1962]: pp. 356.

insecurity’, but also because it suggests that ‘Indians’ are biological representatives of ‘man in his primitive state’ that can be studied not on their own terms but as stand-ins for early humans. To be fair to Neel, this ideological or epistemic move in which the ‘Indian’ became a manifestation of biological pastness did not sit easily in his mind. For example, a rather revealing passage in Neel’s autobiography lamented: “again and again I have warned against taking the Yanomama as an exact model for early human societies. On the other hand, we know of no better approximation.”³² The epistemic violence, racism, and white supremacy associated with studying Indigenous peoples as ‘Indians’ whose blood holds answers corresponding to the western biological subject is quite considerable; however, what is important to underscore here is that the construction of the ‘Indian’ as enduring long periods of starvation is unscientific regardless of the ethics and epistemologies involved. For example, Dr. John Speakman insisted in 2006 that biological anthropologists and other scientific researchers already knew enough about historical patterns of famine in pre-neolithic hunter-gatherer societies to refute Neel’s assumptions about “ancient metabolism” being a factor in contemporary diabetes cases; as Speakman explained, “agricultural societies were at least as susceptible to feast-and-famine cycles as hunter-gatherers, with undernourishment rampant in the Greco-Roman empire and Europe both before and during the Industrial Revolution.”³³ Claiming that it was time to ‘call off the search for the thrifty gene’, Speakman’s 2006 intervention offered five numbered objections to the thrifty gene hypothesis listed in the below:

1. The extent of mortality during famine and the frequency of famine are insufficient
2. The historical pattern of famine occurrence is incompatible with other aspects of the hypothesis
3. Relatively few people in famines die of starvation

³² Neel, *Physician to the Gene Pool*, 200.

³³ J.R. Speakman, “Thrifty genes for obesity and the metabolic syndrome – time to call off the search?” in *Diabetes and Vascular Disease Research*, Vol. 3, Issue 1 (May 2006): pp. 7-11.

4. The burden of mortality in famines affects the wrong individuals for there to be selection for energy efficiency
5. The prevalence of obesity between famines is too low.³⁴

In this same year (2006), an article appeared in the *American Journal of Physical Anthropology* with the title “Exploring the Thrifty Genotype’s Food-Shortage Assumptions”; this article reported that there was “no statistical difference ($P < 0.05$) in the quantity of available food...between preindustrial foragers, recent foragers, and agriculturalists.”³⁵ Significantly, the authors argued that their findings added “to a growing literature that calls into question assumptions about forager food insecurity and nutritional status in general, and ultimately, the very foundation of the thrifty genotype hypothesis: the presumed food shortages that selected for a “thrifty” metabolism in past foraging populations.”³⁶ Thus, by 2006, it is fair to say that many experts saw the thrifty gene hypothesis as a house built on sand.

Given the baselessness or at least the assumptive, non-empirical nature of the hypothesis, it is unsurprising that it is almost completely lacking in evidence. As Ozanne and Hales noted one year before the Sandy Lake study was released in 1999, “despite great effort and much expenditure no genetic basis for NIDDM has emerged and recent pan-genomic searches have been very disappointing.”³⁷ Interestingly, in 2009, an article in *Diabetologia* that asked in its title “Is the thrifty genotype hypothesis supported by evidence?” answered in the negative; in 2012, an article in the same journal reaffirmed this finding when reporting that “there had been 45 ‘type-2 diabetes susceptibility genes’” identified globally, but that “these quantitatively account

³⁴ J.R. Speakman, “Thrifty genes for obesity and the metabolic syndrome – time to call off the search?” in *Diabetes and Vascular Disease Research*, Vol. 3, Issue 1 (May 2006): pp. 7-11.

³⁵ D.B. Benyshek and J.T. Watson, “Exploring the Thrifty Genotype’s Food-Shortage Assumptions: A Cross-Cultural Comparison of Ethnographic Accounts of Food Security Among Foraging and Agricultural Societies” in *The American Journal of Physical Anthropology*, Vol. 131 [2006]: pp. 120-126.

³⁶ D.B. Benyshek and J.T. Watson, “Exploring the Thrifty Genotype’s Food-Shortage Assumptions: A Cross-Cultural Comparison of Ethnographic Accounts of Food Security Among Foraging and Agricultural Societies” in *The American Journal of Physical Anthropology*, Vol. 131 [2006]: pp. 120-126.

³⁷ S. E. Ozanne and C. N. Hales, “Thrifty yes, Genetic no” in *Diabetologia* Vol. 41 [1998]: pp. 486.

for only around 10% of the primary constitutional origin of type 2 diabetes”, thereby “confirm[ing] the notion that the association is predominantly non-genetic.”³⁸ In 2014, a comprehensive review of these genetic markers found that “the collective analysis of all T2D-associated variants, even when stratified by their impact on β -cell function or insulin resistance, has to date found no support for global or differential positive selection at T2D loci, thus offering little support for the thrifty gene hypothesis.”³⁹ Other studies have pointed out that the search for a “diabetes gene” in and of itself creates problems in that the genetic spotlight casts a shadow on other contributing factors; for example, Ferreira and Lang argued that “the nervous system... along with the endocrine system... has been greatly neglected, in spite of the evidence that systematic exposure to stressors such as trauma and other kinds of nervous stimuli play an important role in the onset of diabetes mellitus.”⁴⁰ This dovetails neatly with Jennifer Poudrier’s argument concerning genetic research in Indigenous communities in the Canadian context: mainly, that these particular forms of knowledge production are unlikely to help, and are in fact more likely to be “harmful to Aboriginal communities, especially in the case of multifactorial conditions such as obesity and NIDDM [read: type-II diabetes]... because the focus on gene sequencing diverts attention from other basic health requirements like food security [and] employment.”⁴¹ Flagging these critiques of genetic science as syphoning funds and knowledge

³⁸ See L. Southam, N. Soranzo, S. B. Montgomery, T. M. Frayling, M. I. McCarthy, I. Barroso, and E. Zeggini, “Is the thrifty genotype hypothesis supported by evidence based on confirmed type 2 diabetes- and obesity-susceptibility variants?” in *Diabetologia*, Vol. 52 [2009]: p. 1847; also, see A. A. Vaag, L. G. Grunnet, G. P. Arora, and C. Brøns, “The Thrifty Phenotype Hypothesis Revisited” in *Diabetologia* Vol. 55 [2012]: p. 2085.

³⁹ Letizia Marullo, Julia S. El-Sayed Moustafa, and Inga Prokopenko, “Insights into the Genetic Susceptibility to Type 2 Diabetes from Genome-Wide Association Studies of Glycaemic Traits” in *Curr. Diab. Rep.*, Vol 14 [2014]: pp. 556.

⁴⁰ Mariana Leal Ferreira and Gretchen Chelsey Lang, “Introduction: Deconstructing Diabetes” in *Diabetes and Indigenous People*, eds. P. Stewart and A. Strathern (Durham: Carolina Academic Press, 2006), pp. 11.

⁴¹ Jennifer Poudrier, “The Geneticization of Aboriginal Diabetes and Obesity: Adding Another Scene to the Story of the Thrifty Gene” in *Obesity in Canada: Critical Perspectives*, edited by Jenny Ellison, Deborah McPhail, and Wendy Mitchinson (Toronto: University of Toronto Press, 2016), p. 110.

production capacities away from other potential avenues of research and intervention, it is here that I want to leave the science behind, so to speak, as my purpose is not to debunk an already failed hypothesis but to historicize and explain its origins and afterlife.

Chapter Breakdown and Objectives

Because it is based on the ‘*myth* of forager food insecurity’ (and because it represents settler assumptions about Indigenous pasts rather than an actual empirical interrogation into those pasts), I opt to frame the thrifty gene hypothesis as myth(ology). In framing the case this way, I am thinking of what Vine Deloria Jr. wrote concerning the ‘myth of scientific fact’ – a concept I unpack in Chapter One.⁴² In this chapter, I elaborate upon the theoretical frameworks informing this study and discuss the historiographical foundations of reading colonialism and science as co-constituted components of a power/knowledge formation both in the global and Canadian contexts. Significantly, this chapter traces a critical genealogy of Indigenous critique that connects Ella DeLoria – a Yankton Dakota anthropologist born in 1899 – to Dr. Kim TallBear, whose *Native American DNA* (2013) has profoundly shaped the ways in which scholars have approached the fraught histories and methods associated with the science of Indigenous genomics. In so doing, I hope to offer readers not only a review of my theoretical framework, but an intellectual history that affirms the long-standing tradition of critical scholarship undertaken by Indigenous women on Turtle Island. Because all other chapters focus on travelling white male scientists who produce knowledge about Indigenous biologies according to outside predicates, it seemed appropriate to introduce the critical issues tackled in

⁴² Vine Deloria Jr., *Red Earth, White Lies: Native Americans and the Myth of Scientific Fact* (Golden, Colorado: Fulcrum Publishing, 1997).

this dissertation with reference to a more grounded, place-based, and truth-yielding intellectual tradition than the history of the thrifty gene mythology.

Chapter Two (re)tells the story of Charles Darwin and his generative journey aboard the *Beagle* in the 1830s. In the most immediate sense, this chapter offers readers a preview of the narrative structure of the chapters to follow, as each focus singularly on the story of a white male scientist who travelled to Indigenous spaces to produce evolutionary or genetic knowledge that functioned to naturalize or biologize (settler) colonial genocides. Looking closely at Darwin's material conditions of access to the flora and fauna he needed to formulate his theory, I underscore his reliance on family networks of privilege and British imperial powers of naval travel. Therafter, I focus on his writings on Indigenous peoples and the ways in which Darwin saw Indigenous genocide within biological rather than political registers. This chapter also contextualizes discourses of Indigenous disappearance within orders of western thought before the emergence of genetics as a modern scientific discipline. In short, because Darwin didn't know about genetics as the missing material mechanism for evolutionary change, he was forced to used 'nature' as a metaphor for the process by which (un)favourable adaptations were 'selected' in or out of existence: consequently, Darwin's account of evolution by means of natural selection was incomplete and unfortunately retained some of the more racist orders of European thought that saw the extinction of primitive races as inevitable and even natural.

In the same decade that Darwin sailed on the *Beagle*, British Indian policy in Canada took a sharp turn from the formulation of military alliances to the making of a massive experiment in assimilation, civilization, and relocation. In Chapter Three, I discuss the historical development of this experimental logic of federal Indian policy as a way to show that Canada was a national stage on which the drama of evolutionary theory was debated, enacted, and

recruited as a settler colonial governmentality. After reviewing British Indian policy and the foundations of Canadian federal Indian policy and the reserve system, I review the careers of Chief Medical Officers of the Department of Indian Affairs as a way to track the emergence of a more modern scientific logic of policy creation and state knowledge production. I begin with the career of Dr. Peter Hendersen Bryce, who undertook public health surveys that showed genocidal death rates from tuberculosis in residential schools in the early 20th century. Bryce, like his successor E.L. Stone, was not taken seriously by the Superintendent of Indian Affairs and was even professionally punished for producing scientific knowledge and advocating for Indian policy reforms that embarrassed the settler state and its Draconian treatment of Indigenous children. This departmental history frames what is the main narrative of Chapter Three – the career of Percy Moore, who succeeded E.L. Stone in 1937 and served as the medical director of Indian Affairs until 1965. My purpose in reviewing the career of Moore in particular and Chief Medical Officers of Indian Affairs in general is to historicize the foundations of Canadian federal Indian policy and to show both rupture and stasis in the deployment of science by the settler state in its administration of Indian public health. That is, whereas Bryce and Henderson failed to secure scientific management as a viable strategy for settler colonial administration, Moore was much more successful and enjoyed a long-standing employment with the Department of Indian Affairs, and a robust detailing of his career is necessary departmental background for understanding the cultures of surveillance, data collection, and knowledge production that made possible the hunt for the thrifty gene in Sandy Lake First Nation in the 1990s.

Fittingly, in the same decade that Percy Moore retired, James V. Neel invented the thrifty gene hypothesis. Chapter Four focuses singularly on the career of Moore and the story of his

blood-taking expeditions. To that end, I start by reviewing the beginning of Neel's scientific career studying the effects of radiation under the auspices of the Atomic Bomb Casualty Commission in Japan. Thereafter, I follow Neel through colonial Africa as he studied sickle-cell anemia on research trips taken through British, French, and Belgian Africa in the 1950s. Finally, I review in detail the story of Neel's 1962 invention of the thrifty gene hypothesis and his subsequent research trips to Brazil, Venezuela, Costa Rica, and Panama, where he collected blood, bone marrow, breastmilk urine, faeces, milk, saliva and other samples so that he might prove his hypothesis viable. As a way to place the man and his ideas in a Canadian context, I anchor this chapter around the story Neel's 1978 trip to Vancouver where he gave an altogether aggressive keynote address to the American Society of Human Genetics that reflects in a distilled way his legacy in the field of genetic science.

In Chapter Five, I return once again to the Canadian context to tell the story of Dr. Robert Hegele and the reinvention of the thrifty gene hypothesis in the 1990s. Beginning first with a review of the way in which Indigenous peoples across northern Ontario were incorporated into the states' regimes of data collection through partnerships formed between the Sioux Lookout Medical Director and the University of Toronto in the late 1960s, I carry on to a more robust detailing of the Sandy Lake study and the 1999 publication of Hegele et. al's paper. In this chapter, I also review the role of the thrifty gene hypothesis in informing the 'Aboriginal Diabetes Initiative', which received start-off funding the same year as the thrifty gene 'discovery' received the world's attention (1999). Concluding this chapter is a review of the ways in which Canadian state literature, clinical guidelines, and medical journals have continued to reproduce the mythology of the thrifty gene long after it was criticized and rejected by both the scientific community and the very geneticists who originally advanced and defended it.

In my conclusion, I discuss the unsettling nature of the relationship between science and settler colonialism in the Canadian context of ‘Aboriginal diabetes’ and the thrifty gene hypothesis. Based on the evidence of the previous chapters, I argue that there exists a demonstrable historical dynamic in Canada between settler colonial statecraft and scientific knowledge production: whereas science sanitizes the settler state by naturalizing the deaths of Indigenous peoples at the hands of their colonizers, the settler state has constituted Indigenous communities and bodies as sites of scientific knowledge production wherein the disciplines of genetic, endocrinological, epidemiological, and nutritional science can be developed, professionalized, and deployed. This power/knowledge formation is, I claim, the easiest way to explain the curious persistence of the thrifty gene hypothesis long after it was found to be baseless.

Methods and Scopes of the Study

As is evident from my chapter breakdown, it was not possible to draw straight lines when tracing this history and I was forced to transit back and forth between the national and global domains. Beginning with Darwin’s stories of world travel, I move into the story of the scientization of Canadian federal Indian policy; thereafter, I shift back to stories of global science and genetic science, as I follow James V. Neel through post-war Japan, colonial Africa, and South America in the 1960s; finally, I return to the national or federal setting of Canadian colonial healthcare administration by historicizing the survival of the thrifty gene mythology within registers of Canadian scientific research and healthcare provision.

As I move back and forth between the realms of global scientific travel and Canadian colonial medicine, I oscillate between source materials that facilitate the study of these two related but separated spheres of history. In Chapter Two, which focuses on the story of Charles

Darwin, his voyage aboard the *Beagle*, and his writing on ‘Indians’, I rely on a primary reading of his autobiographies, travelogues, and full-length scientific publications.⁴³ In Chapter Three, which focuses on the scientization of Canadian federal Indian policy, I rely on archival research conducted in at Library and Archives Canada (LAC). The vast majority of LAC documents supporting my arguments in this chapter were taken from Record Group 29 (the Department of National Health and Welfare) and RG 22 (the Department of Indian Affairs and Northern Development). In Chapter Four, which follows the scientific travels of American geneticist James V. Neel, I switch again from archives to travelogues and rely heavily on Neel’s rather lengthy and detailed autobiography (which has not been read critically elsewhere, at least to the best of my knowledge) as well as his scientific publications. Finally, in Chapter Five, I return once more to archival materials that sketch out more material and structural histories of colonial medicine and healthcare administration in Canada. The majority of records in this final chapter were taken from the University of Toronto Archives and Records Management Services (UTARMS). UTARMS houses the records for the University of Toronto Sioux Lookout Project – a northern healthcare provision schema hatched between the University of Toronto, the Medical Services Branch, and the Sioux Lookout Zone Health Authority around the exact time the thrifty gene hypothesis was invented. As Chapter Five explains, the historical processes by which southern settler scientists from Toronto travelled to First Nations communities in northern Ontario to hunt for thrifty genes involved not only statist but academic institutions, and my source materials reflect this historical relationship. Thus, my focus on the life-writing,

⁴³ Strictly speaking, my primary reading of Darwin’s life-writing was guided and facilitated by my reading of secondary source materials offered by Robert Young, Tony Barta, and Charles de Paulo. See Robert Young in “Darwin’s Metaphor: Does Nature Select?” in *The Monist*, Vol. 55, No. 3 [July 1971]: pp. 442-503; Tony Barta, “Mr. Darwin’s Shooters: On Natural Selection and the Naturalizing of Genocide” in *Patters of Prejudice*, Vol. 39, No. 2 [2005]: pp. 116-137; finally, see Charles De Paulo, *The Ethnography of Charles Darwin: A Study of His Writings on Aboriginal People* (London: McFarland and Company, Inc., Publishers, 2008).

travelogues, and scientific publications of major evolutionary, genetic, and endocrinological figures in Chapters 2 and 4 offers an intellectual history of the thrifty gene mythology that focuses on the way in which it was produced through powers of imperial travel. In chapters 3 and 5, my focus on Canadian archival records reveals the processes through which settler Canadians came to negotiate and employ these imperial technologies of global science within the national setting by constituting Indigenous communities and bodies as places where Canadian science happens.

By bringing together the life-writing, autobiographies, and scientific publications of major figures in the thrifty gene mythology's history with the more archival and departmental-focused stories of federal Indian policy and its administration of Indigenous public health, I hope to tell a Canadian story that has resonance far beyond the boundaries of a single settler state. And while the goal of this archival hunting and gathering of scientific literature remains Canadian in the sense that I want my fellow settlers to come to terms with our own complicity in so-called 'diabetes epidemics' in First Nations communities, my methods affirm the fact that settler colonialism is a truly global formation composed and constituted at multiple sites through similar power/knowledge formations and acts of land dispossession. As we shall see throughout this dissertation, the settler appropriation of access to nature is a major condition of possibility not only for settler resource economies, but also for settler economies of knowledge and scientific truth. Simply put, access to flora, fauna, blood, and bone make possible the settler state as well as the science that sanitizes the violence of its Indian policy.

Chapter One:

Theorizing the Science of Settler Colonialism

Introduction: The Intellectual Legacy of Ella Deloria

Because of the male-centredness and the whiteness of the scientific tradition, the following four chapters in this book will focus almost singularly on white male scientists who played a central role in the production of the thrifty gene mythology and, by extension, the invention of ‘Aboriginal diabetes’ as a paradigm of Canadian healthcare and scientific research. This is because, as Evelyn Fox Keller writes, “to focus on the personal, emotional, and sexual dimensions of the construction and acceptance of claims to scientific knowledge is, precisely because of the male-centredness of this tradition, to focus on the personal, emotional, and sexual dimensions of male experience.”⁴⁴ For that reason, I wanted to try to balance this study slightly by beginning Chapter One with a story about the Yankton Dakota anthropologist, linguist, ethnologist, artist, poet, and writer Ella Deloria (1899-1971). This is not offered as a gestural or tokenistic inclusion but as a way to introduce the theoretical and historiographical issues that occupy and animate this study. As we shall see, Ella Deloria’s work was foundational in its critical treatment of science and anthropology’s tendency to produce myths and misunderstandings about Indigenous peoples.

Ella Deloria was born on the Yankton Sioux Indian Reserve on the 31st of July in 1889.⁴⁵ Her father, the Reverend Philip Deloria, who had been one of the “first Sioux to receive a college education, established an Episcopal mission in 1885” where Deloria was educated as a young

⁴⁴ Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1985), p. 9-10.

⁴⁵ “Ella Clara Deloria”, *Encyclopedia.com*, 2004; available online, see <http://www.encyclopedia.com/history/encyclopedias-almanacs-transcripts-and-maps/ella-clara-deloria> [accessed 18 July 2017].

child.⁴⁶ In 1915, she completed her Bachelors' Degree in Education at Columbia University.⁴⁷ Soon thereafter, she became “one of the first truly bilingual, bicultural figures in American anthropology, and an extraordinary scholar, teacher, and spirit who pursued her own work and commitments under notoriously adverse conditions.”⁴⁸ Deloria's studies at Columbia University put her in proximity to famed anthropologist Franz Boas – often referred to as the ‘father of modern anthropology.’ While there have been a handful of excellent studies on the life and work of Ella Deloria by scholars much more familiar with her story than myself, she has been poorly remembered by the broader anthropological discipline and sometimes rendered as a mere student or employee of Boas.⁴⁹ Though it was Deloria who did the linguistic labour and translating work for Boas' attempts to understand Lakota language and culture, thereby making much of his ethnology possible, she also taught Boas about forming proper research relationships with Indigenous communities in various letters and personal correspondences. For example, in October of 1929, she wrote to Boas:

I cannot tell you how essential it is for me to take beef or some food each time I go to an informant - the moment I don't, I take myself right out of the Dakota side and class myself with outsiders. If I go, bearing a gift, and gladden the hearts of the informants, and eat with them, and call them by the correct social kinship terms, then later I can go back,

⁴⁶ See Janet Flynn, “Walls and Bridges: Cultural Mediation and the Legacy of Ella Deloria” in *Frontiers: A Journal of Women Studies*, Vol. 21, No. 3 [2000]: pp. 161.

⁴⁷ University of Columbia Department of Anthropology, “The 2018 Undergraduate Ella Deloria Research Fellowship”, 2017; ; available online, see <http://anthropology.columbia.edu/undergraduate-research-fellowships> [accessed 18 July 2018].

⁴⁸ University of Columbia Department of Anthropology, “The 2018 Undergraduate Ella Deloria Research Fellowship”, 2017; ; available online, see <http://anthropology.columbia.edu/undergraduate-research-fellowships> [accessed 18 July 2018]. It should be noted here that Deloria spoke not only Lakota and English, but also the Yankton dialect, which is somewhat more than ‘bilingual’, in the strict sense.

⁴⁹ Aside from the studies cited throughout, a particularly excellent work of research on Ella Deloria can be found in Susana Dalena Geliga-Grazales' “Ella Deloria: A Dakota Woman's Journey Between and Old and New World”, Master's Thesis (University of Nebraska-Lincoln: History Department, 2014); available online, see: <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1069&context=historydiss> [accessed 18 July 2017]. For a particularly touching study, see Susan Gardner, “Speaking of Ella Deloria: Conversations with Joyzelle Gingway Godfrey, 1998-2000, Lower Brule Community College, South Dakota” *The American Indian Quarterly*, Vol.24, No. 3 [Summer 2000]: pp. 456-481.

and ask them all sorts of questions, and get my information, as one would get favors from a relative. It is hard to explain, but it is the only way I can work. To go at it like a white man, for me an Indian, is to throw up an immediate barrier between myself and the people.⁵⁰

In 1929, then, Ella Deloria was writing to the ‘father of modern anthropology’ and schooling him on the importance of paying strict attention to the way in which the researchers related to their Indigenous subjects of study. In the chapters that follow, I will be focusing almost singularly on the way in which white European and settler scientists have conducted themselves and related to their Indigenous objects of study in the colonial locales wherein these exchanges have occurred. I think this little-known episode from the life of Ella Deloria is both powerful and instructive, and while ‘going at it like a white man’ is an exceptionally funny phrase, I find her refusal to articulate the necessity of gift-giving as especially striking: *‘it is hard to explain, but it is the only way I work.’* Readers familiar with the concept of ethnographic refusal, particularly as theorized by Audra Simpson, will find Deloria’s ‘refusal’ to explain herself to Boas as similarly striking.⁵¹ As Simpson writes, her *“notion of refusal articulates a mode of sovereign authority over the presentation of ethnographic data, and so does not present ‘everything.’ This is for the express purpose of protecting the concerns of the community. It acknowledges the asymmetrical power relations that inform research and writing about native lives and politics, and it does not presume that they are on equal footing with anyone.”*⁵² Interestingly, Simpson writes of Ella Deloria in her own book that “Deloria was responsible for the bulk of the ethnological material gathered on her own people and conducted her research at great personal expense. Unlike her

⁵⁰ Ella Deloria to H. E. Beebe, December 1952; cited in Raymond J. DeMallie, "Afterword," in Ella Cara Deloria, *Waterlily* (Lincoln: University of Nebraska Press, 1988), p. 237.

⁵¹ See Audra Simpson, “On Ethnographic Refusal: Indigeneity, ‘Voice’ and Colonial Citizenship” in *Junctures* No. 9 [2007]: p. 217.

⁵² Audra Simpson, *Mohawk Interruptus: Political Life across the Borders of Settler States* (Durham, Duke University Press, 2014): p. 105.

contemporaries she trained with at Columbia—Margaret Mead and Ruth Benedict—Deloria struggled for most of her career to receive funding for her work.”⁵³ And while I will not linger much longer on the Boas connection, I do want to flag the fact that it was meat – ‘beef or some food’ – that Ella required to cultivate good research relations as it introduces the politics of food and nutrition into this history of the emergence of western anthropology.

And while her translation work was foundational and path-breaking (to use a colonialist metaphor), Ella Deloria was no mere translator: following her work with Boas, she went on to publish her own studies in linguistics and ethnology. In 1932, she published *Dakota Texts*; ten years later, she published *Dakota Grammar*.⁵⁴ These texts were central to the intellectual project of American ethnology and anthropology at a key moment in their development. For her work in this and other intellectual pursuits, Ella Deloria was awarded the Indian Achievement Medal in 1943.⁵⁵ This achievement did not bring about satisfaction or rest, however, as she went on to publish *Speaking of Indians* in 1944. In this text, Deloria attempted to address what she saw as a disconnect between anthropological knowledges of ‘Indians’ and the reality of Indigenous experiences of culture, identity, belonging, and colonial contact.⁵⁶ Later, she would write to a friend that her purpose was “to make the Dakota people understandable, as human beings, to the white people who have to deal with them.”⁵⁷ I want to quote the opening lines of *Speaking of Indians* at length:

⁵³ Audra Simpson, *Mohawk Interruptus: Political Life across the Borders of Settler States* (Durham, Duke University Press, 2014): p. 105.

⁵⁴ See Ella Cara Deloria’s *Dakota Texts* (Lincoln: University of Nebraska Press, 1932) and *Dakota Grammar* (American Ethnological Society, 1942).

⁵⁵ “Ella Clara Deloria”, *Encyclopedia.com*, 2004; available online, see <http://www.encyclopedia.com/history/encyclopedias-almanacs-transcripts-and-maps/ella-clara-deloria> [accessed 18 July 2017].

⁵⁶ Ella Deloria, *Speaking of Indians* (Lincoln: University of Nebraska Press, 1944).

⁵⁷ Ella Deloria to H. E. Beebe, December 1952; cited in Raymond J. DeMallie, “Afterword,” in Ella Clara Deloria, *Waterlily* (Lincoln: University of Nebraska Press, 1988), p. 237.

Science tells us that the Native Americans came from northern Asia and that they may have arrived here ten to twelve thousand years ago. But they were not the first inhabitants of this continent. From archaeological evidence we know that man-made implements of stone were left beside ancient campfires fifteen to eighteen thousand years ago, some say twenty thousand... We cannot know what became of them – whether they had all vanished before the ancestors of the modern Indians arrive, or whether some were still wandering about and were absorbed by newcomers. Of course, every bit of this is speculative; one guess is nearly as good as another, for we can never be sure of what actually took place. And it doesn't really matter, does it? All that which lies hidden in the remote past is interesting, to be sure, but not so important as the present and the future.⁵⁸

Thus, in the very first lines of her 1944 book, Ella Deloria disrupted the dominant temporal schema of professional science and anthropology that positioned Indigenous peoples of Turtle Island as ancient immigrants. Significantly, Deloria did not categorically deny the Bering Land Bridge theory, but underscored the possibility of continental occupation by human populations long before the formation of the land bridge (a position that would dovetail neatly with more contemporary studies on coastal migration patterns and pre-Clovis occupation of the continent).⁵⁹ Though Deloria had to cache her intervention in language that concealed the foundational challenge posed to the scientific and anthropological enterprise, it was, in effect, an empirical as well as an ontological challenge to the bodies of knowledge that the western academy had produced on 'Indians'; however, she did not linger long on her landed punch, as she immediately proceeded to underscore that whatever provisional and speculative scientific model we wish to impose on the pastness of Indigeneity on the continent, what truly mattered was the contemporary colonial situation, the material conditions of communities, and the ways in which the scientific enterprise was constellated within these power relations. When I read Deloria's

⁵⁸ Ella Deloria, *Speaking of Indians* (Lincoln: University of Nebraska Press, 1944), p. 1-2.

⁵⁹ For example, see Jessi Halligan et. al., "Pre-Clovis Occupation 14,550 years ago at the Page-Ladson site, Florida, and the peopling of the Americas" in *Science Advances* Vol. 2, No. 5 [May 2016]: pp. 1-8.

words on the ‘remote past’ and the urgency of the contemporary political moment, I am reminded of the words of Frantz Fanon, who was himself channeling Marx in an oft-cited but nonetheless impactful passage: “When one has taken cognizance of this situation, when one has understood it, one considers the job completed. How can one then be deaf to that voice rolling down the stage of history: what matters is not to know the world, but to change it’?”⁶⁰ The presentist sentiments of Deloria as articulated in the opening lines of *Speaking of Indians* also bring to mind the words of the late Stuart Hall:

Against the urgency of people dying in the streets, what in God's name is the point of cultural studies?...At that point, I think anybody who is into cultural studies seriously as an intellectual practice, must feel, on their pulse, its ephemerality, its insubstantiality, how little it registers, how little we've been able to change anything or get anybody to do anything. If you don't feel that as one tension in the work that you are doing, theory has let you off the hook.⁶¹

Though I will return presently to the intellectual legacy of Ella Deloria, I find these connections between the presentist political orientation of Black and Indigenous scholarship important to underscore on its own right, as well as a means of articulating my own approach to scholarship, critique, and writing. Having one’s head rooted firmly in the past is an asset as a historian. Too often, however, the heart follows.

Ella Deloria has an intellectual legacy of which readers are likely aware: her nephew, Vine Deloria Jr., continued this critical project in his 1969 *Custer Died For Your Sins*, in which he implicated anthropological knowledges of Indigeneity as bearing responsibility for “each policy and program with which Indians are plagued.”⁶² In a passage penned elsewhere, Deloria Jr. argued that the “struggle of this century has been to emerge from the heavy burden of

⁶⁰ Frantz Fanon, *Black Skin, White Masks*, trans. C.L. Markmann (New York: Grove Press, 1967), p. 17.

⁶¹ Stuart Hall, “Cultural Studies and its Theoretical Legacies” in *Cultural Studies*, ed. L. Grossberg (London: Routledge, 1992): pp. 285-286.

⁶² Vine Deloria Jr., *Custer Died for Your Sins* (London: MacMillan Company Publishing, 1969), pp. 81.

anthropological definitions that have made Indian communities at times *mere laboratories* for political and social *experiments*.”⁶³ While we will soon turn to a fuller articulation of the way in which Deloria Jr.’s diagnostic work on science, anthropology, and American settler colonialism is easily transferable to a Canadian historical context, it is also necessary to relay here that Ella Deloria’s great-nephew (that is, Vine Deloria Jr.’s son) Phillip J. Deloria has also written powerfully on the way in which settler societies have projected their own anxieties concerning sense of place into constructions of ‘Indians’ that correspond more often to settler imaginaries than historical realities.⁶⁴ And, fittingly, the Deloria family’s intellectual genealogy is not merely a family affair or matter of blood quantum, as they have had a particularly formative influence on the development of Indigenous intellectuals who have challenged more contemporary forms of scientific research on Indigenous peoples as part of settler colonial projects.

Kim TallBear, the current Canadian Research Chair in Indigenous Peoples, Technoscience and Environment at the University of Alberta, recalls that “[her] mother, LeeAnn TallBear, exposed [her] to Deloria’s thinking before [she] could read, when she was an undergraduate student at Northern State College in Aberdeen, South Dakota.”⁶⁵ In 2013, she published *Native American DNA*, thereby consolidating Indigenous critiques of science in general and genetics in particular as a productive intellectual space informed by a long tradition of politically-oriented, presentist academic work that was exercised with the material conditions of Indigenous communities. This particular intellectual genealogy and its insights have been central to this study and its interrogation of the thrifty gene hypothesis; for example, TallBear’s

⁶³ Vine Deloria Jr., *Red Earth, White Lies* (Golden, Colorado: Fulcrum Publishing, 1997), pp. 51.

⁶⁴ See Philip J. Deloria, *Playing Indian* (New Haven: Yale University Press, 1998). Also, see Also, see Philip J. Deloria, *Indians in Unexpected Places* (Lawrence: University Press of Kansas, 2004).

⁶⁵ See Kim TallBear, “Standing With and Speaking as Faith: A Feminist-Indigenous Approach to Inquiry” in *Journal of Research Practice*, Volume 10, Issue 2, Article N17, 2014; available online at <http://jrp.icaap.org/index.php/jrp/article/view/405/371> [accessed 24 Nov., 2016].

work has been foundational in articulating the ways in which genetic research can harm Indigenous communities by drawing attention to “science’s long history of using the remains of people of color to prop up the notion that race is biological, reinforcing its oppressive function.”⁶⁶ Thus, Ella Deloria’s critique of the Bering land bridge (1944) and her work in linguistics and ethnology in many ways made possible Vine Deloria Jr.’s work on anthropology and his critique of the Indian reserve/reservation as a ‘laboratory’ (1969); similarly, Vine Deloria Jr.’s work (as well as his auntie’s) impacted a young Kim TallBear, who thereafter located ‘Native American DNA’ within a power/knowledge formation that emerged in tandem with the ascendancy of settler states and sciences.

The story of Ella Deloria and the intellectual legacy which followed her serves as a good introductory counter-example to the kind of knowledge production I will be discussing in the rest of this dissertation: whereas Ella Deloria challenged the registers of anthropological thought, had a hard time finding funding for her work, and did not receive due recognition for her intellectual contributions to the field, the men I discuss in the following chapters reproduced colonialist modes of knowledge production, found lucrative funding opportunities for their work, and received international recognition for their role in advancing evolutionary, genetic, and metabolic sciences. The travelling power of these scientists as well as their ideas correspond to the glass ceilings and difficult conditions experienced by thinkers such as Ella Deloria. Though my focus is on white male scientists and my discipline is historical in the broad sense (read: not situated within the emergent field of Indigenous Studies), I have nonetheless benefitted from the

⁶⁶ Kim TallBear, “Who Owns the Ancient One?”, BuzzFeed Newsreader, July 23rd, 2015; available online: https://www.buzzfeed.com/kimtallbear/how-the-man-stole-ancient-man-from-his-native-descendants?utm_term=.nhAp5PDy4#.xczYB9Rwv [accessed 24. Nov. 16]. Also, see Kim TallBear, “Narratives of Race and Indigeneity in the Genographic Project” in *The Journal of Law, Medicine & Ethics*, Vol. 35, No. 3 [Fall 2007]; pp. 412-424.

insights and the intellectual labour of those named above. And while I do not want to police a disciplinary quarantine between Indigenous Studies and History, there are particular lines of critique or trajectories of knowledge production that are closed to me. I am thinking here especially of the productive way in which the “thrifty gene hypothesis” can be theorized, played with, pulled apart, and turned inside out according to the epistemologies, ontologies, and cultural modes of critique associated with Cree, Ojibway, and other Anishnabek knowledge systems and traditions. For example, Métis scholar Jennifer Poudrier has argued that “the thrifty gene should not be considered a genetic marker, but rather imagined as a complex character in an evolutionary drama about genes, race, and society beginning with a story of Raven Trickster.”⁶⁷ Refusing these modes of analysis reflects my understanding of the power relations implicit in the practice of research and knowledge production; similarly, my decision not to fly to Sandy Lake First Nation to extract community understandings of diabetes, genetics, and healthcare (explained more fully in the below) rests on a refusal to reproduce the problematics I unpack in this dissertation. Flagging the productive potential of these critical avenues, I leave them untraversed in what follows, as my critical objective corresponds to a subject position that matches up with figures such as Charles Darwin, Percy Moore, James V. Neel, and Robert Hegele rather than Ella Deloria, Vine Deloria Jr., Kim TallBear, and Jennifer Poudrier.

Negotiating Problems of Travel, Power, and Knowledge

At the beginning of this study, my plan was to travel to Sandy Lake First Nation so that I could interview key members of the community about their experiences with and understandings of diabetes, particularly with respect to the thrifty gene hypothesis and the 1999 publication on

⁶⁷ See Jennifer Poudrier, “The Geneticization of Aboriginal Diabetes: Adding Another Scene to the Story of the Thrifty Gene” in *The Canadian Review of Sociology and Anthropology*, Vol. 44, No. 2 [2007]: pp. 237-261.

the alleged ‘discovery’; however, as I began my preliminary studies into the intellectual and material histories associated with the thrifty gene hypothesis, I realized that such an endeavor would be dangerously reproductive of the histories of power and travel that originally constituted the problem I was aiming to address. The story of the thrifty gene hypothesis is a story in which well-funded settler or European men travelled to Indigenous spaces, collected blood and other human samples, and used these materials to produce data that often naturalized, biologized, and geneticized nutrition-related diseases. Regardless of my intentions, I felt that I could not fly in to Sandy Lake First Nation to ask questions, collect data, and then fashion this data into my own narrative, as I could not hope to foundationally critique this sort of knowledge production while practicing it myself.

Three other important reasons prevented me from undertaking this kind of community-based research project: first, I did not feel I could honestly tell community members and ethics review boards that my project would bring a benefit to the community; secondly, I doubted whether or not a truly ethical and anti-colonial research project was feasible within the limited time constraints and resources of a doctoral degree; and third, I was lucky enough to be involved in other community-based, action-oriented research projects that allowed me to partake and participate in these modes of research without enacting or practicing them in my dissertation.⁶⁸ Indeed, I question in a foundational way the logic of having any settler graduate student design their own field study in a First Nation or Inuit community, as scholars at this stage in our career almost by definition lack the requisite experience, training, professionalization, and expertise required to be able to promise good returns to community members who may be generous

⁶⁸ Descriptions of some of this work can be found in Kelly Skinner, Kristin Burnett, Lori Chambers, and Travis Hay, “Retail Food Environments, Shopping Experiences, First Nations, and the Provincial Norths” in *Health Promotion and Chronic Disease Prevention in Canada*, Vol. 37, No. 10 [October 2017].

enough to provide us with their time. Though I hope someday to further develop my capacity for this kind of work and my relationships with First Nations community members throughout northern Ontario (Treaty Nos. 3, 5, and 9), I decided that this dissertation would be based on archival methodologies that took the thrifty gene and the scientists who invented it as its key object of critical inquiry.

What is more, for readers who are not familiar with Sandy Lake First Nation, the community has been extensively over-studied beyond what has unfortunately become ‘normal’ in northern Ontario. For example, while pouring through the field notes of a health survey administrator describing her experiences in Sandy Lake First Nation, I noted that she wrote as far back as 1973 “this community has been very-much over-surveyed.”⁶⁹ As we shall see, between 1973 and 1999, Sandy Lake First Nation became all the more a site of scientific study and it was important to refuse re-enacting this history of travel and observation. While I do not think I have somehow accomplished a ‘settler move to innocence’ or offered some kind of productive settler counterpart to ‘ethnographic refusal’ in shaping the project along these lines, I do want to recall the words of Lenore Keeshig Tobias when she instructed settlers to “stop stealing Native stories” – words that rang in my ear as I tried to figure out where I was positioned and whose story I was trying to tell.⁷⁰ In this regard, I affirm through the writing of this dissertation that settlers have our own stories to tell and many responsibilities to attend to before approaching Indigenous communities with our good intentions and plans to extract stories, knowledges, truth, or some other form of community lifeblood.

⁶⁹ UTARMS, A-2014-0050, Box 002, File No. 4, Fieldnotes of Dr. Mary Hunter, 1973.

⁷⁰ See Eve Tuck and K. Wayne Yang, “Decolonization is not a Metaphor” in *Decolonization: Indigeneity, Education and Society*, Vol. 1, No. 1 [2012]: pp. 1-40. Also, see See Lenore Keeshig Tobias, “Stop Stealing Native Stories” in *Borrowed Power: Essays on Cultural Appropriation*, eds. Bruce Ziff and Pratima Rao (New Jersey: Rutgers University Press, 1997), pp. 71 and Lenore Keeshig-Tobias, “Stop Stealing Native Stories,” *The Globe and Mail*, 26 January 1990, A19.

Thus, for the many reasons listed above, I did not want this dissertation to be about Indigenous peoples or communities in the strict sense, but about the constitution of First Nations and Inuit communities as places of scientific knowledge production – as spaces where geneticists, endocrinologists, and epidemiologists travel to gain access to Indigenous bodies suffering from chronic conditions related to nutrition. Accordingly, the main category of historical interrogation in this dissertation is not merely the idea of the thrifty gene, but the material process that produced it. As we shall see, this was a traceable process involving colonial travel, extractions of blood, assemblages of data, and the rendering intelligible of these data with respect to discourses of Indigenous disappearance. Moreover, in the Canadian context, wherein First Nations and Inuit spaces are places created and heavily over-determined by colonial power, this process also involved an entire governmental regime of federal Indian policy that created these communities as ‘isolated’ spaces where malnutrition and its effects manifested in high rates of metabolic disorders. Though we will review the specifics of these constitutions of First Nations spaces as data-collection sites for government-funded scientists more fully in Chapters Three and Five, I want to proceed with my historiographical articulation of the precedence for this study, as I do not want my characterizations of Canadian colonial formations to appear as baseless, heavy-handed, or unique to this study.

Historiographies of Settler Science in Canada

Many keynote Canadian historians have argued that federal Indian policy can be productively understood as a kind of experiment. Primary in this regard is a recent work by Indigenous health historian Mary Jane Logan McCallum, who has suggested that “starvation, experimentation, segregation, and trauma” have been historically endemic components of Indian policy that historians ought to use in our attempts to understand Canadian colonial health

histories.⁷¹ While this particular article is a recent contribution to the literature, McCallum has been producing rigorously researched and hard-hitting critiques of the Canadian medicalization of colonial violence for quite some time. In a 2005 article titled “The Last Frontier: Isolation and Aboriginal Health”, McCallum investigated medical journals and departmental histories to demonstrate the ways in which colonial forms of data collection, health surveys, and discourses of ‘isolation’ shaped Indigenous health histories.⁷² Notably, McCallum’s work speaks to this project in its articulation of Indigenous health as ‘a frontier’, thereby signaling the way in which the frontiers of modern Canadian science can be mapped evenly onto terrains of Canadian state expansion into the north. Keynote Canadian historian Sarah Carter also maintains a foundational approach with respect to the experimental nature of Indian policy when she writes that “the concept of the reserve as a training ground or *laboratory* for civilizing the Indian began to take shape in the 1830s.”⁷³ In numerous contributions to the field of Canadian social histories of coloniality and gender, Carter articulates reserve spaces as “laboratories of transformation” in which settler notions of Indigenous difference were both developed and deployed.⁷⁴ In his own article detailing the originary logics of federal Indian policy, John Tobias explains that “the reserve system, which was to be the keystone of Canada’s Indian policy, was conceived as a social *laboratory*.”⁷⁵ Statesmen of the confederation period were also quick to point out that

⁷¹ Mary Jane Logan McCallum, “Starvation, Experimentation, Segregation, and Trauma: Words for Reading Indigenous Health History” in *The Canadian Historical Review*, Vol. 98, No. 1 [March 2017]: pp. 96-113.

⁷² For example, twelve years previous to her article on ‘starvation, experimentation, segregation, and trauma’, McCallum published “The Last Frontier: Isolation and Aboriginal Health” in *The Canadian Bulletin of Medical History*, Vol. 22, No. 1 [2005]: pp. 103-120.

⁷³ Sarah Carter, *Lost Harvests: Prairie Indian Reserve Farmers and Government Policy* (Montreal: McGill-Queens University Press, 1990), pp. 24.

⁷⁴ Sarah Carter, *Lost Harvests: Prairie Indian Reserve Farmers and Government Policy* (Montreal: McGill-Queens University Press, 1990), pp. 24. Also, see Carter’s *The Importance of Being Monogamous: Marriage and Nation Building in Western Canada to 1915* (Edmonton: University of Alberta Press, 2008) and *Capturing Women: The Manipulation of Cultural Imagery in Canada’s Prairie West* (London: McGill University Press, 1997).

⁷⁵ John L. Tobias, “Protection, Civilization, Assimilation: An Outline History of Canada’s Indian Policy” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), pp. 43-45.

federal Indian policy was to be “based on the broad and *experimental* principle of treating the Indian as a fellow subject.”⁷⁶ The case has certainly been made, then, that Canadian settler colonial formations have always been premised on a logic of human experimentation that has positioned Indigenous communities as places where settlers enact interventions designed to civilize, assimilate, or otherwise discipline the Indigenous body. In Chapter Three, however, I will attempt to historicize this aspect of federal Indian policy and argue that it was not until the reforms of Percy Moore that the administration of Indian health by the colonial state reached a robust stage of scientization. My position here is not to argue against the foundationalism of experimentation in the context of Canadian Indian policy, but to add texture to this history by sketching out a transformation in which the black robes and bibles of priests and nuns were slowly replaced by the white coats and diagnostic manuals of doctors and nurses as federal Indian policy became less and less about the Christian mathematic of souls and more and more about the scientific production and deployment of public health data.

Also of relevance to this study is the scholarship of both Maureen Lux in *Medicine That Walks* and James Daschuk in *Clearing the Plains* - two texts that demonstrated in a Plains context that the ‘politics of starvation’ and the control of food sources were used as disciplinary and coercive tools of settler colonialism to consolidate state formation and solve the so-called ‘Indian problem.’⁷⁷ Similarly, the work of Frank Tester and Peter Kulchyski in both *Tamaarniit (Mistakes): Inuit Relocation in the Eastern Arctic, 1939-1963* and *Kiumajut (Talking Back): Game management and Inuit rights, 1900–70* is foundational in providing evidence for the

⁷⁶ George Walkem quoted in Cole Harris, *Making Native Space: Colonialism, Resistance, and Reserves in British Columbia* (Vancouver: UBC Press, 200), p. 89.

⁷⁷ See Maureen Lux, *Medicine that Walks: Disease, medicine, and Canadian Plains Native people, 1880–1940* (Toronto: University of Toronto Press, 2001) and James Daschuk, *Clearing the Plains: Disease, politics of starvation, and the loss of Aboriginal life* (Regina: University of Regina Press, 2013).

forced experimental relocation policies of the federal government in the mid-20th century period, as well as the way in which these acts of genocide effected Indigenous access to land-based foods in the years just before the rise of ‘diabetes epidemics’ on-reserve.⁷⁸ A lesser known but still highly relevant contribution to this field is a seldom-cited paper from Andrew Orkin, who provided “an examination of the relocation of Canadian Inuit in 1953 from the perspective of the law on experimentation involving human subjects.”⁷⁹ Lux and Daschuk have focused on the Plains, however, while Tester, Kulchyski, and Orkin have focused on the territorial norths. There is a hole in the literature when it comes to the provincial north of Ontario, which has prevented it from becoming more widely known as a place where scientific studies of human malnutrition have been *and continue to be* conducted.⁸⁰

Hugh Shewell’s research on the history of federal Indian policy has also been foundational in establishing the rise of scientific logics within the regimes of post-war Indian policy. What is more, he was generous with his time, support, and encouragement throughout the writing of this dissertation. Shewell’s *Enough to Keep Them Alive* is an absolute standard in the field and continues to offer what is probably the most comprehensive and ambitious theorizing of federal Indian policy available.⁸¹ Further, in an article investigating “the influence of social sciences on Canada’s Indian policy, 1947-1969”, Shewell explained that Indigenous peoples

⁷⁸ See Peter Kulchyski and Frank Tester, *Kiumajut (Talking Back): Game management and Inuit rights, 1900–70* (Vancouver: UBC Press, 2007), p. 177; also, see Peter Kulchyski and James Tester, *Tammarniit (Mistakes): Inuit Relocation in the Eastern Arctic, 1939-1963* (Vancouver: UBC Press, 1994).

⁷⁹ Andrew Orkin, “Immersion in the High Arctic: An examination of the relocation of Canadian Inuit in 1953 from the perspective of the law on experimentation involving human subjects,” unpublished paper submitted to the Canadian Arctic Resources Committee, 5 July 1993, 1086–1177.

⁸⁰ This argument will be evidenced and proven in Chapter Five, when I review the story of the Sandy Lake study and its legacy in Canadian colonial healthcare; however, readers looking for a contemporary example of similar studies taking place in Indigenous communities in northern Canada can consult Joanne Stassen, “High Infant Mortality Rate May Be Related to Fat-Burning Gene Variation”, *CBC News*, Nov. 12, 2016; available online at: <http://www.cbc.ca/news/canada/north/inuit-infant-mortality-alaska-gene-research-1.3844052> [accessed 22 July 2017].

⁸¹ Hugh Shewell, *Enough to Keep Them Alive: Indian Welfare in Canada, 1873-1965* (Toronto: University of Toronto Press, 1994).

“would have to resist the power of experts who would seek to define and solve their problems within [a] paradigm of universal and scientific truths.”⁸² That the nature of these ‘problems’ often had colonial causes and stemmed from miserly, Draconian Indian policies has been made abundantly clear by many other Canadian historians. In *Colonizing Bodies* (2006), for example, Mary-Ellen Kelm maintains that it is productive and appropriate to theorize “from the starting point that aboriginal bodies are made.”⁸³ The title and content of Cole Harris’ *Making Native Space* (2002) also signals the author’s constructionist interpretation of Indigenous spaces and the medical conditions that tend to effect the bodies that occupy these spaces.⁸⁴

As a close reader of the historians named in the above paragraphs, I was troubled in 2013 by the Canadian media’s reception to the publication of an article by food historian Ian Mosby titled “Administering Colonial Science.”⁸⁵ The article garnered much attention for its descriptions of nutrition experiments conducted on Indigenous children in residential schools between 1942 and 1952.⁸⁶ That the architecture of Canadian settler colonialism used malnourished and captive groups of Indigenous children to produce scientific knowledges about nutrition was a horrifying revelation for many; one newspaper, for example, reported that the experiments were a “dark chapter in Canada’s treatment of aboriginal people.”⁸⁷ Though I

⁸² See Hugh Shewell, “‘What Makes the Indian Tick?’ The influence of social sciences on Canada’s Indian policy, 1947–1964” in *Histoire sociale / Social History*, Vol. 34, no. 67 [May 2001]: p. 133-167. Also, see Sally M. Weaver, “The Hawthorn Report: Its Use in the Making of Canadian Indian Policy” in Noel Dyck and James B. Waldram, eds., *Anthropology, Public Policy, and Native Peoples in Canada* (Montreal and Kingston: McGill-Queen’s University Press, 1993), pp. 75-97.

⁸³ Mary-Ellen Kelm, *Colonizing Bodies: Aboriginal health and healing in British Columbia 1900–50* (Vancouver: UBC Press, 2006), p. 11.

⁸⁴ See Cole Harris, *Making Native Space: Colonialism, resistance, and reserves in British Columbia* (Vancouver: UBC Press, 2002).

⁸⁵ Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952” in *Histoire sociale/Social History* Vol. 46, No. 91 [2013]: pp. 145–72.

⁸⁶ These research projects are discussed in full historical context in “Chapter Three: The Story of Percy Moore.”

⁸⁷ Livingstone, Andrew. “Son defends scientist behind aboriginal nutrition experiments.” *The Star* 24 July 2013; available online at:

commend Mosby for his article, I found the sorts of conversation around it deeply troubling, as I am aware of the very ongoing nature of this issue despite its construction as an shameful but closed chapter of Canadian colonial histories of science and experimentation. In addition to the thrifty gene studies that we will review in extreme detail throughout the following chapters, there continues to be at the time of writing genetic studies on differential rates of infant mortality in northern Indigenous communities.⁸⁸ Clearly, the biologizing of settler colonial structural violence through scientific studies on Indigenous malnutrition is an ongoing and foundational characteristic of Canadian colonial formations: it has characterized federal Indian policy from its outset and continues to define research realities and healthcare delivery at the time of writing. In pointing to this continuous and co-constitutive relationship between Canadian colonialism and scientific knowledge production, I am also hoping to put Canadian history (and historiography) into conversation with other national contexts.

Historiographies of Science and (Settler) Colonialism Outside of Canada

Canada is not the only country to develop a complex between colonialist intervention and scientific study. Indeed, as a British imperial project sutured onto a French colonial mission, Canada is characterized by many of the same power/knowledge formations identified elsewhere by scholars of race, colonialism, and science. As Sandra Harding wrote in *Is Science Multicultural?*, “the establishment of European colonies resulted in immense contributions to the growth of science in Europe” and “mightily advance[d] the growth of European’s knowledge

http://www.thestar.com/news/canada/2013/07/24/son_defends_scientist_behind_aboriginal_nutrition_experiments.html [accessed 21 July 2017].

⁸⁸ Joanne Stassen, “High Infant Mortality Rate May Be Related to Fat-Burning Gene Variation”, *CBC News*, Nov. 12, 2016; available online at: <http://www.cbc.ca/news/canada/north/inuit-infant-mortality-alaska-gene-research-1.3844052> [accessed 22 July 2017].

about nature's order."⁸⁹ Canadian historians such as Ted Binnema have also commented on this dynamic and located it "during the 17th century[, when] exploration became 'scientized' in a process influenced by Bacon's philosophy of science" which saw nature as a feminine essence to be dominated by a knowing and sojourning masculine subject.⁹⁰ Other scholars have traced the trajectory of this relationship between scientific knowledge and imperial travel. Of particular interest here is what Johannes Fabian called 'the topos of travel' or Paul Rabinow called 'anthropos': mainly, the way in which white male colonial travel has been the primary vehicle of anthropological knowledge production.⁹¹ Commenting on the pre-Darwinian histories of colonial pedagogies made possible by white male imperial travel, Fabian writes that, "for the established bourgeois of the 18th century, travel was to become...every man's source of 'philosophical', secular knowledge."⁹² In the aptly titled *The Colonizer's Model of the World*, J.M. Blaut further developed this critical line of thinking when he wrote that "the nineteenth century was the age of scientific exploration – Darwin in the *Beagle*, Livingstone in Africa, Powell in the rockies, and so on – but the sources of support for these efforts tended to be institutions with a very practical interest in the places being studied."⁹³ Thus, from the seventeenth to the nineteenth century, imperial frontiers were produced in tandem with scientific frontiers, as travel became an important part of the material process associated with the production and testing of scientific knowledge.

⁸⁹ Sandra Harding, *Is Science Multicultural?: Postcolonialisms, Feminisms, and Epistemologies* (Bloomington: Indiana University Press, 1998), p. 44.

⁹⁰ Binnema, *Enlightened Zeal*, 33. Though it is probably apocryphal, Bacon is widely cited as having said that nature ought to be 'put on the rack and tortured for her secrets.'

⁹¹ See Johannes Fabian, *Time and the Other: How Anthropology Makes Its Object* (New York: Columbia University Press, 1983). Also, see Michel Foucault, "Space, Power, Knowledge: interview with Paul Rabinow" in *The Foucault Reader*, trans. Christian Hubert (New York: Pantheon Publishing, 1984), pp. 239-257.

⁹² See Johannes Fabian, *Time and the Other: How Anthropology Makes Its Object* (New York: Columbia University Press, 1983), p. 6.

⁹³ J.M. Blaut, *The Colonizer's Model of the World: Geographical Diffusionism and Eurocentric History* (New York: Guildford Publishing, 1993), pp. 23.

This power/knowledge formation was common to a wide array of European imperial powers who, through the power of travel and conquest, gained access to new populations and territories that had to be scientifically managed to be exploitable. In *The Science of Empire*, for example, Zaheer Baber explains that codified knowledges of the Other were central to the maintenance of the British Colonial project in India.⁹⁴ More lofty attempts have been made by scholars such as Helen Tilley to articulate the entirety of Africa as a “living laboratory” in her 2011 book on “empire, development, and the problem of scientific knowledge.”⁹⁵ However, more precise studies from scholars such as Frances Gouda have revealed that Dutch colonists believed “urgent intellectual questions within certain academic disciplines could be tested and verified in a colonial setting” and accordingly “reconfigure[ed] the world of Indonesia as an experimental laboratory” as a means of answering those questions.⁹⁶ This work by Gouda rings true with what I have gleaned from the archival records and travelogues that inform this study, as the violent impact of federal Indian policies appear to have been treated as powerful provocations for scientific knowledge production in mid-20th century Canada. I also find a lot of common ground in this study with what James McClellan’s has written in his keynote work *Colonialism and Science: Saint Domingue in the Old Regime* (1992). In this text, McClellan clearly articulated the way in which science and medicine were not coincidental but constitutive elements of the French colonial project, and his clarity is difficult to paraphrase or cut short:

Science and organized knowledge did not come to Saint Domingue as something separate from the rest of the colonizing process, but, rather, formed an inherent part of French colonialism from the beginning. In

⁹⁴ Zaheer Baber, *The Science of Empire: Scientific Knowledge, Civilization, and Colonial Rule in India* (Albany, N.Y.: State University of New York Press, 1996).

⁹⁵ Helen Tilley, *Africa as Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (Chicago: University of Chicago Press, 2011).

⁹⁶ Frances Gouda, “Mimicry and Projection in the Colonial Encounter: The Dutch East Indies/Indonesia as Experimental Laboratory, 1900-1942” in *The Journal of Colonialism and Colonial History*, Vol. 1, No. 2 [2000].

other words, the French did not colonize Saint Domingue and then import science and medicine as cultural afterthoughts. French science and learning came part and parcel with French colonialism, virtually as a ‘productive force.’ Because they were already so institutionalized in the culture and state apparatus of France in the eighteenth century, science and medicine played – or seemed to play – important roles in the development of French West Indian colonial interests.⁹⁷

As the lengthy passage above reveals, science and medicine have been historicized as ‘productive forces’ that shape colonial encounters in profoundly interconnected ways. This was true of European powers in the general sense (as McClellan, Gouda, and Baber collectively demonstrate) but it has been shown to be particularly acute in the specific socio-economic contexts of settler colonial projects.

Numerous studies undertaken in settler colonial locales other than Canada have made the connection between the emergence of settler colonial states and modern science. In *The Cultivation of Whiteness*, for example, Warwick Anderson reviews how federal policy in post-war Australia became “framed as a vast *experiment*, the results of which only medical scientists could interpret.”⁹⁸ Erik Olssen has made this case in the historical context of New Zealand, which he claims “became a very particular example of post-Enlightenment experimental practice” in the same time period.⁹⁹ In *Commonwealth of Knowledge*, Saul Dubow explores these power/knowledge formations in South Africa and explains how the nation was often seen as “an experimental station and laboratory in racial and cultural relations.”¹⁰⁰ Reading these works over and against one another suggests two things worth noting for my present purposes: first, that

⁹⁷ James E. McClellan, *Colonialism and Science: Saint Domingue in the Old Regime* (Baltimore: John Hopkins University Press, 1992), pp. 7-8.

⁹⁸ Warwick Anderson, *The Cultivation of Whiteness: Science, Health, and Racial Destiny in Australia* (New York: Basic Books Publishing, 2003), p. 113; the emphasis is mine. Also, see Warwick Anderson, *The Collector of Lost Souls: Turning Kuru Scientists Into White Men* (Baltimore, Maryland: John Hopkins University Press, 2008).

⁹⁹ Erik Olssen, “Mr. Wakefield and New Zealand as an Experiment in Post-Enlightenment Experimental Practice” in *The New Zealand Journal of History*, Vol. 31 [1997]: pp. 197-218. This quote is on page 198.

¹⁰⁰ Saul Dubow, *Commonwealth of Knowledge: Science, Sensibility, and White South Africa 1820-2000* (Oxford: Oxford University Press, 2006), p. 231.

settler societies have often understood themselves as experiments in human relocation, transformation, and adaption; second, that settler societies tend to position Indigenous communities as places where scientific knowledges are both developed and deployed. In this way, my work on the thrifty gene hypothesis can be situated in a broader historiographical tradition of scholarship that interrogates the relationship between colonialism and science globally as well as within the national setting of Canadian Indian policy and health histories. Though this dual scope of historical inquiry makes this somewhat messy analytically, I found it important to undertake my critique as an oscillation between global and national settings to affirm that settler colonialism is a global formation rather than an atomized series of national projects incommensurable with or unintelligible to one another.

Gender, Genetics, and Evolutionary Theory

Historically, genetic science has been a knowledge-producing activity dominated by white men. Unsurprisingly, it has borne the stamp of these social origins and acted as a repository for the emotions and myth structures that correspond to that subject position. Of course, this is true of almost all disciplines and fields of knowledge production in the modern university; however, evolutionary theory and genetic science are particularly marked by a history of white masculinity wherein the content – not merely the context – of knowledge production has been skewed by ideologies of race and gender. As we review in the following chapter, Charles Darwin was ignorant of genetics as a mechanism of evolutionary change and was therefore forced to use ‘natural selection’ as a metaphor to represent the process he could not have possibly understood in the mid-19th century. This reliance on a metaphor as the mechanism of evolutionary change created problems for Darwin in *The Descent of Man*, wherein he grappled with the uncomfortable conclusions regarding the “preservation of favoured races in the

struggle for survival.”¹⁰¹ However, as the persistence of the thrifty gene mythology suggests, the discovery of genetics as the missing piece of the evolutionary puzzle did little to rid evolutionary theory and classical genetics from the ideologies that characterized its conditions of historical emergence.

The concept of the ‘gene’ is absent in 19th century discussions of natural philosophy, which –at best- include vague references to Mendellian ‘factors.’ Though Mendel read his foundational paper on the study of heredity on the 8th of February 1865, physicist Evelyn Fox Keller explains that it was not until:

1900 [that] Mendel was rediscovered; in 1902 Mendelian ‘factors’ were tied to chromosomal structures; the term *genetics* was coined in 1905 and *gene* in 1909. In 1915 T.H. Morgan published *The Mechanism of Mendelian Heredity*; in 1916 the first genetics journal was founded, clearly marking the fact that a new discipline was off and running.¹⁰²

While this development in classical genetics filled in the conceptual gaps left by Darwin’s metaphorical account of evolution by means of ‘natural selection’, the discipline was hardly safeguarded from further ideological tampering or the contaminating effects of global politics. Of particular relevance here is the (re)balancing of the geopolitical stage during and after the Second World War, which put an almost complete stop the developing field of embryology as studied in Germany and across Europe more broadly. This non-scientific development shaped post-war genetics in two primary ways: first, it gave precedence and primary consideration to the gene, rather than cytoplasmic substrates, as American post-war science was heavily preoccupied with genetics as opposed to the embryonic focus of Axis powers; second, the post-war power order sent American scientists such as James V. Neel – the inventor of the thrifty gene – all over

¹⁰¹ The quoted section is the subtitle to Darwin’s original publication of “On the Origins of Species.”

¹⁰² Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia University Press, 1995), p. 4.

the world, thus granting them material access to populations considered ‘uncivilized’, and thereby rebooting the entire imperialist enterprise of travelling 19th-century science. Through these political, extra-scientific factors, American post-war power gave intellectual precedence to the study of genetics over embryology and granted material access to American scientists who thereafter led the way in shaping the field of molecular genetics in the late 20th century.

Evelyn Fox Keller has rigorously theorized this intellectual history wherein genes became seen as the primary biological building blocks of all life within the western scientific imaginary.¹⁰³ Naming this problem in biology as “the discourse of gene action”, Keller critiques the ways in which this view of biology included “the attribution of agency, autonomy, and causal primacy to genes” and thereby “cast a deep and debilitating shadow on the questions, the methods, indeed, on the very subject of embryology” as well as the role of cytoplasmic substrates and other biological processes or materials encoded as feminine in relation to the masculine zygote.¹⁰⁴ Throughout her career, Keller named and unpacked this intellectual history as a fundamental example of the ways in which science in general and genetics in particular have not been immune to the myths and ideologies of gender.

In 1953, J.D. Watson and Francis Crick identified deoxyribonucleic acid (DNA) as the biological material associated with genetic variation; however, this moment in the intellectual history of genetics has been wrongly understood as the moment at which all metaphor was removed from the registers of biological sciences. Specifically, the idea that DNA carries

¹⁰³ See Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1985); also, see Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia University Press, 1995); further, see Evelyn Fox Keller, *The Century of the Gene* (Cambridge: Harvard University Press, 2000); finally, see Evelyn Fox Keller, “Beyond the Century of the Gene” in *The Journal of Biosciences*, Vol. 30, No. 1 [March 2005]: pp. 3-10.

¹⁰⁴ Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia University Press, 1995), p. xv.

‘information’ has been identified as a data or computer-based metaphor recruited by Crick and Watson as a way to represent the dynamic process of protein synthesis. As Keller explains:

As early as 1952, geneticists recognized that the technical definition of *information* simply could not serve for biological information (because it would assign the same amount of information to the DNA of a functioning organism as to a mutant form, however disabling that mutation was). Thus the notion of genetical information that Watson and Crick invoked was not literal but metaphoric. But it was extremely powerful... This move and, even more, the collapsing of *information* with *program* and *instruction* vastly fortified the concept of gene action.¹⁰⁵

The Darwinian metaphor of ‘natural selection’ and the data-based metaphor of ‘genetical information’ are important to review in such detail because they are the sites of the thrifty gene mythology’s emergence. Though Keller articulates the discourse of gene action and the primacy given to genetics as implicated in the discipline’s sexist and masculinist conditions of emergence, I plan to show in a comprehensive way that the discourse of gene action was also deeply racist and colonialist in its effects, as it was bound up within the invention of ‘Aboriginal diabetes’ and the simplistic rendering of type-II diabetes on-reserve as a genetic phenomenon void of structural violence. In short, I am quite critical of the Canadian scientific enterprise and a national discourse that holds up figures such as Frederik Banting and Tommy Douglas as national heroes.¹⁰⁶ I plan to show that when we put colonial health histories into conversation with celebratory narratives of healthcare in Canada, we are met with the unsettling fact that professional settler scientists in Indigenous communities have succeeded not in administering curative therapies but in occupying huge amounts of scientific resources for their interventionist and invasive inquiries.

¹⁰⁵ Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia University Press, 1995), p. 19.

¹⁰⁶ Douglas and Banting were the first and fourth ‘Greatest Canadians’ according to the *Canadian Broadcasting Corporation*, 2004.

Conclusion: On the Science of Settler Colonialism

As a project that began as a simple data collection survey in Sandy Lake, this dissertation has kaleidoscoped into an eclectic but nonetheless important investigation into the history of white male travel, settler colonial science, the thrifty gene hypothesis, and the invention of ‘Aboriginal diabetes.’ As we shall see in the chapters that follow, modern molecular genetics reproduced one of the oldest tropes in the colonial handbook – that is, the image the ‘vanishing Indigene’ or ‘disappearing Indian’ – through a combination of blood-taking and myth-making.¹⁰⁷ Thus, at the start of the 21st century, we see in Canada a situation similar to a hundred years previous, wherein tuberculosis was seen as a ‘disease of civilization’ that killed Indigenous peoples who were biologically unfit to survive modernity or contact with white, western civilization.¹⁰⁸ In this way, discourses of tubercular susceptibility in ‘Indian’ populations in the late 19th century (soon after the creation of the reserve and pass systems) appear to have re-emerged in the post-war period in the form of thrifty gene mythologies that, while unscientific and rejected by the academic community, continue to reproduce the thrifty gene mythology as a paradigm of healthcare administration and colonialist intervention.

For example, in 2011 (long after Hegele had already rejected his findings), *Health Canada* issued a report entitled “Diabetes in Canada”; under the subtitle of “genetic risk factors” the report suggested that the “‘thrifty gene effect’ plays a role in the increased rates of obesity and diabetes in the Aboriginal population.”¹⁰⁹ More troublingly, the Canadian Pediatric

¹⁰⁷ Patrick Brantlinger, *Dark Vanishing: Discourse on the Extinction of Primitive Races, 1880-1930* (London: Cornell University Press, 2003); also, see Warwick Anderson, “Immunities of Empire: Race, Disease, and the New Tropical Medicine, 1900–1920,” *Bulletin of Medical History*, Vol. 70 [1996]: pp. 94–118”

¹⁰⁸ See Christian W. McMillen, “‘The Red Man and the White Plague’: Rethinking Race, Tuberculosis, and American Indians, ca. 1890–1950” in *The Bulletin of the History of Medicine*, Vol. 82, No. 3 [Fall 2008]: pp. 608–645.

¹⁰⁹ Health Canada, *Diabetes in Canada: Facts and Figures from a Public Health Perspective*, December, 2011; this document is widely available online, see: <http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/chap6-eng.php> [accessed 7 June 2017].

Society's (CPS) "Position Statement" on "Risk Reduction for Type-II Diabetes in Aboriginal Children in Canada" (affirmed on February 28th, 2018) cites Hegele et. al.'s 1999 study.¹¹⁰ We also find Hegele's study in the footnotes of the 2018 Clinical Practical Guidelines of the Canadian Diabetes Association, as well as in state literature more broadly.¹¹¹ Further examples evidencing the survival of the thrifty gene in regimes of Canadian healthcare and constructions of 'Aboriginal Diabetes' can be found in Chapter Five.

In titling this dissertation 'The Science of Settler Colonialism', I am trying to signal what I see as a dynamic and long-standing relationship between the development and professionalization of Canadian science and the violent impacts of federal Indian policies. For my purposes, the 'science of settler colonialism' refers to modes of scientific knowledge production that do colonial work, operate on colonialist epistemologies, function on extractivist logics consistent with Canadian industry, and ultimately serve to do harm to the very communities that scientists and medical professionals swear to service in good faith. Of course, I am not attempting to theorize within the confines of this dissertation *all* forms of scientific research in Canada as colonial, as studies in mercury poisoning or climate change can and have helped affirm Indigenous political movements and agitations of the settler state, thereby deserving special consideration. Nonetheless, what this study reveals is an uncomfortable and unsettling complicity between the rise of professional Canadian sciences as instituted in southern

¹¹⁰ See K. Saylor, "Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada" in *Pediatric Child Health*, Vol. 10, No. 1 [2005]: pp. 49-52. Also, see Canadian Paediatric Society, *Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada*, January 1st, 2005; reaffirmed February 28th, 2018; available online: <https://www.cps.ca/en/documents/position/risk-reduction-type-two-diabetes-aboriginal-children> [accessed 10 May 2018].

¹¹¹ See L. Crowshoe, D. Dannenbaum, M. Green, R. Henderson, M.N. Hayward, and E. Toth, "Clinical Practical Guidelines: Type 2 Diabetes and Indigenous Peoples" in *The Canadian Journal of Diabetes*, Vol. 42 [2018]: S296-S306.

universities and the lack of access to healthcare, food, and funding that characterizes reserves in the provincial north.

As we shall see in what follows, many scientists became successful, professional, and internationally-celebrated figures in the field as they travelled from settler to Native space and back again. As they did so, they biologized the ‘starvation, experimentation, segregation, and trauma’ they encountered as a function of evolutionary theory, misfiring genetics, or poorly adapted bodies, thereby serving the needs of a settler state responsible for this violence and bound to the provision of relief and healthcare through treaty.

Chapter Two:

The Transit of Charles Darwin: Imperial Travel and Genealogies of Evolutionary Thought

Introduction: Landing on Darwin

I struggled when writing this dissertation with where to begin the story of the thrifty gene hypothesis. Questions of origin, of rupture, and of periodization proved difficult to answer. When did this idea begin? And with whom? Initially, I considered locating the origins of the thrifty gene hypothesis within the travelogues of the Récollets and Jesuits, who often wrote of the ‘Indians’ of the New World as the bearers of bodies far different than their own. There are many examples of relevance contained within *The Jesuit Relations* – a collection of 17th-century Jesuit travelogues often regarded as founding texts in Canadian anthropology. For example, one 17th-century missionary noted that “the Savages do not eat as we French do”, and went so far as to insist that “eating among the Savages is like drinking among the drunkards of Europe.”¹¹² “The Savages have always been gluttons,” wrote this same observer, “[they] eat their food as long as they had any...for that is the kind of life they live, feasting as long as they have something.”¹¹³ Indeed, the Jesuits made much of the difference in foodways across the colonial divide and interpreted these differences with reference to the loaded categories of vice, virtue, civilization, and savagery that they brought with them.¹¹⁴ Yet these categories lacked the kind of

¹¹² See *The Jesuit Relations and Allied Documents: Travels and Explorations of the Jesuit Missionaries in New France, 1610-1791*, ed. Reuben G. Thwaites (Cleveland: The Burroughs Brothers, 1898-1901), p. 267.

¹¹³ See *The Jesuit Relations*, 269.

¹¹⁴ Renée Girard, a graduate student in the History Department at McGill University, is currently doing interesting research on the subject of food and foodways in *The Jesuit Relations*. Renée, who has the language skills to undertake this sort of work in a comprehensive way, was generous with her time and research as I prepared this dissertation. She shared a conference paper titled “Layers of Interpretation: French Missionaries Perception of New France Natives’ Food Culture.” This paper was immensely helpful and shaped my thinking about food and ethnography.

scientificity necessary to include them meaningfully within the history of the thrifty gene hypothesis. *The Jesuit Relations* also correspond to a French colonial project that was rooted in a dominant Christian metaphysic wherein racial differences were generally ascribed to biblical accounts of Adam as opposed to scientific stories about mitochondrial Eve. This would not do, as the science of settler colonialism (at least in its Canadian iterations) appears to have emerged more fully from a British tradition of Victorian science that was present at the inceptions of Canadian federal Indian policy.

The Anglican cleric Robert Thomas Malthus was another potential candidate for locating the origins of the thrifty gene hypothesis. In 1798, he published his *Essay on the Principle of Population, as it affects the future improvement of society, with remarks on the speculations of Mr. Godwin, M. Condorcet, and other writers*.¹¹⁵ This text was a major development in the history of scientific thought for two reasons: first, it included in its assessment of human social relations an arithmetical and geometrical logic that called into question the capacity of civilization to feed itself under observed conditions of population growth and agricultural development, thereby imbuing Malthus' ideas with an authoritative or even 'scientific' force not present in the works of natural theology that came before; second, Malthusian principals produced a worldview in which death, violence, and disharmony were natural and even divinely inspired aspects of the human condition. Malthus wrote:

The power of population is so superior to the power in the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction; and often finish the dreadful work themselves.¹¹⁶

¹¹⁵ See Thomas Malthus, *An Essay on the Principal of Population and Other Writings*, ed. Robert J. Mayhew (London: Penguin Publishing, 2015).

¹¹⁶ See Thomas Malthus, *An Essay on the Principal of Population: Chapter 7*, 1798; available online at <https://www.marxists.org/reference/subject/economics/malthus/ch07.htm> [accessed 29 April 2017].

One can see in this passage the posing of a connection between vice and depopulation wherein famine and food-related health crises are understood to be the manifestation of a given race's inability to follow the heavenly prescriptions of virtue and restraint. For Malthus, such a relation between food consumption and civilization was not merely metaphorical, but existed as an iron law of human societies and their ability to attain to civilizational goals. "Had population and food increased in the same ratio," wrote Malthus, "man might never have emerged from the savage state."¹¹⁷ In other words, Malthus' arguably scientific principles of population were articulated with reference to a Christian moral economy that cohered and grounded savagery as the absence of godly virtue. One can read this tension coming to the fore particularly when Malthus discusses the fall of the Roman empire to 'barbarians' or the rise of the Thirteen Colonies in the New World. But while he retained the ontologies and categories of Christian theology, Malthus was arguably quite scientific in his methods: he not only rooted his analysis in a rationalist understanding of population progression, he also grounded these claims in an empiricist rigor that looked at demographics, statistics, and censuses. He was, for those reasons, an interesting figure to discuss as an originator of the thrifty gene hypothesis. Alas, Malthus was no world traveler: his study on population sizes was informed by travel through European nations, but did not necessarily involve the global power of imperial travel as a condition of possibility (which is a key historical condition of possibility for the emergence of the thrifty gene hypothesis). Further, it is likely that many readers would refuse to see Malthus as scientific in the modern sense, as the direct relationship that he posed between vice and savagery (or between virtue and civilization) rings much more of 18th-century utilitarianism than the proto-scientific debates of natural philosophers in the 19th-century. Even so, one cannot properly introduce a

¹¹⁷ See Thomas Malthus, *An Essay on the Principal of Population: Chapter 18*, 1798; available online at <https://www.marxists.org/reference/subject/economics/malthus/ch18.htm> [accessed 29 April 2017].

western intellectual history of the relationship between food, savagery, and population decline without giving Malthus his due.

Charles Darwin thus presented himself as the best candidate for tracing the origins of the science of settler colonialism and historicizing the relationship between imperial travel and scientific observation of Indigenous peoples. More specifically, Darwin's famous voyage aboard the *H.M.S. Beagle* – a ten-gun brig of the British Imperial Navy – seemed to be a useful starting point as it so neatly encapsulated what Linda Tuhiwai Smith has called “research adventures on Indigenous lands.”¹¹⁸ In his autobiography, Darwin wrote that the voyage was “by far the most important event in my life and has determined my whole career...I have always felt that I owe to the voyage the first real training or education of my mind...I feel sure that it was this training which has enabled me to do whatever I have done in science.”¹¹⁹ In addition to citing his travel aboard the *Beagle* as formative for his future work in science, Darwin's voyage ended in close proximity to the ascension of Queen Victoria on the English throne, which qualified him as an historical actor firmly situated at the beginnings of Victorian science. Darwin's voyage is also central to the history of the coloniality of modern scientific knowledge and the constitution of the ‘Indian’ as an object of scientific, ethnographic, and transatlantic observation. As Charles de Paolo reviewed in his own research, Darwin made many ethnographic observations and evolutionary prescriptions regarding ‘Indians’ during his voyage.¹²⁰ Further, as noted by both Jace Weaver and Coll Thrush, Darwin's voyage aboard the *Beagle* also implicated him in the forced relocation and human trafficking of a group of Yamana people (or ‘Fuegians’) taken from

¹¹⁸ Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (Dunedin: University of Otago Press, 1999). ‘Research Adventures on Indigenous Lands’ is the title of Smith's Fourth Chapter.

¹¹⁹ Charles Darwin, *The Autobiography of Charles Darwin* (London, Bibliolis Books Ltd., 2010), p.17-18.

¹²⁰ Charles De Paolo, *The Ethnography of Charles Darwin: A Study of His Writings on Aboriginal People* (London: McFarland and Company, Inc., Publishers, 2008).

present-day Argentina to be put on ethnographic display in England.¹²¹ Darwin's travels through geographical space can therefore be mapped evenly onto the lines of force that sustained (and linked) British scientific observation and naval power. What is more, Darwin's movement through historical time produces interesting historical proximities when read alongside the rise of the Canadian settler colonial project.

Objectives and Arguments

Significantly, Darwin's journey about the *Beagle* (1831-1836) also happened in the same decade as the rise of British Indian policy in the Canadas. As I shall argue in what follows, Darwin's views on 'Indians' and the story of his global travels can be read within and alongside the broader history of the thrifty gene hypothesis and the development of the co-constitutive dynamic between Canadian settler colonialism and Canadian sciences of nutrition, endocrinology, genetics, and epidemiology. As Robert Young explains, "Darwin displaced some racial ideologies, but replaced them with others", and this intellectual history is important to review in historicizing the formation of Canadian Indian policy.¹²² Thus, while Darwin's bioevolutionary schema affirmed the unity of the human race as descended from a common ancestor, he nonetheless remained convinced that the gap between savagery and civilization was too substantial to be closed through any kind of colonial intervention and that 'Indians' were doomed to disappear as a result of their contact with superior or more 'civilized' European peoples. In the following chapter, I will discuss the ways in which early formulations of Indian policy attempted to either close this civilizational gap or experiment in leaving it wide open

¹²¹ Coll Thrush, *Indigenous London: Native Travelers at the Heart of Empire* (London: Yale University Press, 2016), p. 260. Also, see Jace Weaver, *The Red Atlantic: American Indigenes and the Making of the Modern World, 1000-1927* (Chapel Hill: University of North Carolina Press, 2014), pp. 72-74.

¹²² Robert Young, *Colonial Desire: Hybridity in Theory, Culture and Race* (New York: Routledge Publishing, 1995), p. 73.

through various coerced relocations, scientific observations, and public health interventions. At present, however, my purpose is to use the life-writing and scientific work of Charles Darwin to bring texture to the Victorian waters in which proto-Canadian Indian policies were gestating.

To assist me in this endeavour, I draw on historians of science who have read Darwin through the lens of coloniality to try and locate him as a central and foundational figure in the history of settler colonial science (née British imperial science). As I review the story of Darwin's early life and journey, I will be paying particular attention to his social location, his experience of frontier genocide on the *Beagle* voyage (1831-1836), and his questioning of whether or not the destruction of Indigenous nations should be considered a natural event or a political intervention. In my conclusion, I will more robustly theorize the voyage of Darwin aboard the *Beagle* as an 'imperial transit' in the sense described by Jodi Byrd in *The Transit of Empire* (2011) and affirm the extent to which Indigenous peoples and 'Indians' rest at the very heart of the material and intellectual histories of modern science. To that end, I begin with a brief biographical treatment of Darwin for readers unfamiliar with the more intimate details of his early life.

Darwin's Early Years: From Birth to the Voyage of the Beagle

Charles Robert Darwin was born on the 12th of February, 1809 at the intersection of two rich and powerful families. His paternal grandfather was Erasmus Darwin – a well-respected physician and popular naturalist. As has been noted, Erasmus Darwin's "powerfully argued ideas about the evolution of species mapped out much of the ground to be explored by his grandson Charles."¹²³ Erasmus was published in the *Philosophical Transactions of the Royal Society* and,

¹²³ Martin Priestman, *The Poetry of Erasmus Darwin: Enlightened Spaces, Romantic Times* (London, Routledge Publishing, 2013), p. 2. Also, see Lance Workman, *Charles Darwin: Shaper of Evolutionary Thinking* (New York: Palgrave Macmillan, 2014), p. 10.

as far back as 1771, was penning passages such as the following: “[t]he final course of this contest among males seems to be, that strongest and most active animal should propagate the species which should be improved.”¹²⁴ In 1794, Erasmus published *Zoonomia; or the Laws of Organic Life*. Though this text has been described as closer to Lamarckian evolution than Darwinian thinking, it is clear that Darwin was not - even in the context of his own family - a singular contributor to the theory of evolution by means of natural selection.¹²⁵ A closer look at the life of Erasmus Darwin speaks volumes about the social location of the Darwin family before the birth of Charles. For example, one story of Erasmus has him “turn[ing] down a request to attend the increasingly deranged King George III.”¹²⁶ That Erasmus was politically and economically secure enough not just to receive but also to *refuse* the royal invitation from King George is significant in that it demonstrates the high standing of the Darwin family at the end of the 18th-century. Darwin’s maternal grandfather - Josiah Wedgwood – was also a rich and powerful industrial potter who had amassed a great fortune in tune with the rise of the industrialization and mass production in England. Wedgwood could also boast of royal invitations, as he designed particular products known as ‘Queen’s Ware’ and was even known to refer to himself as ‘Potter to her Majesty’.¹²⁷ Both Erasmus and Josiah Wedgwood were members of the Lunar Society – a collection of prominent scientists, inventors, and entrepreneurs that included the likes of James Watt, Joseph Priestly, and Benjamin Franklin.¹²⁸ As John

¹²⁴ Erasmus Darwin quoted in Lance Workman, *Charles Darwin: Shaper of Evolutionary Thinking* (New York: Palgrave Macmillan, 2014), p. 11. Also, see John Bowlby, *Charles Darwin: A New Life* (New York: W.W. Norton and Company, 1991), p. 28.

¹²⁵ For a discussion of the Lamarckian contents of Erasmus’s *Zoonomia* (1794), see Tim Lewens, *The Routledge Philosophers: Darwin* (Florence, US: Routledge, 2006), p. 9.

¹²⁶ Martin Priestman, *The Poetry of Erasmus Darwin: Enlightened Spaces, Romantic Times* (London, Routledge Publishing, 2013), p. 2.

¹²⁷ John Bowlby, *Charles Darwin: A New Life* (New York: W.W. Norton and Company, 1991), p. 16 and 24.

¹²⁸ John Bowlby, *Charles Darwin: A New Life* (New York: W.W. Norton and Company, 1991), p. 24-26.

Howard wrote, Darwin's biographers are certainly faced with "what amounts to an embarrassment of riches."¹²⁹

Writing of his early life in his own autobiography, Darwin recalls (somewhat surprisingly) that he was considered by "[his] masters and by [his] father a very ordinary boy, rather below the common standard in intellect."¹³⁰ For that reason, Charles' father took him out of school in October of 1825 to study the family business (medicine) alongside his brother at Edinburgh University; however, the extent of his privilege appeared to have prevented the young Darwin from taking very seriously the study of medicine. Darwin reflected:

As I was doing no good at school, my father wisely took me away at a rather earlier age than usual, and sent me (October 1825) to Edinburgh University with my brother, where I stayed for two years or sessions... But soon after this period I became convinced from various small circumstances that my father would leave me property enough to subsist on with some comfort, though I never imagined that I should be so rich a man as I am; but my belief was sufficient to check any strenuous effort to learn medicine."¹³¹

Unsurprisingly, given this admission, Darwin was not successful or even impressive during his studies in Edinburgh. He cultivated little scientific knowledge and developed few skills beyond an already strong penchant for shooting birds.¹³² Darwin recalled that while he did in fact "attended lectures on Geology and Zoology" while at Edinburgh University, he found them "incredibly dull" to the extent that they "produced on [him] the determination never as long as [he] lived to read a book on Geology, or in any way to study the science."¹³³ Similarly, the

¹²⁹ Johnathan Howard, *Darwin: A Very Short Introduction* (London: Oxford Paperbacks, 2003), p. 1.

¹³⁰ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 28.

¹³¹ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 46.

¹³² Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 28 and 48.

¹³³ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 26.

lectures of a “Dr. Munro” on human anatomy were, in Darwin’s words “as dull as he was himself”, and so he did not learn anatomical dissection and drawing (a rather serious shortcoming in a 19th-century naturalist).¹³⁴ One biographer writes that when Darwin left for “Edinburgh to follow in the footsteps of his father (and grandfather)...[he] proved to be a lazy and a queasy student” that spent his time “mainly hunting and drinking.”¹³⁵ Elsewhere in his autobiography, Darwin recalled that the entire Edinburgh academic experience was “intolerably dull” and discloses that he had his sisters do the hard work of telling his father that the young Charles did not want to be a physician.¹³⁶

Charles’ father Robert Darwin was, at this point, seriously concerned that his son was going to become not a naturalist or physician but rather an “idle sporting man”, which Darwin admits “then seemed [his] probable destination.”¹³⁷ On that basis, Mr. Darwin famously insisted that his son was to study at Cambridge and join the clergy as an Anglican priest. Charles recalls that his father then hired a “private tutor” in “the summer of 1828” to prepare him for studies at Cambridge, as his academic performance thus far had been questionable at best.¹³⁸ Yet again, Darwin found his instructor to be a “dull man” whose dullness he cited as the reason for his failure to become proficient at mathematics.¹³⁹ Darwin recalled that he squandered his time at Cambridge, writing: “my time was wasted, as far as the academical studies were concerned, as

¹³⁴ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 47.

¹³⁵ Lance Workman, *Charles Darwin: Shaper of Evolutionary Thinking* (New York: Palgrave Macmillan, 2014), p. 2.

¹³⁶ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 47.

¹³⁷ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 56.

¹³⁸ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 58.

¹³⁹ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 58.

completely as at Edinburgh and at school.”¹⁴⁰ Darwin also wrote that the dullness of his time at Edinburgh further prevented his scientific interest and engagement at Cambridge: “public lecture on several branches were given in the University, attendance being quite voluntary; but I was so sickened with lectures at Edinburgh that I did not even attend.”¹⁴¹ Thus, the Darwin that one encounters in a close reading of his early life, autobiography, and social location is a very human Darwin, indeed: he was not a child prodigy, nor a particularly talented naturalist or gifted academic as a young man. He was, rather, a mostly aimless young man preoccupied with the prospect of disappointing his father.

Luckily for Darwin, however, he was able to secure during his time at Cambridge the friendship of a Professor J.S. Henslow. In his autobiography, Darwin recalls that he was known to his cohort thereafter ‘the man who walks with Henslow’ and that he was often asked by the professor to his family home for dinner.¹⁴² Darwin insisted that his “intimacy with such a man ought to have been an inestimable benefit” and Henslow’s friendship was “a circumstance which influenced [his] whole career more than any other.”¹⁴³ In his own study of the conditions of Charles Darwin’s access to men such as Henslow and their good graces, Howard Gruber proposed that historians ought to think in terms of “networks of enterprise” in order to understand the social circle, advantages, and activities of Charles Darwin during this period in his life.¹⁴⁴ For example, when discussing the ‘unbounded benevolence’ shown to him by

¹⁴⁰ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 58.

¹⁴¹ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 60.

¹⁴² Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 65.

¹⁴³ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 64 and 66.

¹⁴⁴ Howard E. Gruber, “Going the Limit: Toward the Construction of Darwin’s Theory (1832-1839)” in *The Darwinian Heritage*, edited by David Kohn (Princeton: Princeton University Press, 1985).

Henslow, Darwin writes that he was introduced to prominent men in the world of the natural sciences as well as “several other men older than [himself], who did not care much about science, but were friends of Henslow.”¹⁴⁵ What is more, as is already apparent from the story so far, the educational opportunities that Darwin had already received – mainly, his father taking him out of medical school at Edinburgh and sending him to study at Cambridge – had a lot to do with his social location as a white Victorian male born into a prestigious family. British historian of science Janet Browne has made a similar case in her own research into Darwin, which places a high degree of importance on Darwin’s aptitude and experience as a double-end book keeper and keen economist whose close attention to debts and credits in his own personal management of funds deeply informed the way in which he viewed different adaptations as (dis)advantageous within evolutionary economies of change, reproduction, and survival.¹⁴⁶ In any case, there is a strong sense in the historical literature that Darwin was, in both his personal and professional life, indelibly shaped by his social location as a wealthy Victorian male from a powerful family.

In 1831, Henslow began pressing the young Darwin to begin studying geology and started to connect him to prominent men in the field. For example, Henslow asked a colleague (a Professor Sedgewick) if Charles could accompany him on a geological survey of North Wales in August of 1831. Darwin notes that the tour with Sedgewick “was of decided use in teaching [him] a little how to make out the geology of a country.”¹⁴⁷ When he returned home from his privileged excursion with Professor Sedgewick, Darwin received yet another opportunity from Henslow in the form of a letter which explained “that Captain Fitz-Roy [of the British Imperial

¹⁴⁵ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 67.

¹⁴⁶ See Janet Browne’s “Becoming Darwin: History, Memory, and Biography – Economist of Nature”, Dwight H. Terry’s Public Lecture Series, Yale University, November 3rd, 2015; available online at: <https://www.youtube.com/watch?v=KmgGII38EJw&t=593s> [accessed 17 December, 2017].

¹⁴⁷ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 67.

Navy] was willing to give up part of his own cabin to any young man who would volunteer to go with him *without pay* as a naturalist to the Voyage of the *Beagle*.”¹⁴⁸ Darwin’s ability to volunteer for this position as a naturalist on a ten-gun brig of Her Majesty’s Navy was therefore heavily conditioned by his social location and economic privilege: first, (as others have noted¹⁴⁹) he was unqualified as a naturalist, couldn’t draw, and had been studying geology for less than a year with his only academic accreditation coming from the field of theology. Second, Darwin’s ability to accept this offer and seize the opportunity was dependent upon an economic safety-net provided him by his father, as Charles could very much afford to forego an income while sailing around the world for five years (1831-1836) due to his family’s significant wealth. It was by and through these networks of enterprise, privilege, and Victorian social relations that a young Charles Darwin marched aboard the *H.M.S. Beagle* just a few days after Christmas, 1831.

Thus, while personal privilege was an important factor placing the young Darwin aboard the *Beagle*, it should be noted here that it was imperial initiative and military agency that originally requested the presence of a naturalist on board. In the general sense, the presence of a naturalist on board an imperial expedition was a consequence of the implicit knowledge-producing character of the voyage; as Darwin later wrote in *Voyage of the Beagle*, “the object of the expedition was to complete the survey of Patagonia and Tierra del Fuego commenced under Captain King in 1826 to 1830, to survey the shores of Chile, Peru, and of some islands in the Pacific and to carry a chain of chronometrical measurements round the world.”¹⁵⁰ The imperial impetus for the production of scientific and cartographic knowledges is a well-theorized and

¹⁴⁸ Charles Darwin, *The Autobiography of Charles Darwin, 1809-1882*, edited by Nora Barlow (New York: W.W. Norton and Company, 1958), p. 71.

¹⁴⁹ For example, LeMaster and Wilson write: “With little qualification beyond the recommendation of J.S. Henslow... Darwin was appointed ‘naturalist’ on the five-year-long British expedition setting out to explore the coasts of South America and points west on the HMS *Beagle*” [emphasis mine]; see J.R. LeMaster and James D. Wilson, *The Routledge Encyclopedia of Mark Twain* (New York: Routledge Publishing, 1993), p. 204.

¹⁵⁰ Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 1.

thoroughly historicized aspect of 19th-century modes of colonial expansion. As J.M. Blaut explains in *The Colonizer's Model of the World*, “the nineteenth century was the age of scientific exploration – Darwin in the *Beagle*, Livingstone in Africa, Powell in the rockies, and so on – but the sources of support for these efforts tended to be institutions with a very practical interest in the places being studied.”¹⁵¹ Postcolonial feminist thinker Sandra Harding made a similar case when she noted that “Europeans’ appropriation of access to nature around the globe enabled them also to compare, contrast, and combine observations of nature’s regularities in divergent geographical sites”, thereby knitting together in an inextricable way practices of imperial travel and scientific knowledge production.¹⁵² Indeed, the relationship between imperial military power and the emergent knowledge of natural sciences – embodied in the personal intimacies of Charles Darwin and Robert Fitzroy – was a productive one.

The role that Darwin was to play on the *Beagle* was not entirely scientific: indeed, his academic prowess for geology and other pursuits in the natural sciences had so far been questionable at best. Darwin himself noted that his place in the expedition “was in consequence of a wish expressed by Captain Fitzroy of having some scientific person on board.”¹⁵³ While I do want to underscore the significance of the imperial initiative towards cartographic knowledge as concerns my broader argument concerning the power/knowledge formations that characterize settler colonial science, I think it is also important to disclose at this juncture the fact that Darwin’s spot on the *Beagle* had as much to do with Victorian attitudes towards social relations as they did towards scientific knowledge production. I am referring here to the way in which

¹⁵¹ J.M. Blaut, *The Colonizer's Model of the World: Geographical Diffusionism and Eurocentric History* (New York: Guildford Publishing, 1993), pp. 23.

¹⁵² Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities, and Modernities* (Durham, Duke University Press, 2008), p. 137.

¹⁵³ Charles Darwin, *The Autobiography of Charles Darwin* (London, Bibliolis Books Ltd., 2010), p. 18.

Robert Fitzroy, himself a young Victorian man born into a rich and prestigious family, was not expected to keep much company with the crew of the *Beagle*, as he was being groomed for a more lucrative career that eventually led him to his Vice Admiralty. On that basis, as keynote Darwin biographers Desmond and Moore explain, he was expected to keep in his company a “gentleman dining companion” on the long journey who might “relieve the loneliness of command” and keep the high-born Fitzroy from consorting in too familiar a fashion with the more lowly crew.¹⁵⁴ Thus Fitzroy, who was initially concerned that Darwin was too weak and whiggish a man for the voyage, eventually had his reserves quelled by the assurance that the “breeding and manners” of Charles Darwin were sufficient to the task at hand.¹⁵⁵ Fitzroy had grounds to be suspicious, as he had some idea of what to expect on the *Beagle*’s second journey.

In *The Red Atlantic*, Jace Weaver pays close attention to the first journey of the *H.M.S. Beagle* and retells the multiple interactions Fitzroy had with ‘indigenes.’¹⁵⁶ In January of 1830, Fitzroy was enraged to find that a group of Yamana Indians had stolen one of his crews whaleboats, dismantled it, and repurposed the materials used in its construction.¹⁵⁷ A month previous, Fitzroy’s crew attempted to avenge a crew member that had been beaten and robbed by a group of Yamana, but were scared off by armed ‘Fuegians’ who promptly forced the crew to flee.¹⁵⁸ Not wanting to lose face following the theft of the whale boat, Fitzroy decided to seek

¹⁵⁴ Adrian Desmond and James Moore, *Darwin’s Sacred Cause: How a Hatred of Slavery Shaped Darwin’s Views on Human Evolution* (New York: Houghton Mifflin Harcourt, 2009), p. 72.

¹⁵⁵ Adrian Desmond and James Moore, *Darwin’s Sacred Cause: How a Hatred of Slavery Shaped Darwin’s Views on Human Evolution* (New York: Houghton Mifflin Harcourt, 2009), p. 72. On page 76, Desmond and Moore repeat the argument that the primary purpose for Darwin’s presence on the *Beagle* was to “mess together” with Fitzroy.

¹⁵⁶ Jace Weaver, *The Red Atlantic: American Indigenes and the Making of the Modern World, 1000-1927* (Chapel Hill: University of North Carolina Press, 2014), pp. 66-69.

¹⁵⁷ Jace Weaver, *The Red Atlantic: American Indigenes and the Making of the Modern World, 1000-1927* (Chapel Hill: University of North Carolina Press, 2014), pp. 66-69.

¹⁵⁸ Jace Weaver, *The Red Atlantic: American Indigenes and the Making of the Modern World, 1000-1927* (Chapel Hill: University of North Carolina Press, 2014), pp. 66-69.

revenge by taking three ‘Fuegians’ hostage.¹⁵⁹ In *Evolution’s Captain*, biographer Peter Nichols claims that, for Fitzroy, the decision to take hostages was “an act that required no justification. It was a quick, practical decision, born of the necessity of the situation, but was a signal moment of change in Fitzroy’s relationship with the Fuegians.”¹⁶⁰ Weaver notes that Fitzroy attempted to turn these ‘Fuegians’ into intermediaries by training them in English language, culture, and power; what is more, Fitzroy had the four hostages vaccinated for smallpox in Uruguay, which ultimately caused one of the hostages to die (likely due to the quality of the vaccine).¹⁶¹ One can only assume that Darwin heard many such stories from Fitzroy during the *Beagle’s* second journey, which may have shaped the way he wrote about ‘Indians’ in his travelogues, autobiographies, and scientific publications. Further, it is reasonable to infer that the ‘Fuegian’ and ‘Yamanan’ peoples contacted by these imperial travelers may have produced ancestry that were studied by James V. Neel in his 1960s research ventures through Yanamamo villages.

A Young Darwin Encounters Genocide

As Tony Barta writes, while the voyage of the *Beagle* initiated Darwin more fully into the world of natural science, it also introduced him “into another drama, quicker and more dire. While he began his search for specimens in South America, the settlers were shooting the Indians. Even as his party of Europeans discovered the remains of long-dead megafauna, he observed European colonists doing their best to make the indigenous people extinct.”¹⁶² Barta

¹⁵⁹ Jace Weaver, *The Red Atlantic: American Indigenes and the Making of the Modern World, 1000-1927* (Chapel Hill: University of North Carolina Press, 2014), pp. 66-69.

¹⁶⁰ Peter Nichols, *Evolution’s Captain: The Dark Fate of the Man Who Sailed Charles Darwin Around the World* (New York: Harper Collins, 2003), p. 47.

¹⁶¹ Peter Nichols, *Evolution’s Captain: The Dark Fate of the Man Who Sailed Charles Darwin Around the World* (New York: Harper Collins, 2003), p. 47.

¹⁶² Tony Barta, “Mr. Darwin’s Shooters: On Natural Selection and the Naturalizing of Genocide” in *Patterns of Prejudice*, Vol. 39, No. 2 [2005]: p. 117.

extends this argument to make the case that “the practices of colonialism that Darwin encountered as a young man were embedded in the vocabulary of his most influential work and its reception.”¹⁶³ Indeed, it is clear from Darwin’s own writing that his first encounters with Indigeneity left an indelible impression on his psyche: “The sight of a naked savage in his native land”, wrote Darwin, “is an event which can never be forgotten.”¹⁶⁴ So too was Darwin impacted by encountering first-hand what he called the ‘war of extermination’ that Spanish colonials were visiting upon Indigenous peoples. In *The Voyage of the Beagle*, Darwin often reads as the first modern war correspondent:¹⁶⁵

During my stay at Bahia Blanca, while waiting for the Beagle, the place was in a constant state of excitement, from rumours of wars and victories, between the troops of Rosas and the wild Indians. One day an account came that a small party forming one of the postas on the line to Buenos Ayres, had been found all murdered. The next day, three hundred men arrived from the Colorado, under the command of Commandant Miranda. A large portion of these men were Indians...they passed the night here; and it was impossible to conceive anything more wild and savage than the scene of their bivouac [read: camps].¹⁶⁶

Elsewhere, Darwin recounts some experiential knowledge of military battles on the frontier:

The only weapon of an Indian is a very long bamboo or chuzo, ornamented with ostrich feathers, and pointed by a sharp spearhead...Another attack was still more quickly repulsed. A cool Frenchman managed the gun; he stopped till the Indians approached close, and then raked their line with grape-shot: he thus laid thirty-

¹⁶³ Tony Barta, “Mr. Darwin’s Shooters: On Natural Selection and the Naturalizing of Genocide” in *Patters of Prejudice*, Vol. 39, No. 2 [2005]: p. 119.

¹⁶⁴ Darwin, Charles, *The Autobiography of Charles Darwin 1809-1882*, Barlow, Nora, ed., London and Glasgow: Collins Clear-Type Press, 1958, pp. 80

¹⁶⁵ This depiction of Darwin as the first modern war correspondent is borrowed from Charles De Paolo, *The Ethnography of Charles Darwin: A Study of His Writings on Aboriginal People* (London: McFarland and Company, Inc., Publishers, 2008), p. 1.

¹⁶⁶ This depiction of Darwin as the first modern war correspondent is borrowed from Charles De Paolo, *The Ethnography of Charles Darwin: A Study of His Writings on Aboriginal People* (London: McFarland and Company, Inc., Publishers, 2008), p. 1. The quoted passage is from Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 1.

nine of them on the ground; and, of course, such a blow immediately routed the whole party.¹⁶⁷

In other passages, Darwin makes clear that he could not possibly have understood what he saw as the sizeable gap between civility and savagery before seeing a ‘savage’ in person, even going so far as to relate this difference to variation under domestication: “I could not have believed how wide was the difference between savage and civilized man: it is greater than between a wild and domesticated animal.”¹⁶⁸ Closer readers of Darwin will intuit that this comparison between ‘Indians’ and undomesticated animals speaks to the coloniality of Darwin’s methodology and metaphors in *Origins of the Species* – a text which began with a chapter on ‘Variation Under Domestication’ as the primary elaborative context for his later articulation of evolution by means of natural selection. This is further evidence that Darwin’s frontier experience shaped the way he thought about biological variation in the broad sense.

As Charles de Paulo has shown in his dutiful analysis of Darwin’s writings on Indigenous peoples, there is a “contradiction in Darwin’s thinking [that] was the consequence of his applying laissez-faire policy and evolutionary principles to the colonization of tribal lands... Darwin, therefore, appeared to rationalize, and thereby to sanction, colonial advancement as inexorable and as perfectly consistent with the natural laws governing demography.”¹⁶⁹ To my mind, there are two primary passages that present themselves as exemplary of this attitude. First is Darwin’s description of the justificatory discourses at work regarding the Spanish colonial genocide. He writes: “everyone here is fully convinced that this is the most just war, because it is against barbarians... the children of the Indians are saved, to be sold or given away as servants,

¹⁶⁷ Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 40.

¹⁶⁸ Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 125.

¹⁶⁹ Charles De Paulo, *The Ethnography of Charles Darwin: A Study of His Writings on Aboriginal People* (London: McFarland and Company, Inc., Publishers, 2008), p. 3.

or rather slaves for as long a time as the owners can make them believe themselves slaves; *but I believe in their treatment there is little to complain of.*"¹⁷⁰ At first glance, the Darwin we read in this passage is certainly at odds with 'Darwin the abolitionist' as constructed by Desmond and Moore (2009), as he appears not to see slavery of Indigenous peoples as an affront to human dignity or an Adamic ethic of universal human brotherhood; however, as De Paulo explains, this need not necessarily be read as a contradiction or inconsistency in his thinking, as Darwin was in a much larger sense puzzled by the question of how 'Indians' fit into his moral and biological schemas. In this reading, Darwin viewed Black slavery as an evil because it was an unnatural affront to *laissez-faire* concepts such as freedom, agency, and property, whereas the extermination of Indigenous peoples perplexed Darwin as a potentially natural and inevitable biological event (as opposed to an unnatural political intervention that could be resisted).

Darwin dealt with few of these anthropocentric tensions in *On the Origin of Species, or the Preservation of Favoured Races in the Struggle for Survival* (1859); however, in 1871, Darwin published *The Descent of Man, and Selection in Relation to Sex*, wherein he grappled continuously with the implications of understanding the history of man within biological terms of struggle, selection, and survival. Though it has become a slight cliché to quote selectively from this text (which might be considered Darwin at his worst), one passage proves far too relevant to miss (at least for the purposes of a historical investigation of the thrifty gene hypothesis). In this passage, Darwin postulates that the Indigenous body must be haunted biologically by some kind of mechanism or agency that ensures contact with civilized societies brings about death, destruction, and disappearance:

Besides these several evident causes of destruction, there appears to be some mysterious agency generally at work. Wherever the

¹⁷⁰ Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 65.

European has trod, death seems to pursue the Aboriginal... We may look to the wide extent of the Americas, Polynesia, the Cape of Good Hope, and Australia, and we find the same result. Nor is it the white man that thus acts the destroyer... The varieties of man seem to act on each other in the same way as different species of animals – the stronger always extirpating the weaker.¹⁷¹

Darwin's identification of a 'mysterious agency' causing the disappearance of Indigenous peoples is extremely significant in the broader context of the thrifty gene hypothesis, as genetics can be generally regarded as the 'mysterious agents' that eluded Darwin's understanding.

Mr. Darwin's Metaphor

While it may at first seem unproductive or even unfair to point out that Darwin didn't know about genetics, the implications of this fact bear heavily on the way in which myth and metaphor found space to survive within the registers of modern scientific thought and created fertile ground for the growth of the thrifty gene hypothesis in post-war genetic science. Specifically, because Darwin lacked an understanding of classical or molecular genetics, he was forced to use the concept of struggle and selection as the primary constitutive dynamic that informed the success or failure of variations and thereby shaped natural selection in a foundational way. Robert Young explains:

Darwin's reasons for pitching his argument in abstract and metaphorical terms [of struggle] was that he was frankly and profoundly ignorant of both the causes of variation and the precise means by which favourable variations were preserved and accumulated. That is, he really had no mechanism at all. A crude and anachronistic way of putting this is to say that he lacked a particulate theory of heredity, a distinction between somatic and germ cells, and a

¹⁷¹ Darwin quoted in Evelleen Richards, *Darwin and the Making of Sexual Selection* (Chicago: University of Chicago Press, 2017) , p. 31.

concept of dominance. In short, he lacked genetics and molecular biology.¹⁷²

Thus, while Darwin's theory was both predictive and powerful, it had one very specific blind spot: it "located struggle and the survival of the fittest as the central animating force that originated the species and acted as a check on the (de)population processes theorized by Malthus in the century previous."¹⁷³ Again, this was a fully necessary and even productive metaphor, as Darwin could not have possibly benefitted from the insights of genetics (neither Mendellian, classical, nor molecular).¹⁷⁴ Nonetheless, Darwin's metaphor of 'natural selection' retained the voluntarist overtones of Christian theology by positioning nature as an active selecting agent. More broadly, this tension over the evolutionary agency of nature's 'selection' problematically positioned the elimination of Indigenous nations as an event that was 'selected', thereby causing Darwin to retain the cold logics of a Malthusian moral economy that saw race-based population decline as divinely inspired, written in stone, and inevitable. If we are taking the analysis of Charles de Paulo seriously, Darwin's vocabulary of struggle and survival was also to some extent informed or even contaminated by the colonial experiences of witnessing the nature of contact between Spanish and British imperials and the Indigenous peoples whose lands they targeted for cultivation. In a direct way, then, the question of the cultivation of land became for Darwin a question of struggle and survival for the Indigenous peoples located in these territories.

¹⁷² Robert Young, *Darwin's Metaphor: Nature's Place in Victorian Culture* (Cambridge: Cambridge University Press, 1985), p. 97. Also, see in Robert Young in "Darwin's Metaphor: Does Nature Select?" in *The Monist*, Vol. 55, No. 3 [July 1971]: pp. 442-503

¹⁷³ Robert Young, *Darwin's Metaphor: Nature's Place in Victorian Culture* (Cambridge: Cambridge University Press, 1985), p. 98.

¹⁷⁴ This necessity to reach for metaphor is mirrored later in the history of genetic science; as Evelyn Fox Keller writes, "the notion of genetical information that Watson and Crick invoked [in the 1950s] was not literal but metaphoric." See Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia University Press, 1995), p. 19.

Reading Darwin's diaries and other writings – specifically, those that make anthropological or ethnological descriptions of Indigenous peoples – it becomes apparent that he was often preoccupied with Indigenous foodways and eating. For example, when Darwin took to sea aboard the *Beagle*, three Tierra del Fuegians captured on a previous imperial voyage were present on the ship.¹⁷⁵ Darwin wrote in his recollections aboard the *Beagle*: “we got on board with our three giants, who dined with the captain...nothing was so much relished as sugar.”¹⁷⁶ In this passage (as well in others), Darwin's ‘Indians’ are relentlessly embodied beings with massive bodies ruled by primitive passions and base appetites. Elsewhere, Darwin's travel journals double-down on this construction: “the Indians eat much salt, their children sucking it like sugar...this habit is very different from the Spanish Gauchos, who, leading the same kind of life, eat scarcely any...[the Indians] have an unconquerable desire for salt.”¹⁷⁷ I believe Darwin's language is important here, as the ‘unconquerable desire’ of the ‘Indian’ for salt and sugar seems to show up rather powerfully as analytic assumptions when he discusses ‘the preservation of favoured races.’ In passages of this kind, Darwin theorizes the inevitability of Indigenous decline: “We can see that the cultivation of the land will be fatal in many ways to savages, for they cannot, or will not, change their habits. New diseases and vices are highly destructive; and it appears that in every nation a new disease causes much death, until those who are most susceptible to its destructive influence are gradually weeded out.”¹⁷⁸ The significance of this and other passages quoted above paragraph is that they each network together a Malthusian view of food production, the domestication of animals, and struggle that naturalizes Indigenous genocide

¹⁷⁵ The story of the first voyage of the *Beagle* and the ascendancy of Fitzroy to the position of Captain is well narrated by Peter Nichols in *Evolutions Captain: The Dark Fate of the Man Who Sailed Charles Darwin Around the World* (New York: Harper Collins, 2003).

¹⁷⁶ Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 142.

¹⁷⁷ Charles Darwin, *The Voyage of the Beagle* (Ebook: Project Gutenberg, 2010), p. 62.

¹⁷⁸ Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (Princeton: Princeton University Press, 1981), pp. 233.

as a biological process rather than a political intervention. In making these connections, Darwin reproduced a teleology of historicist progress and Indigenous disappearance by constructing the cultivation of land as causally linked to the disappearance of ‘savage races.’ Whereas Darwin the Abolitionist (see Desmond and Moore [2009]) viewed slavery as the theft of life and property and therefore as immoral, Darwin the Colonialist seems to have viewed Indigenous peoples as excepted from this larger ethical system. Take as an example in this regard the following passage, wherein Darwin acts as an ethnographer of ‘Indians’ in the early 1830s:

If their dress and appearance is miserable, their manner of living is still more so. – Their food chiefly consists of limpets and mussels, together with seals & a few birds; they must also catch occasionally a Guanaco. They seem to have no property excepting bows & arrows & spears; their present residence is under a few bushes by a ledge or rock: it is no ways sufficient to keep out rain or wind... I believe if the world was searched, no lower grade of man could be found. – The southern Islanders are civilized compared to them, & the Esquimaux, in subterranean huts may enjoy some of the comforts of life.¹⁷⁹

It is of particular interest the extent to which Darwin’s diaries often read as intensely preoccupied with property, food, and clothing (or lackthereof). In these descriptions, Indigenous peoples are savage subjects who eat differently, dress differently, and have no concept of property. Thus, while others have argued that a hatred of slavery shaped his views on humanity and evolution in a foundational way, one can see in his writings on Indigenous peoples and in the research of De Paula and Barta a clear pattern of exceptionalism wherein Indigenous peoples are not seen as endowed with a sufficiently evolved or civilized humanity and therefore cannot be considered as victims of slavery or genocide in the full sense. For my part, I have come to understand Darwin by combining De Paulo and Barta’s interpretative schemas with those of Gruber and Browne, who focus on Darwin’s ‘networks of enterprise’ and his experience with

¹⁷⁹ Charles Darwin quoted in Weaver, *The Red Atlantic*, p. 72 and Nichols, *Evolutions Captain*, pp. 161-162.

double-end book-keeping, respectively. In other words, Darwin's white, Victorian masculinity and pedigree shaped the environment in which he evolved as a natural philosopher ultimately perplexed by the impressive gap between civilization and savagery and ignorant of the particular material mechanisms of evolutionary change.

The Voyage of the Beagle as 'Imperial Transit'

In *The Transit of Empire*, Jodi Byrd focuses on the expedition of Captain James Cook (1768) and the Transit of Venus as a particularly important moment when European thought and travel came together to produce an emergent settler imperial metaphysic conditioned by its access to Indigenous lands and contact with Indigenous peoples. For Byrd, the travel of European observers and their collection of both geographic and ethnographic evidence produced "an imperial planetarity that sparked scientific rationalism and...served to survey a world into European possession by transforming indigenous peoples into the homo nullius inhabitants of lands emptied and awaiting arrival."¹⁸⁰ Within this critical frame, the power/knowledge formation between European imperial travel and scientific knowledge production allowed British thinkers to cohere themselves as 'civilized' in relation to a multiply constituted notion of 'Indianness', which always signified savagery, stasis, non-sovereignty, abjection, and death. Byrd's contributions in *The Transit of Empire* dovetail neatly with Sandra Harding's postcolonial critiques of science, which hold that "Europeans' appropriation of access to nature around the globe enabled them also to compare, contrast, and combine observations of nature's regularities

¹⁸⁰ Jodi Byrd, *Transit of Empire: Indigenous Critiques of Colonialism* (Minneapolis: University of Minnesota Press, 2011), pp. xx-xxi.

in divergent geographical sites”, thereby knitting together in an inextricable way practices of imperial travel and scientific knowledge production.¹⁸¹

I believe it is both productive and appropriate to theorize Darwin’s originary journey aboard the *Beagle* as an ‘imperial transit’ in the sense described by Byrd for three reasons. Firstly, Darwin’s access to and observation of far off flora and fauna was a key moment in the production of an ‘imperial planetarity’ wherein British knowledge of the globe was produced in tandem with an ability to travel, map, and know the New World. While this is true in the macro sense and the ‘age of exploration’, the story of Darwin’s early life also demonstrates that Victorian social relations (particularly those of class) were uniquely prominent in placing him aboard the *Beagle* as a young man. What is more, the slightly tangential but intensely relevant story of Captain Fitzroy’s first voyage aboard the *Beagle* – which included the capture (and vaccination of) four ‘Fuegians’ – also qualifies as an imperial transit that enfolded Indigenous peoples into European orders of transatlantic, scientific, and ethnographic observation/knowledge production. Secondly, Darwin’s views on the decline of Indigenous peoples following from the cultivation of land was a powerful articulation of ‘Indianness’ as an abject, disappearing, and insufficiently adapted biological essence that was unfit for survival in the modern world. Third, and perhaps most importantly, Darwin’s exceptionalism towards Indigenous peoples vis a vis his broader humanist and anti-slavery ethic captures the way in which many fields of study (not merely scientific but also historical disciplines) have as their conditions of possibility the erasure and elision of Indigeneity from material and conceptual realms of existence, humanity, and political belonging. Put simply, too many foundational thinkers in the western canon remained unconvinced of the full humanity of Indigenous peoples,

¹⁸¹ Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities, and Modernities* (Durham, Duke University Press, 2008), p. 137.

and this has had demonstrable effects on the kinds of knowledges settler universities have produced, stabilized, and imbued with facticity despite a lack of empirical evidence.

For Byrd, imperial and colonial projects of Europe were actuated into settler orders of power and knowledge “not through frontiers but through the production of a paradigmatic Indianness” that was produced *in transit* and actuated as the politico-scientific underside of the sovereign settler biocitizens.¹⁸² On that basis, the ethnographic observations and evolutionary prescriptions of ‘savagery’ offered by Charles Darwin can be read as powerful productions of a paradigm of evolutionary difference rooted in a more modern, scientific, and Victorian ethos. Though Darwin was certainly not the first European thinker to construct as inevitable the disappearance of Indigenous nations and peoples, his production of the theory of evolution by means of natural selection was certainly produced in transit in the sense described by Byrd, which links him closely to the other scientists whose stories we review in this study. What I ask readers to see in Darwin, then, is an originary story of travelling European science that translated the reality of Indigenous peoples into a more scientific paradigm of ‘Indianness’ consistent with the values of an emergent Victorian order of global power.

Conclusions and Connections

In the following chapter, we will be encountering the rise of 19th-century British Indian Policy in the Canadas, as well as the story of Dr. Percy Moore (who travelled to various Indian communities to conduct health surveys and to collect scientific data). Following that, we will be tracing the transits of Dr. James V. Neel, the inventor of the thrifty gene hypothesis, as he travelled through Japan, Central Africa, and Central and South America. Finally, we will review

¹⁸² Jodi Byrd, *Transit of Empire: Indigenous Critiques of Colonialism* (Minneapolis: University of Minnesota Press, 2011), pp. xxxv.

the story of Dr. Robert Hegele who claimed to have discovered a thrifty gene in the blood of Sandy Lake First Nation in northern Ontario in the 1990s. I believe that Charles Darwin has haunted the work of each of these scientists, as the relationships between power, travel, scientific knowledge, and the naturalizing of colonial trauma that exist in his writing can be similarly located in their research trips and scholarly productions. I believe that this continuity signals the way in which the imperial nature of Darwin's contact with the New World embedded coloniality in both the cognitive and structural foundations of modern evolutionary science *before* the emergence of genomics in either its classical or molecular instantiations.

Thus, while Darwin is representative of a 19th-century story of Victorian science and British imperial ascendancy, he is also a very important piece of the puzzle when trying to patch together the history of the thrifty gene hypothesis. His transit aboard the *Beagle* was a generative journey in the sense that it more fully incorporated Indigenous peoples into an imperial planetarity by translating their biological realities into a paradigm of 'Indianness' that signified an inability to survive or to struggle against invasion. Though the Jesuits or even Thomas Malthus had already seen in the 'Indian' a biologically different being whose desire for food and inability to civilize disqualified them from the upper echelons of human existence, Darwin's discussions of and experiences with Indigenous peoples provided the scientific basis for understanding Indigenous decline and disappearance as a problem of the 'Indian's' inability to adapt.

Chapter Three:

Percy Moore and The Scientization of Colonialist Interventions in Canada

Introduction

Dr. Percy Elmer Moore (1899-1987) was the head of the Canadian Department of Indian and Northern Health Services from the Second World War until his retirement in 1965. Throughout his lengthy career, Moore increasingly grounded departmental initiatives and interventions on the generation of public health data collected by travelling medical professionals working in service of the settler state.¹⁸³ As we shall see in what follows, Moore's departmental predecessors - Dr. Peter Henderson Bryce and Col. E.L. Stone - were unsuccessful in their attempts to secure major departmental reforms that took seriously the troubling public health data produced by travelling scientists studying Indigenous death rates from tuberculosis (TB). Thus, in addition to the fact that he retired around the same time as the invention of the thrifty gene hypothesis, it seemed important to spend an entire chapter examining Moore and to use the record of his career as a means of diagnosing the processual scientization of colonialist interventions in Canada.

Specifically, then, this chapter will contextualize the career of Dr. Percy Moore by situating it within a broader departmental history wherein statist interventions became increasingly informed by the generation of public health data gathered by travelling settler scientists. Though I will rely to some extent upon the scholarship other historians of Canadian colonial medicine that have focused on Percy Moore as a key historical actor, I also hope to add

¹⁸³ In this chapter, I refer to this process as 'scientization.'

further texture to the history of his career by drawing upon original archival materials corresponding to a so-far undiscussed episode in his career – that is, his organization of rat starvation experiments in residential and day schools in the latter stages of his career. By describing the broader historical context of Percy Moore’s career as well as the particular episode of the rat experiments, I want to communicate change over historical time and articulate the extent to which Moore’s career signals a turning point in the history of federal Indian policies and public health interventions. Further, I believe that the centrality of starvation, experimentation, and nutrition to the story of Percy Moore’s career is profoundly relevant to the history of the thrifty gene mythology and is necessary to review if we are to appreciate the full historical extent of the relationship between colonialist intervention and scientific knowledge production in the context of Canadian settler colonialism. And while my strategy will be to focus mainly on Moore and, to a lesser extent, his predecessors Bryce and Stone, this departmental history would be incomplete without a brief discussion of the British imperial origins of the Department of Indian Affairs.

British Imperial Origins of Indian Policy

In 1670, British parliament made Indian relations the royal responsibility of colonial governors, who received the following instructions:

Foreasmuch as most of our Colonies do border upon the Indians, and peace is not to be expected without the due observance and preservation of justice to them, you are in Our name to command all Governors that they at no time give any just provocation to any of the said Indians that are at peace with us ... and do by all ways seek fairly to oblige them and ... employ some persons, to learn the language of them, and ... carefully protect and defend them from their adversaries ... more especially take care that none of our own subjects, nor any of their servants do in any way harm them. And that if any shall dare offer any violence to them in

persons, goods or possessions, the said Governors do severely punish the said injuries, agreeably to right and justice. As you are to consider how the Indians and slaves may be best instructed and invited to the Christian religion, it being both for the honour of the Crown and of the Protestant religion itself, persons within any of our territories, though never so remote, should be taught the knowledge of God and be made acquainted with the mysteries of salvation.¹⁸⁴

It seems evident from the passage above that the trio of God, glory, and gold (rather than the production of scientific knowledge) was the primary incentive of the British imperial project in the late 17th century. Moreover, rooted as it was in a French colonial presence, the imperial project continued to rely heavily on religious institutions as agents of this Christian civilizing project. Thus, the founding of the British Indian Department in 1755 was an originary moment in this history of scientization and secularization of colonial Indian policy. The department had as its original mandate the regulation and orchestration of the fur trade and the securing of British over French imperial interests.¹⁸⁵ In his own work (cited regularly throughout the literature and considered a standard in the field), John L. Tobias writes of 1745-1761 as a distinct period in British Indian policy that was characterized by a preoccupation with trade and land that was codified “into law when they were incorporated in the Royal Proclamation of 7 October 1763.”¹⁸⁶ The British Indian Department did not disappear with the Proclamation, however, as it continued to assist with fur trade operations until the American Revolutionary War.

In 1774, “the Indian Branch was called upon to reembrace the original cause of its existence” and to begin shoring up relations with Indigenous peoples as a way to protect the

¹⁸⁴ The Royal Charter quoted in John Leslie and Ron MacGuire, *The Historical Development of the Indian Act* (Ottawa: Indian and Northern Affairs, 1978), p. 3.

¹⁸⁵ See Indian and Northern Affairs, *The British Indian Department and the Frontier in North America, 1755-1830* (Ottawa: Parks Canada National Historic Parks and Sites Branch, 1975).

¹⁸⁶ John L. Tobias, “Protection, Civilization, Assimilation: An Outline History of Canada’s Indian Policy” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), p. 128.

British empire from rebelling American colonists.¹⁸⁷ In *The Historical Development of the Indian Act*, Leslie and MacGuire go so far as to suggest that “the revolutionaries had approached the Indians to obtain, if not their assistance, at least their neutrality in the coming struggle”, which gave the Crown the impetus to issue a series of instructions standardizing Indian relations in 1775.¹⁸⁸ Significantly, at least for the broader purposes of this dissertation, these instructions included bans on the provisions of alcohol to Indians, thus reflecting a shift from the formation of military and economic alliances towards a more paternalistic approach that also saw in the Indian a fundamental metabolic and biological weakness or difference; however, as is evident from the considerable amount of historical literature written on the subject, the British empire was completely dependent on Indigenous military power and relied in a foundational way on the good will of the Six Nations on the Niagara Frontier during the War of 1812.¹⁸⁹ In 1816, the Indian Department was placed under military control, where it remained until 1830.

Early Experiments in Assimilation and Relocation (1830-1867)

Speaking rather bluntly, historian L.F.S. Upton argued that “by 1830, the British empire no longer needed the Indians of the two Canadas. These Indian had been key allies in the struggle for continental power as late as 1814, but except in the memory of a few veterans of the Indian Department this military potential was of no further use.”¹⁹⁰ Thus, it was in the 1830s that

¹⁸⁷ Robert J. Surtees, *Canadian Indian Policy: A Critical Bibliography* (Bloomington: Indiana University Press, 1982), p. 21; finally, see Robert J. Surtees, “The Development of Canadian Indian Reserve Policy in Canada” in *Ontario History*, No. 61 [1969]: p. 24.

¹⁸⁸ John Leslie and Ron MacGuire, *The Historical Development of the Indian Act* (Ottawa: Indian and Northern Affairs, 1978), p. 9.

¹⁸⁹ Though it is a very dated reference, an always useful read in this regard is G.E. Raeman’s *The Trail of the Iroquois Indians: How the Iroquois Nation Saved Canada for the British Empire* (London: Frederick Muller Publishing, 1967). Also, a standard though rather problematic reference in this regard is George F.G. Stanley’s “The Indians in the War of 1812” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), pp. 105-124.

¹⁹⁰ L.F.S. Upton, “The Origins of Canadian Indian Policy” in *The Journal of Canadian Studies*, Vol. 8, No. 4 [November 1974]: p. 51.

Indian Affairs passed to civilian control and the British undertook what Tobias called “several experiments in civilization...[that] entailed the establishment of Indian reserves in isolated areas” which were to act as “social laboratories where the Indian could be prepared for coping with the Indian.”¹⁹¹ Surtees also names 1830 as the year in which assimilation became the department’s new official mandates, and explains that the new policy of civilizing the Indian “was instituted with two experiments in 1830 at Coldwater on Lake Simcoe and on the Saint Clair Rivers.”¹⁹² Each of these experimental communities predated (to the best of my knowledge) the Manitoulin Experiment, wherein Indigenous peoples were kept in isolation as an experiment in settler social engineering from 1830 until 1860.¹⁹³ Thus, while Darwin was aboard the *Beagle*, Canadian colonial experiments in human relocation and population transfers orchestrated by the same imperial power were already well underway. It is therefore ultimately impossible to disentangle these histories of imperial travel and colonial experimentation as they are coterminous and, arguably, part of the same project. Indeed, the experimentation involved in creating isolated communities of Indigenous peoples at Coldwater, Lake Simcoe, and Manitoulin can be understood as rooted in an evolutionist logic that saw the gap between civility and savagery as too great to be closed. Similarly, later efforts to close this conceptual gap and turn Indigenous peoples into European-style farmers were also rooted in a world view that linked savagery and civility teleologically via the logics of cultural evolutionism.¹⁹⁴

¹⁹¹ John L. Tobias, “Protection, Civilization, Assimilation: An Outline History of Canada’s Indian Policy” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), p. 129. London retained final say over colonial matters in the Maritimes and in British Columbia until confederation.

¹⁹² Robert J. Surtees, *Canadian Indian Policy: A Critical Bibliography* (Bloomington: Indiana University Press, 1982), pp. 34-35.

¹⁹³ See Philip C. Bellfy, *Three Fires Unity: The Anishinaabeg of the Lake Huron Borderlands* (Lincoln: University of Nebraska Press, 2011), pp. 108-109.

¹⁹⁴ See Sarah Carter, *Lost Harvests: Prairie Indian Reserve Farmers and Government Policy* (Montreal: McGill-Queens University Press, 1990).

Of course, as widely noted in Canadian historical literature, reserve isolation experiments and assimilation interventions were always underfunded, unsuccessful, poorly conceived, and violent. For example, in 1836, Lieutenant-Governor Bond-Head lamented “that an attempt to make farmers of the Red Man has been generally speaking a complete failure” and that “congregating them for the purposes of civilization has implanted many more vices than it has eradicated.”¹⁹⁵ From 1842-1844, the Bagot Commission, led by Governor-General of the Province of Canada Sir Robert Bagot, worked to determine that Indians had to become “agriculturalists” or “mechanics” and could no longer be assisted in efforts to live traditional lives outside of settler industry and agro-economy.¹⁹⁶ Significantly, the Bagot Commission suggested the placing of Indigenous children into residential schools on a massive scale, which was echoed by Adolphus Egerton Ryerson in his *Report on Native Education* (1847).¹⁹⁷

The 1850s saw the rise of colonial legislation related to the consolidation of the system of isolation, assimilation, and land control pursued since 1830. Notably, the *Act to authorize the setting apart of Lands for the use of Indian Tribes in Lower Canada* (1850) and the *Act for the protection of the Indians in Upper Canada from imposition and the property occupied by them from trespass and injury* (1851) initiated this process whereas the *Gradual Civilization Act* of 1857 hurried it along. As Tobias explains with regard to the 1857 act, “no longer was the end result simply to teach the Indian to cope with persons of European ancestry; he was to become European and to be fully assimilated into the colonial society.”¹⁹⁸ Through these proto-Canadian

¹⁹⁵ Bond-Head quoted in John Leslie and Ron MacGuire, *The Historical Development of the Indian Act* (Ottawa: Indian and Northern Affairs, 1978), p. 15.

¹⁹⁶ John Leslie and Ron MacGuire, *The Historical Development of the Indian Act* (Ottawa: Indian and Northern Affairs, 1978), p. 16.

¹⁹⁷ The Truth and Reconciliation Commission, *Canada's Residential Schools: The History – Part I: Origins to 1939* (Montreal: McGill-Queens University Press, 2016), pp. 50-51.

¹⁹⁸ John L. Tobias, “Protection, Civilization, Assimilation: An Outline History of Canada's Indian Policy” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), p. 130.

modes of settler statecraft, British Indian policy created the foundation for an experimental colonial system that treated Indigenous communities as laboratories wherein settler statesmen (and, later, scientists) could study the techniques of colonial intervention, workshop technologies of assimilation, and produce knowledges on the nature of the ‘Indian’ and his civilizational potential (or, later, his ‘public health’). By 1859, the passing of *An Act respecting Civilization and the Enfranchisement of certain Indians* embodied the belief of settler statesmen that assimilation and participation in the industrial economy were heavily desired by many Indigenous peoples. This wrong-headed assumption was slowly realized throughout the 1860s, as few Indians volunteered for enfranchisement. John S. Milloy has suggested that the department’s response to the failure of voluntary enfranchisement in the late 1850s was to blame traditional Indigenous governance systems and pursue their utter destruction in the following decade.¹⁹⁹

The Origins of Federal Indian Policy and the Emergence of TB Epidemics

In 1860, the British government transferred control of Indian Affairs to the province of Canada (though London retained final say over matters in the Maritimes and in British Columbia). This was an important development in the history of settler colonialism in Ontario as it signaled the reconfiguration of a periphery/metropole dynamic from a transatlantic and imperial formation to a more national and settler colonial formation.²⁰⁰ In 1867, following confederation, “Indians and lands reserved for Indians” were placed in the list of legislative

¹⁹⁹ See John S. Milloy, “The Early Indian Acts” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), pp. 149-150.

²⁰⁰ Lorenzo Veracini names this metropole/periphery dynamic as definitional in the context of settler colonial statehood: see his “Introduction: The Settler Colonial Situation” in *Settler Colonialism: A Theoretical Overview*, p. 1-15.

powers and responsibilities secured to the federal government by the British North America Act, Section 91 (24).²⁰¹ In 1869, *The Act for the Gradual Enfranchisement of the Indians* updated the 1857 act and created band councils and Indian chiefs through male-only elections explicitly designed to destroy traditional governance systems, attack the political authority of Indigenous women, and discipline Indigenous peoples in Canada to European modes of political representation and patriarchal statecraft. Milloy maintains that “with the act of 1869, federal control of on-reserve governmental systems became the essence of Canadian-Indian constitutional relations” and the lynchpin of settler control in First Nations communities since “the department could now institute all the systems of development it cherished.”²⁰² Tragically, but not accidentally or coincidentally, the onset of TB epidemics in Indigenous communities followed from the settler colonial overdetermination of Indigenous national patterns.

Though onsets of epidemics were by no means monolithic across Canada, Plains historians have shown beyond a shadow of a doubt that high mortality rates from TB corresponded to state-orchestrated starvation tactics and foundational state-making modes of Indian policy. Daschuk, Hackett, and MacNeil explain:

In the early 1870s, the disease was relatively rare among the indigenous population of the plains. Within a few years, the situation changed dramatically. By the early 1880s, TB was widely recognized to be the primary cause of morbidity and mortality among First Nations populations. Rather than direct infection from the burgeoning European population in the region, the explosion of the disease was caused by sudden ecological, economic, and political changes in the

²⁰¹ Robert J. Surtees, *Canadian Indian Policy: A Critical Bibliography* (Bloomington: Indiana University Press, 1982), pp. 41.

²⁰² See John S. Milloy, “The Early Indian Acts” in A. L. Getty and Antoine S. Lussier, eds., *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies* (Vancouver: University of British Columbia Press, 1983), p. 151.

west that were primarily the result of the imposition of Canadian hegemony.²⁰³

This correlation of Indigenous ill-health to the rise of Canadian settler hegemony is a powerful formulation that has been made elsewhere. For example, an article in the *Canadian Medical Association Journal* from 2000 put the case rather bluntly: “tuberculosis was recognized in aboriginal North Americans in the pre-Columbian period but only became a major problem in the latter part of the 19th century, after we and the Americans had destroyed their livelihood, impoverished them and crowded them together on reservations or in prison (as we still do).”²⁰⁴ In *Medicine That Walks*, Maureen Lux recounted in deep detail the way in which Plains Indigenous peoples died not from a racial frailty or weakness to TB, but from a lack of food and the chaos caused by violent colonial tactics of forced removal and ‘sign or starve’ tactics of treaty-making. Elsewhere, Lux has argued that Canadian Indian policy instituted “the vicious cycle of malnutrition, a weakened immune system, and consequent infection” in Plains and other Indigenous populations, thereby contributing to high morbidity rates from TB.²⁰⁵ Indigenous peoples across the north continue to die from TB, which is particularly egregious when we recall, as Maureen Lux did in her own research, that Indigenous children in Saskatchewan’s residential schools were used as test subjects in TB-vaccine trials (with some of these children dying in the course of the experiments).²⁰⁶ In short, it is by no means a controversial claim to suggest that the

²⁰³ James Daschuk, Paul Hackett, Scott MacNeil, “Treaties and Tuberculosis: First Nations People in the late 19th Century Western Canada, a Political and Economic Transformation” in *The Canadian Bulletin of Medical History*, Vol. 23, No. 2 [2006]: p. 307.

²⁰⁴ Leo M. Kahana, “TB among Aboriginal Canadians” in *The Canadian Medical Association Journal*, Vol. 162, No. 10 [May 2000]: pp. 1404-1405.

²⁰⁵ See Maureen Lux, *Medicine That Walks: Disease, Medicine, and Canadian Plains Native people, 1880–1940* (Toronto: University of Toronto Press, 2001).

²⁰⁶ See Julie Page, “TB Death in Quebec’s Far North spurs public health awareness campaign”, *CBC News*, 21 February 2018; available online at: <http://www.cbc.ca/news/canada/montreal/tuberculosis-death-quebec-nunavik-1.4543922> [accessed 10 March 2018]. Finally, see “Thunder Bay Health Unit says Tuberculosis confirmed in city”, *CBC News*, 9 March 2018; available online at: <http://www.cbc.ca/beta/news/canada/thunder-bay/tuberculosis-thunder-bay-1.4569439> [accessed 10 March 2018].

reserve and residential school system as originally conceived acted as a vector of violence towards Indigenous health as it facilitated high morbidity rates from TB and permitted settler scientists to conduct sometimes fatal medical experiments on Indigenous children.

Significantly, the rise of TB epidemics also emerged in tandem with a sharp rise in discourses of disappearance that drew on emergent Darwinian frameworks for explaining away the deaths of Indigenous peoples from TB. Though *On the Origins of Species* was published in 1859, *The Descent of Man* was published in 1871, which set off a series of Canadian debates regarding Social Darwinism, the commensurability of the Christian religion with evolutionary theory, and the feasibility of civilizational schemas.²⁰⁷ Lux argues, for example, that “notions of Social Darwinism informed the thought of those in contact with Native people” on both sides of the 20th century, and that “the ideas of evolutionary theory and survival of the fittest, applied to human societies, were used to explain the Native people's plight.”²⁰⁸ Speaking to the more particular context of TB, Christian McMillen’s “The Red Man and the White Plague” explains that of all the explanations for high rates of TB in Indigenous communities circulated in the late 19th century, “none were more discussed and debated—and none held on with more tenacity—than theories of Indians’ inherent racial susceptibility, virgin soil, and degree of Indian blood.”²⁰⁹ Indeed, the racial susceptibility hypothesis was a popular and professionally maintained

Maureen Lux, “Perfect Subjects: Race, Tuberculosis, and the Qu’Appelle BCG Vaccine Trial” in *The Canadian Bulletin of Medical History*, Vol. 15, No. 8 [1998]: pp. 277-295.

²⁰⁷ See Ramsay Cook, *The Regenerators: Social Criticism in Late Victorian English Canada* (Toronto: University of Toronto Press, 2016). Also, see Mariana Valverde, *The Age of Soap and Light Water: Moral Reform in English Canada* (Toronto: McClelland and Stewart Publishing, 1999).

²⁰⁸ See Maureen Lux, “Perfect Subjects: Race, Tuberculosis, and the Qu’Appelle BCG Vaccine Trial” in *The Canadian Bulletin of Medical History*, Vol. 15, No. 8 [1998]: p. 278.

²⁰⁹ See Christian W. McMillen, “‘The Red Man and the White Plague’: Rethinking Race, Tuberculosis, and American Indians, ca. 1890–1950” in *The Bulletin of the History of Medicine*, Vol. 82, No. 3 [Fall 2008]: pp. 608-645; also, see Patrick Brantlinger, *Dark Vanishing: Discourse on the Extinction of Primitive Races, 1880-1930* (London: Cornell University Press, 2003); finally, see Warwick Anderson, “Immunities of Empire: Race, Disease, and the New Tropical Medicine, 1900–1920,” *Bulletin of Medical History*, Vol. 70 [1996]: pp. 94–118.

explanation for high rates of TB in Indigenous populations in Canada until at least 1929, when R.G. Ferguson issued his report on *Tuberculosis among the Indians of the Great Canadian Plains*, and arguably through to the 21st century, as genetic studies on polymorphisms presenting TB complications continue to be conducted in Indigenous communities as late as 2008.²¹⁰ Of particular interest here is the way in which ‘Indian blood’ became ‘Aboriginal ancestry’ within colonial discourses of disappearance as they transited across tuberculosis and diabetes epidemics in the 19th and 20th centuries.

Residential Schools and the Rise of the Chief Medical Officer

Though schools for Indigenous children had been run by a wide variety of religious organizations prior to the rise of residential schools, the post-confederation desire on the part of settler Canadians to civilize, assimilate, and thereby get rid of ‘the Indian problem’ added urgency to the issue. In 1873, the Indian Affairs branch was transferred to the Department of the Interior. In 1883, the federal government opened three industrial schools (two in present-day Saskatchewan and one in present-day Alberta). As the TRC Report explained, “unlike the church-run boarding schools, which provided a limited education with a heavy emphasis on religious instruction, the industrial schools were intended to prepare First Nations people for integration into Canadian society by teaching them basic trades, particularly farming.”²¹¹

²¹⁰ See R. G. Ferguson, *Tuberculosis among the Indians of the Great Canadian Plains: Preliminary Report of an investigation Being Carried Out by the National Research Council of Canada; reprinted from the Transactions of the Fourteenth Annual Conference of the British National Association for the Prevention of Tuberculosis* (London: Adlard and Son, 1929). Also, see Linda Larcombe, Pamela H. Orr, Andrew M. Lodge, Jodie S. Brown, Iga J. Dembinski, Leisel C. Milligan, Erin A. Larcomb, Bruce D. Martin, and Peter W. Nickerson, “Functional Gene Polymorphism in Canadian Aboriginal Populations with High Rates of Tuberculosis” in *The Journal of Infectious Diseases*, Vol. 198, No. 8 [October 2008]: pp. 1175–1179.

²¹¹ The Truth and Reconciliation Commission, *Canada’s Residential Schools: The History – Part I: Origins to 1939* (Montreal: McGill-Queens University Press, 2016), p. 57.

However, as most Canadians are now well aware, the primary function of residential schools was not the industrial training of Indigenous children but their biological and cultural genocide.

Dr. Peter Henderson Bryce is remembered (most often fondly) by Canadian historians as the first medical figure to press the settler state on the issue of TB in residential schools. Bryce spent almost two decades working as a public health official for the Ontario Board of Health as well as for the Department of Immigration.²¹² In 1904, Bryce became the settler state's very first Chief Medical Officer of the Department of the Interior.²¹³ Upon taking the job, Bryce – who had previously drafted *The Canadian Health Act of 1884* – began collecting data on the death rates of TB in residential schools as a way of quantifying state knowledges on the health of Indigenous peoples.²¹⁴ Specifically, in 1907, Bryce released a report drawing attention to the fact that, according to his surveys, 24% of all Indigenous children attending residential schools had died from TB: “of a total of 1,537 pupils reported upon nearly 25 per cent are dead, of one school with an absolutely accurate statement, 69 per cent of ex-pupils are dead, and that everywhere the almost invariable cause of death given is tuberculosis.”²¹⁵ Bryce's report, it is worth noting, named poor ventilation and poor standards of care from school officials as the primary cause of TB deaths as opposed to a racial susceptibility hypothesis. Put simply, Bryce made it “quite clear that the schools acted as clearing houses for the disease” and “exposed the genocidal practices of

²¹² Mary-Ellen Kelm, “Diagnosing the Discursive Indian: Medicine, Gender, and the ‘Dying Race’” in *Ethnohistory* Vol. 52, No. 2 [Spring 2005]: pp. 376.

²¹³ Mary-Ellen Kelm, “Diagnosing the Discursive Indian: Medicine, Gender, and the ‘Dying Race’” in *Ethnohistory* Vol. 52, No. 2 [Spring 2005]: pp. 376.

²¹⁴ See First Nations Caring Society, “About Peter Bryce”, available online at: <https://fncaringsociety.com/peter-bryce> [accessed 24 September 2016].

²¹⁵ Bryce quoted in The Truth and Reconciliation Commission, *Canada's Residential Schools: The History – Part I: Origins to 1939* (Montreal: McGill-Queens University Press, 2016), p. 96. Also, see P.H. Bryce, *Report on the Indian Schools of Manitoba and the North-West Territories* (Ottawa: Government Printing Bureau, 1907).

government-sanctioned residential schools, where healthy Indigenous children were purposefully exposed to children infected with TB, spreading the disease through the school population.”²¹⁶

As Mary-Ellen Kelm recalls, Bryce then “called for a major overhaul in the system of residential schooling, demanding that each student be considered a potential tuberculosis case and be treated accordingly.”²¹⁷ However, when Duncan Campbell Scott became Deputy Superintendent-General of Indian Affairs in 1913, he informed Bryce that his annual medical reports on TB in residential schools were no longer necessary given that the information was costly to produce and the department had no intention of acting upon it.²¹⁸ Significantly, for our purposes, Scott referred to Bryce’s demands as “scientific [but] inapplicable”, forcing him to retire in 1921.²¹⁹ Significantly, then, Bryce’s reports on residential schools marks a development in the history of federal Indian policy wherein empirical data collected by a medical professional was used to undercut the moral authority of church-run institutions and pose a challenge to the administrative practices of Indian Affairs.²²⁰ Though his reforms were ‘inapplicable’ due to the stingy, parsimonious, and Draconian funding structures of the settler state, Bryce’s suggestions were nonetheless endowed with a certain authority when Scott acknowledged their scientificity. Thus, while still subordinated to a fiscal logic, we can see in federal Indian policies of the early

²¹⁶ I am quoting from two sources in this sentence; first, Mary-Ellen Kelm, *Colonizing Bodies: Aboriginal health and healing in British Columbia 1900–50* (Vancouver: UBC Press, 2006), p. 71; second, Pam Palmater, “Genocide, Indian Policy, and Legislated Elimination of Indians in Canada” in *aboriginal policy studies*, vol. 3, no. 3, [2014]: pp. 31-32.

²¹⁷ Mary-Ellen Kelm, “Diagnosing the Discursive Indian: Medicine, Gender, and the ‘Dying Race’” in *Ethnohistory* Vol. 52, No. 2 [Spring 2005]: pp. 375

²¹⁸ Megan Sproule Jones, “Crusader for the Forgotten: Dr. Peter Bryce, Public Health, and Prairie Native Residential Schools” in *Canadian Bulletin of Medical History*, Vol. 13 [1996]: p. 218.

²¹⁹ Duncan Campbell Scott quoted in Mary-Ellen Kelm, “Diagnosing the Discursive Indian: Medicine, Gender, and the ‘Dying Race’” in *Ethnohistory* Vol. 52, No. 2 [Spring 2005]: pp. 376. As historians of Indian policy know quite well, this move by Scott left a bad in Bryce’s mouth, which he attempted to remedy through the publication of a scathing critique of Scott and the Indian Department; see Peter Bryce, *The Story of a National Crime: Being a Record of the Health Conditions of the Indians of Canada from 1904 to 1921* (Ottawa: James Hope and Sons, 1922).

²²⁰ The best recounting of the historical episode regarding Bryce, his report, and the resulting bureaucratic battles with Duncan Campbell Scott is probably Brian Titley’s *A Narrow Vision: Duncan Campbell Scott and the Administration of Indian Affairs in Canada* (Victoria: UBC Press, 1992).

20th century the slow and steady rise of a new authoritative discourse predicated on health surveys conducted by medical professionals. Of course, this discourse was not so authoritative that it gave Bryce the power to intervene upon an ongoing genocide.

The Failed Reforms of Dr. E.L. Stone

In what is a very telling departmental decision, Indian Affairs went without a Chief Medical Officer for six years following Bryce's forced retirement in 1921. The logic here seems rather obvious: because the department had no plans to act on recommendations, health surveys and medical officers held only the capacity to embarrass the department and lay bare its violent Draconian policies and miserly attitude towards Indigenous peoples. Indeed, even white male literary travel across the provincial and territorial norths threatened to unveil the colonial making of starvation and poor conditions all throughout the 20th century, as Farley Mowat's *People of the Deer* (1952) and its very controversial depiction of northern starvation demonstrated in the 1950s.²²¹ Nonetheless, in 1927, Dr. E.L. Stone became the Regional Superintendent of Indian Health Services and took over the duties and departmental position previously held by Bryce. Like Bryce before him, Stone had experience in the administration of public health and had spent years "travelling throughout Indian agencies undertaking health surveys" as a way of collecting actionable data for administrative and interventionist purposes.²²² Dr. Stone was also Col. Stone, and he appears in the historical record to have been less of a subversive than his predecessor (indeed, it seems likely that he was selected for the position precisely because he was unlikely to make waves).

²²¹ For an excellent discussion of this northern politic of travel and the unveiling of poor conditions, see Alan R. Marcus, *Relocation Eden: The Image and Politics of Inuit Exile in the Canadian Arctic* (Hanover: University Press of New England, 1995).

²²² See James B. Waldram, D. Ann Herring, and T. Kue Young, *Aboriginal Health in Canada: Historical, Cultural, and Epidemiological Perspectives* (Toronto: University of Toronto Press, 2006), p. 191.

During Stone's tenure, TB remained a primary preoccupation of medical officers employed by the department. In 1930, for example, Stone proposed a ten-year plan to address high mortality rates from tuberculosis. Again, like Bryce before him, Stone failed in his efforts to secure any kind of meaningful public health reform. As the Final Report of the Truth and Reconciliation Commission of Canada explains: "Not only did the federal government fail to implement his proposed plan, but it also cut back on the work it was doing. In 1932-33, the Indian Affairs health budget was reduced by 20%."²²³ Stone thus signifies a transitional figure between his predecessor Dr. Bryce (whose suggestions were ignored) and his successor Dr. Percy Moore (who enjoyed a kind of departmental power and unilateral authority throughout his long career). When he himself attempted to make changes to address the TB crisis, Stone was treated punitively and had his funding cut. And while I am centring Stone in this departmental narrative, it is not inappropriate to recall that the failure to accept Bryce's reforms as well as the decision to cut Stone's funding by 1/5th represent extremely violent moments in Canadian colonial health history that correspond to the deaths of thousands of children. I worry that my focus on the stories of Bryce, Stone, and Moore in this chapter may eclipse this ever-present fact about the genocidal character of Canadian federal Indian policy, which makes it necessary to underscore at this juncture that Dr. Stone was not the only (or even a) victim of the funding cuts of the fiscal year of 1932-33.

Amidst this departmental stinginess, however, colonial officials saw it fit to use Indigenous children as human trials in TB vaccination experiments. As Lux explains, "Native children of the Qu'Appelle reserves in southern Saskatchewan became the subjects of a trial of

²²³ The Truth and Reconciliation Commission, *Canada's Residential Schools: The History – Part I: Origins to 1939* (Montreal: McGill-Queens University Press, 2016), pp. 421-422.

the BCG vaccine for tuberculosis in 1933.”²²⁴ In guiding her readers through the unsettling history of the trials, Lux poses a supremely important question: “How did an isolated, poverty-stricken agency in an equally isolated province come to be the site for a major medical experiment?”²²⁵ If we put together the story of E.L. Stone and his failed TB reform measures together with Lux’s question, an unsettling answer emerges: scientific knowledge production remained a much higher priority for Indian Affairs than the actual provision of health care to tubercular Indigenous children. That is, the state’s coffers were often tightly closed when it came to the running of Indian hospitals, residential schools, and sanatoriums; however, when the trauma inflicted by structural violence created an opportunity for the innovation of scientific and medical technologies through the experimental treatment of Indigenous bodies, the state’s machinery moved to make such experiments possible – even in ‘remote’ and ‘isolated’ locales. The relationship between the federal government’s stinginess towards Indigenous requests for intervention and its willingness to invest funding monies into medical research projects will become quite relevant in proceeding chapters, as I show that the University of Toronto’s Sioux Lookout Project (1969-89) sent southern medical students to First Nations communities in northern Ontario as a way to train and professionalize them (rather than as a way to provide these communities with the best forms of healthcare available). As noted by McCallum, these histories of experimentation, segregation, trauma, and starvation are endemic *and not exceptional* to Canadian colonial health history.²²⁶ This is perhaps nowhere more apparent than in the career of Percy Moore, to which we now turn.

²²⁴ Maureen Lux, “Perfect Subjects: Race, Tuberculosis, and the Qu’Appelle BCG Vaccine Trial” in *The Canadian Bulletin of Medical History*, Vol. 15, No. 8 [1998]: p. 277.

²²⁵ Maureen Lux, “Perfect Subjects: Race, Tuberculosis, and the Qu’Appelle BCG Vaccine Trial” in *The Canadian Bulletin of Medical History*, Vol. 15, No. 8 [1998]: p. 278.

²²⁶ Mary Jane Logan McCallum, “Starvation, Experimentation, Segregation, and Trauma: Words for Reading Indigenous Health History” in *The Canadian Historical Review*, Vol. 98, No. 1 [March 2017]: pp. 96-113.

Percy Moore and the Secularization of Federal Indian Policy, 1937-56

Percy Moore was the successor of Dr. E.L. Stone. In many ways, Moore achieved what Bryce and Stone could not in that he was able to successfully consolidate the scientization of federal Indian administration through funding reforms, new medicalized data collection initiatives, and the structural secularization of healthcare provision. Significantly, for my purposes, Moore had a profound influence on northern Indigenous peoples' access to both food and healthcare in his capacity as the Director of Indian and Northern Health Services from 1946 to 1965, thereby implicating him directly in the history of diabetes in First Nations and Inuit communities. As we shall see, moreover, Percy Moore is also responsible for creating and conditioning the material access that modern Canadian scientists have had to malnourished Indigenous bodies in the post-war period. The story of his career is thus an important part of the larger history of the thrifty gene hypothesis in Canada.

Percy Elmer Moore (1899-1987) was born in Oxford Mills, Ontario and graduated from medical school at the University of Manitoba in 1931.²²⁷ After serving a brief stint as the travelling medical superintendent for five reserves in the provincial north, Moore left Manitoba to study Public Health at the University of Toronto.²²⁸ When he completed his studies in 1937, Moore was appointed as the assistant to Dr. E.L. Stone.²²⁹ Luckily for Moore, Col. Stone readily volunteered for overseas service, thus leaving Moore as the acting director. As soon as he took over the position, Moore began recruiting scientific studies as powerful tools in settler colonial exercises of governance. In 1942, for example, he organized a research trip to numerous northern

²²⁷ Charlotte Gray, "Profile: Percy Moore" in *The Canadian Medical Association Journal*, Vol. 126 [February, 1982], p. 416.

²²⁸ This position was the Medical Superintendent for the Fisher River Agency. See *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s* (Vancouver: UBC Press, 2016), p. 39 and Charlotte Gray, "Profile: Percy Moore" in *The Canadian Medical Association Journal*, Vol. 126 [February, 1982], p. 416.

²²⁹ Maureen Lux, *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s* (Vancouver: UBC Press, 2016), p. 39.

communities in Manitoba so that he could “study the state of nutrition of the Indian by newly developed medical procedures.”²³⁰ Collaborating with Dr. Frederik Tisdale of the Royal Canadian Airforce (RCAF), Neel turned Indigenous spaces into data collection sites and conducted blood tests, x-rays, dental examinations, and other procedures designed to measure and quantify Indigenous health according to particular biomarkers.²³¹ It is convenient if a little clumsy to make the analogy that Tisdale was to Moore what Fitzroy was to Darwin, as both travelling white male scientists relied on military mobility to make their observations and data collections.

Like Bryce and Stone before him, Moore’s trips and the data they produced spoke of alarming rates of malnutrition, high mortality rates from TB, and deplorable states of Indigenous health. Armed with the authority granted by scientific credentials, medical training, and empirical data, Moore began to make known the implications of his findings in a fashion more forceful than Stone and Bryce. As Mary-ellen Kelm writes, “Moore pointed out in the 1940s that forcing Aboriginal people into fixed residences on unsanitary reserves had surely facilitated the spread of tuberculosis.”²³² Moving further, Moore began to implicate church-run institutions and their lack of scientific and medicalized health-care as key producers of disease and ill-health amongst Indigenous peoples. In *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s*, Maureen Lux explains that Percy Moore directed a special committee meeting in May of 1945, the purpose of which was to discuss the creation of sectarian hospitals and the issue of

²³⁰ See P. E. Moore, H. D. Kruse, and F. F. Tisdall, “Nutrition in the North: A Study of the State of Nutrition of the Canadian Bush Indian” in *The Beaver*, Vol. 273 [March 1943]: pp. 21-23. Quoted in Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952” in *Histoire sociale/Social History* Vol. 46, No. 91 [2013]: pp. 145–72.

²³¹ See Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952” in *Histoire sociale/Social History* Vol. 46, No. 91 [2013]: pp. 145-6.

²³² Mary-ellen Kelm, *Colonizing Bodies: Aboriginal Health and Healing in British Columbia 1900-50* (Vancouver: UBC Press, 2006), p. 41.

tuberculosis death rates amongst Indigenous populations.²³³ As Lux recalls, Moore was characteristically blunt in his statement of the case. Near the beginning of proceedings, he was reported to have said the following: “Only a few years ago it was common, when one mentioned the Indians, to have one shrugging his shoulders and say ‘Oh they are dying out, and the sooner the better.’ Such is not the case, the Indians...have the largest annual increase of any racial group.”²³⁴ In making this statement, Moore was not only suggesting to the committee that a new ethos was emerging with respect to departmental attitudes, he was also communicating some empirical data that reflected important numerical realities about Indigenous peoples whose management they had met to discuss. Lux explains that, later in this meeting, Moore “pressed for a recommendation that the Indian hospitals be strictly non-denominational.”²³⁵ Members of the committee were acutely aware that this suggestion, if followed, would not only stir up controversy with religious institutions, but also involve major structural reforms. Wondering if this was indeed what Moore wanted, a member of the committee put a direct question to Moore – “Would you like to run your own hospitals, Dr. Moore?” – to which he simply replied: “Yes.”²³⁶ Citing this exact exchange and recommendation as the most significant moment in the meeting, Lux argues that this particular story about Moore signified “the ascendancy of bureaucratic over missionary control of healthcare for Aboriginal people.”²³⁷ For Lux, then, Moore’s taking over of Indian medical services signifies a particular historical moment wherein religious authority

²³³ This was the Advisory Committee for the Control and Prevention of Tuberculosis Among the Indians of May 30th and 31st, 1945.

²³⁴ LAC, “Proceedings of Meeting, 30 and 31 May 1945,” 9 MG28, 176, II (a), File 36.

²³⁵ Maureen Lux, *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s* (Vancouver: UBC Press, 2016), p. 43.

²³⁶ LAC, “Proceedings of Meeting, 30 and 31 May 1945,” 9 MG28, 176, II (a), File 36.

²³⁷ Maureen Lux, *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s* (Vancouver: UBC Press, 2016), p. 43.

waned and Indian Affairs became more scientifically managed. Other historians seem to agree with Lux on this general interpretation of the meaning of Percy Moore and his early reforms.

Laurie Meijer Drees, for example, has also written of Moore as a figure who brought about the further secularization of federal Indian policy through a brand of aggressive and uncompromising statesmanship that drew the ire of his contemporaries. In her *Healing Histories: Stories from Canada's Indian Hospitals*, Drees recalls the story of Percy Moore taking up his position as the official Director of Indian and Northern Health Service programs in 1946. As Drees explains, Moore was quickly faced with two severe problems: “first and foremost, he had to address the tuberculosis crisis and related poor health conditions in Canada’s Aboriginal population...second, he inherited a system in which the various Christian churches played a significant role in Aboriginal health care.”²³⁸ As a very scientifically-minded bureaucrat with a handful of degrees in medicine and public health (as well as a history of conducting scientific studies on public health in First Nations communities), Moore rightly understood these two problems as intrinsically linked and began insisting on the secularization of healthcare services provided by the settler state. Drees recounts that Moore “uncompromisingly developed a plan to move Aboriginal health care south” and “mounted an aggressive campaign to create a totally secular system of health care facilities to replace those provided by the churches.”²³⁹ Moore’s reforms were to have far-reaching structural consequences in that they forced northern Indigenous peoples to leave their families and communities when seeking healthcare.²⁴⁰ In the

²³⁸ Laurie Meijer Drees, *Healing Histories: Stories from Canada's Indian Hospitals* (Alberta: University of Alberta Press, 2013), pp. 13-14.

²³⁹ Laurie Meijer Drees, *Healing Histories: Stories from Canada's Indian Hospitals* (Alberta: University of Alberta Press, 2013), p. 14.

²⁴⁰ Laurie Meijer Drees, *Healing Histories: Stories from Canada's Indian Hospitals* (Alberta: University of Alberta Press, 2013), p. 14. Moore was also characteristically unapologetic about these consequences; for example, in a 1954 article he wrote for *The Canadian Geographical Journal*, Moore insisted that “there is seldom any difficulty in persuading the sick native to climb into a plane, say good-bye to friends and family, and set off to the great unknown

present day, Moore's policies are still felt across the provincial north whenever Indigenous families on reserve are forced to deal with differential and segregated regimes of healthcare administered under the misleading moniker of 'non-insured health benefits.' Again, Moore's departmental legacy will be of supreme relevance when we discuss the making of this healthcare provision schema in northwestern Ontario in Chapter Five; however, I find it necessary here to underscore the cavalier way in which Moore went about these reforms (at least to my historical reading of his personage through the archive and other historical snapshots offered elsewhere).

For example, in his autobiography *A Very Public Life*, Paul Martin shares an interesting story about Moore that I think provides us with a useful image in trying to understand his character. Martin references a meeting between himself, the "jolly, rotund Percy Moore", and a Father Plourde.²⁴¹ In this meeting, Martin describes the "earnest priest" adopting a very serious tone when mentioning the issue of tuberculosis and its treatment in mission hospitals; during this discussion of grave matters, Martin recalls that "Percy stood behind him and pretended to be fiddling with an imaginary rosary. It was hard for me to keep a straight face."²⁴² I think that this story adds some texture and detail to the history of Percy Moore that might be missing from more rigorous studies that discuss his structural reforms. As Martin's story shows, Moore was not only the man most readily associated with lofty and brash reforms that stripped church-run institutions of their authority in the context of Indian Affairs, he was also well-known for doing so in an impudent and flippant manner. Together with the stories from Lux and Drees, Martin's story reveals that Percy Moore's mission was a governmental project that involved institutional

'civilization' outside for an indefinite amount of time." See Percy E. Moore, "Health for Indians and Eskimos," in *Canadian Geographical Journal* Vol. 48 [June 1954]: pp. 216–221.

²⁴¹ Paul Martin, *A Very Public Life, Volume II: So Many Worlds* (Toronto: Deneau Publishers, 1985), p. 65.

²⁴² Paul Martin, *A Very Public Life, Volume II: So Many Worlds* (Toronto: Deneau Publishers, 1985), p. 65.

restructuring as well as a revamping of the values, logics, and systems of authority that guided policy objectives and exercises of statecraft. Whether or not one judges these reforms morally as ‘good’ or ‘bad’, it appears that they were remarkably idiosyncratic in that they were closely associated with the professional conduct and character of Moore.

And yet Percy Moore should not be understood as a man who ushered in a new era of settler colonial administration, nor should the scientization of Indian Affairs be mistaken as a meaningful departure from what came before it. The starkest reminder of this comes from Ian Mosby’s 2013 article ‘Administering Colonial Science’, which detailed Moore’s history of nutrition experiments in Indigenous communities and residential schools following his initial research trips in 1942. Mosby details that Moore’s nutritional studies eventually came to “include controlled experiments conducted, apparently without the subjects’ informed consent or knowledge, on malnourished Aboriginal populations in Northern Manitoba and, later, in six Indian residential schools.”²⁴³ Detailing the ways in which Moore and a wide network of settler institutions used “Aboriginal bodies as ‘experimental materials’ and residential schools and Aboriginal communities as kinds of ‘laboratories’”, Mosby’s article explains how Moore soon became involved in experimenting with the creation of vitamized biscuits and “a ‘blood sausage’ product containing a long list of ingredients.”²⁴⁴ While I will continue with chronological narrative of Moore’s career in the below, it will be important for readers to remember that Moore experimented with vitamized biscuits and sausage products later in this chapter.

²⁴³ Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952” in *Histoire sociale/Social History* Vol. 46, No. 91 [2013]: pp. 145–72.

²⁴⁴ Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952” in *Histoire sociale/Social History* Vol. 46, No. 91 [2013]: p. 155.

In our article “Settling the Table”, Kristin Burnett, Lori Chambers, and myself detailed the ways in which Percy Moore was able to regulate and condition Indigenous peoples’ food purchasing practices following the passing of the Family Allowance Act of 1944.²⁴⁵ Elsewhere, we were able to detail the ways in which Moore collaborated with the HBC to increase the sale of Pablum and powdered milk in northern communities as part of a broader effort to medicalize and regulate the (breast)feeding of Indigenous children throughout the 1940s.²⁴⁶ Similar calls for a revamping of Indigenous foodways were made by Moore following a 1948 research trip he organized to study the diet of “the Canadian Bush Indian” in the James Bay region.²⁴⁷ Discussing this 1948 study in particular, McCallum explains that it “contributed to an expanding body of literature that included official reports, studies and surveys made by the Departments of Indian Affairs and National Health and Welfare, anthropologists, historians, and medical professionals all seeking to describe and analyze Aboriginal health.”²⁴⁸ What these articles demonstrate as a collective is the way in which Percy Moore played a profound role in overdetermining the kind of food procurement practices and dietary regimes that were possible in Indigenous communities. And while he didn’t invent the colonial health archive, he shaped it according to his own views on what Indian policy ought to be.

In the 1950s, Moore went great lengths to prevent northern Indigenous peoples from understanding healthcare and medical treatment as a right, often couching it instead as a function

²⁴⁵ See Kristin Burnett, Lori Chambers, and Travis Hay, “Settling the Table: Northern Food Subsidy Programs and the (Re)Colonisation of Indigenous Bodies” in *Special Issue of Critical Race and Whiteness Studies: The White Man’s Burden After Race*, Vol. 11, No. 1 [2015]: pp. 1-18.

²⁴⁶ See Kristin Burnett, Travis Hay, and Lori Chambers, “Settler Colonialism, Indigenous Peoples, and Food: Federal Indian Policies and Nutrition Programs in the Canadian North since 1945” in *The Journal of Colonialism and Colonial History*, Vol. 17, No. 2 [Summer 2016].

²⁴⁷ See Mary Jane McCallum, “The Last Frontier: Isolation and Aboriginal Health” in *The Canadian Bulletin of Medical History*, Vol. 22, No. 1 [2005]: pp. 103-120.

²⁴⁸ Mary Jane McCallum, “The Last Frontier: Isolation and Aboriginal Health” in *The Canadian Bulletin of Medical History*, Vol. 22, No. 1 [2005]: p. 104.

of the settler state's benevolence. This was at odds with the emergent culture of 'universal healthcare' in that decade, as the federal government of Canada had already introduced legislation intended to provide hospital and insured medical services for all Canadians.²⁴⁹ As Peter Kulchyski and Frank Tester recall in *Kiumajut (Talking Back)*, Moore wrote to another government official in 1957: "As you know, one of our difficulties is the widespread but completely false belief among most Indians, from the needy to the well-to-do, that they have a statutory right to free medical and hospital care and can therefore demand service... Naturally, we are anxious that this misunderstanding of our position should never gain a foothold with the Eskimos."²⁵⁰ Kulchyski and Tester explain that Moore then "proposed a pamphlet, with appropriate Inuktitut translation, be prepared and distributed to explain that the Inuit did not have a right to health care, thereby catching any misapprehensions before they could spread and become a movement."²⁵¹ This particular story about Moore's attempts to head off Inuit healthcare in the 1950s is a single example of the multiple ways in which he shaped healthcare access for northern Indigenous peoples in the latter half of the 20th century.

Percy Moore was largely successful in the scientization of federal Indian policy by the late 1950s. He had travelled to numerous communities to examine both Indigenous bodies and settler facilities; he had secured more funding for health services on the basis of his proposals; he also revamped healthcare access according to his own views on the need for sectarian hospitals; finally, Percy Moore overdetermined Indigenous diets according to scientific studies on nutrition that used biomarkers such as vitamin levels as the basis of their understandings for Indigenous

²⁴⁹ It was not until the *Medical Care Act* of 1966 that universal Canadian healthcare become a legislative reality.

²⁵⁰ Percy Moore, Director, Indian and Northern Health Services, Memo to Ben Severtz, Director, Northern Administration and Lands Branch, 29 October 1957, LAC, RG 85, Vol. 1384, file 1000/150 (Part 2). Quoted in Peter Kulchyski and Frank Tester, *Kiumajut (Talking Back): Game management and Inuit rights, 1900–70* (Vancouver: UBC Press, 2007), p. 176.

²⁵¹ See Peter Kulchyski and Frank Tester, *Kiumajut (Talking Back): Game management and Inuit rights, 1900–70* (Vancouver: UBC Press, 2007), p. 177.

health and well-being. Because of his influence on Indigenous eating practices and access to healthcare, Moore helped create the conditions of possibility for high levels of type-II diabetes in Indigenous communities and shaped the way in which Canadian structures of healthcare would respond to these so-called ‘epidemics’ when they began to emerge in the 1970s and 1980s.

Moore was also quite successful as a scientist and a bureaucrat. In 1956, for example, he began a three-year stint as the Chairman of the Executive Board for the World Health Organization.²⁵²

Pausing here briefly to flag the transition from secondary to primary source materials, I want to pick up on the story of Percy Moore in 1956 and offer a so-far undiscussed episode in his career that begins in this year and helps reveal the governmental logics, values, standards, and practices that characterized Indian administration around the time the thrifty gene hypothesis was invented.

The Lab Rat Experiments of Percy Moore

On the 3rd of January of 1956, Percy Moore sent a letter to the Chief of the Nutrition Division with the subject heading of “Rat Feeding Experiment.”²⁵³ This letter read as follows: “A copy of the instructions for white rat feeding experiments to be carried out in association with our nutrition education project in schools has been made and we are returning the original to you. Your cooperation is appreciated.”²⁵⁴ As the colonial archive reveals, Moore was making copies of ‘instructions for white rat feeding experiments’ as part of a new educational initiative he was planning for Indigenous children in residential and day schools. Moore’s plan was to send a pair

²⁵² The way in which settler scientists central to the history of the thrifty gene are involved with the World Health Organization will be further explored in Chapter Three on James V. Neel.

²⁵³ Percy Moore to Chief, Nutrition Division, January 3rd, 1956. LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

²⁵⁴ Percy Moore to Chief, Nutrition Division, January 3rd, 1956. LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

of live rats (along with an instruction booklet) to a particular school on a specific, pre-arranged date. Once received by a nurse or teacher, these rats would be taken by students and placed on two different diets designed to bring about poor health in one rat and healthy growth in the other. In the final week of the experiment, both rats were to be placed on the same healthy diet and students were to observe the recovery in the sickly rat's state of health.

Though Moore started copying the instructions for the experiments in 1956, it appears he was unable to locate a good source for rats until 1959; however, this may have simply been because he was busy in his capacities as the head of the Executive Board of the World Health Organization. In any case, on the 28th of July, 1959, Moore wrote a letter to a Mr. E.R.W. Gregory of the Food and Drug Directorate. "In a telephone conversation with our Health Educator Miss Martens", wrote Moore, "you mentioned the fact that your Directorate would be able to supply our services with white rats to be used in nutrition experiments in the schools on our reservations."²⁵⁵ Interestingly, on that very same day, P.A. Thompson, the Zone Supervisor of Nursing, wrote to Indian Health Services to request eight sets of instructions booklets for the "rat experiment for schools...so that nurses will be acquainted with the procedure before schools opens."²⁵⁶ This timeline suggests that Moore received a positive response from Gregory and wasted no time at all in immediately rolling out the rat experiment initiative and organizing the shipment of the booklets he had copied three years previous. Indeed, why else would Thompson request these shelved instruction booklets on the same day that Moore had requested rats from Gregory? Other records support the likelihood of this story; for example, in the following month, Gregory sent a letter to Moore that began as follows: "I wish to acknowledge your memo of July

²⁵⁵ Percy Moore to E.R.W Gregory, July 28th, 1959. LAC, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4.

²⁵⁶ P.A. Thompson to Regional Superintendent, Eastern Region, July 28th, 1959, LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

28th and the excellent outline you have been circulating to the nurses and teachers interested in nutritional education. It is felt that you should be congratulated on covering the subject very simply and very completely in a manner which should be readily understood by all those concerned.”²⁵⁷ As this passage reveals, Moore began circulating the instruction booklets rather quickly once locating a source for the rats in July of 1959.

Other archival records help to flesh out the story of Percy Moore’s lab rat experiments and provide some information on when they were conducted and to what effect. The first comes from Dr. J.H. Wiebe, Regional Superintendent of the Eastern Division, who, in December of 1959, sent a letter to Mr. Gregory in which he requested the shipment of “white rats” to “be used for a nutrition experiment at the Micmac Indian Day School and at the Residential School.”²⁵⁸ While it is quite possible that lab rat experiments had been conducted in residential and day schools under the authority and direction of Percy Moore as far back as 1956 (he may have had an alternate source for rats that did not appear in the archival records), this order for ‘white rats’ in December of 1959 is the earliest archival indication of them actually being carried out in a particular school.

Another record reveals that Percy Moore wrote to the Regional Superintendent of the Pacific Division in February of 1960 to discuss the experiments. In this letter, Moore explained that he was “very pleased to hear that the nutrition experiments using white rats are proving to be of interest in your area.”²⁵⁹ Moore continued to explain that he was also “pleased to hear that the rats shipped from Ottawa to Tofino arrived in good condition” and that he would be “pleased to

²⁵⁷ E.R.W. Gregory to Percy Moore, August 14th, 1959. Library and Archives Canada, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4.

²⁵⁸ J.H. Wiebe, Regional Superintendent, Eastern Region to E.R.W Gregory, December 8th, 1959, LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

²⁵⁹ Percy Moore to Regional Superintendent, Nutrition Division, February 22nd, 1960, LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

hear of the results of these experiments or some sort of evaluation from the nurse and the teacher on the use of this type of experiment as a teaching medium.”²⁶⁰ This letter provides a lot of information: first, it reveals that Moore was actively seeking out information on the results of the lab rat experiments in February of 1960, which further suggests that they were first carried out in January of 1960 (at least en masse); second, this letter demonstrates the high degree of interdepartmental and nation-wide collaboration needed to bring off the lab rat experiments; finally, this letter (and the one above) discloses the sheer geographical scale of the lab rat experiments and reveal that they were a coast-to-coast affair - taking place from Nova Scotia to British Columbia. In this way, the lab rat experiments were not a once-off, outlying event but a well-planned initiative requiring a huge amount of collaboration from a wide array of different actors all working together to make sure that Indigenous children all across Canada saw the experiment and learned its stark lesson.

A series of documents in the archives also reveal the sheer extent to which Percy Moore seems to have been personally involved and invested in this nation-wide initiative. For example, Moore appears to have been intimately involved in the shipment and scheduling of the rats. In April of 1961, he sent a letter to Gregory asking him to send “four white rats sent via C.P.R. Express to arrive on Monday, May 1st”; in October of that same year, Moore sent a telegram to the Moose Factory Indian Hospital to put them on notice of impending arrivals of white lab rats.²⁶¹ We can see in these records that Moore did not only locate the rats used in the experiments, he also personally organized their shipments across Canada using railways,

²⁶⁰ Percy Moore to Regional Superintendent, Nutrition Division, February 22nd, 1960, LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

²⁶¹ Percy Moore to E.R.W Gregory, April 19th, 1961. Library and Archives Canada, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4. Also, see Percy Moore Telegram to Mrs. Jean Travella, October 2nd, 1961, LAC, Indian Nutrition Files, RG29, Vol. 2989, File 850-4-5.

telegrams, and other modes of communication and transportation. This level of involvement suggests Moore's personal investment in the success of the rat experiments. Similarly, Moore's request for feedback on the experiments discloses his keen interest in whether or not they had an impact on Indigenous children.

Significantly, Percy Moore created forms to standardize and secure feedback related to the rat experiments and the impact they had on children. These forms had special sections wherein teachers or nurses were to give information on "Effects of Experiment on Eating Habits of Children" and "Impression of Complete Project."²⁶² One respondent recorded on this form that "the children showed a greater interest in drinking milk and eating vitamized biscuits which are provided by the government to Indian schools."²⁶³ I find this last sentence particularly significant, as it suggests that teachers and nurses were instructed to not only teach Indigenous children scientific lessons about nutrition, but also to impart political lessons about the benevolence and bounty of the settler state and to encourage them to eat the kinds of food the government had arranged for them to consume. Pausing here to mention once again that Moore was himself involved in the nutrition experiments and scientific studies involved in the research required for the production of the 'vitamized biscuits', I will get to what is probably the most sinister and scandalous aspect of the lab rat experiments before concluding.

On the 17th of August, 1960, Moore received a letter from an unnamed employee in the Department of National Health and Welfare with the initials "M.L."²⁶⁴ This letter discussed the lab rat experiments and, after some initial throat-clearing about how the experiments were

²⁶² Report of Ms. W. Bednaz, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4. Date not listed, though likely between 1960 and 1962.

²⁶³ Report of Ms. W. Bednaz, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4. Date not listed, though likely between 1960 and 1962.

²⁶⁴ Memorandum: To H51 from H36, August 17th, 1960, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4. Date not listed, though likely between 1960 and 1962.

“carried out to a happy conclusion” and were “bound to effect one or two pupils”, M.L. criticized the inclusion of “corn flakes”, “sausages,” and “weiners” as part of a healthy diet in the instruction booklets sent with the lab rats. M.L. wrote that “more detail should be given as to what is a whole grain cereal. It is sad to hear of corn flakes being recommended as part of a good diet.” M.L.’s memo also noted that while “it is possible that the inclusion of sausages and weiners is realistic under the circumstances, such meats should not be included in a ‘model’ menu.”²⁶⁵ Again, it is necessary here to recall that Moore had tried to produce a sausage product for consumption in residential schools during his research and nutrition experimentation projects between 1942 and 1952.²⁶⁶ It is therefore rather unsettling to read that the lab rat experiments had the effect of encouraging children to ‘eat vitamized biscuits’ and ‘sausages and weiners’, as this makes it appear that their central purpose was more about creating compliant lunchlines than meaningfully imparting nutritional information on healthy eating practices. Indeed, the letter itself points to the fact that Indigenous children were subject to circumstances wherein cheap substitutes (read: vitamized and processed foods) were being served in place of a ‘model menu.’

Thus, while the point seems obvious, it nonetheless bears mentioning that a lack of scientific knowledge on the part of students was never a cause of disease or malnutrition in residential and day schools. And as a well-experienced and highly-trained public health official responsible for the major structural overhaul of Indian health services, Percy Moore knew that. The lab rat experiments were on that basis violent, disciplinary, and part of a broader settler colonial regulatory project wherein Indigenous children were stolen, institutionalized,

²⁶⁵ Memorandum: To H51 from H36, August 17th, 1960, Indian Nutrition Files, RG29, Vol. 2989, File 851-6-4. Date not listed, though likely between 1960 and 1962.

²⁶⁶ Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952” in *Histoire sociale/Social History* Vol. 46, No. 91 [2013]: pp.155-156.

traumatized, chronically underfed, and subject to the kinds of nutritional experiments discussed in the above. Importantly, if we compare the lab rat experiments to the earlier experiments Moore conducted on Indigenous peoples between 1942 and 1952, it is hard not to see that Moore had Indigenous children do to rats what he had done to them. In this way, the lab rat experiments signify a sort of shift in the history of Canadian federal Indian policy: in the first set of experiments, scientific studies on nutrition were used to gain actionable information on Indigenous public health for the purposes of settler state interventions; in the second set of experiments, however, nutrition experiments were used as an affective element and a disciplinary tool recruited to cultivate consent and create compliance amongst Indigenous children being made to eat a less than 'model' menu. If we take the Foucauldian approach of tracking the way in which state's constitute their 'populations' as quantified, known, and demarcated collectives about whom knowledge is needed for the purpose of effective and efficient governance, the first set of nutrition experiments represent a kind of statist knowledge-seeking whereas the lab rat experiments represent the way in which the settler state then introduced regulatory projects designed to implement the knowledges gained in these earlier experiments. In addition to embodying and consolidating the 'starvation, experimentation, segregation and trauma' dynamic of colonial health history identified by Mary Jane Logan McCallum, the lab rat experiments also occupied a considerable amount of time and resources that could have been applied elsewhere and to better effect given that healthy eating choices were rarely available even if students understood perfectly well the science of nutrition.

Conclusion

Percy Moore retired in 1965. A year after his retirement, H.B. Hawthorne published his well-known anthropological study on ‘Canada’s Indians’ that was “commissioned by Indian Affairs to provide contemporary data and ideas for future Indian policy.”²⁶⁷ It is clear, then, that by 1966, the dynamic of data-collection and intervention as a logic of settler colonial governance was already well-consolidated, and this was due in no small part to Percy Moore. More precisely, Percy Moore was responsible for making settler colonial statecraft a synthetic project of rule based on the dialectic between violent federal Indian policies and scientific studies of Indigenous diseases by public health officials and other scientifically trained professionals. When the former did harm, the latter measured and quantified this harm, suggesting new techniques of statecraft that might be employed to resolve the situation. Significantly, in the careers of Bryce and Stone, we see that the generation of public health data by the settler state was a fraught practice wherein medical professionals attesting to high TB death rates were ignored or actively disciplined for embarrassing the settler state. Moore’s career represents a shift in this process of the scientization of colonialist interventions in Canada. It is also essential to underscore that Moore instituted modern scientific nutrition education as something the settler state ought to teach Indigenous peoples as part of public health administration, thereby laying a lot of the groundwork for the way in which Health Canada and Indian Affairs would respond to high rates of type-II diabetes in Indigenous communities once genetics, endocrinology, and nutritional science became part of this settler colonial configuration of Indian policies and scientific

²⁶⁷ See Hugh Shewell, “‘What Makes the Indian Tick?’ The influence of social sciences on Canada’s Indian policy, 1947–1964” in *Histoire sociale / Social History*, Vol. 34, nNo. 67 [May 2001]: p. 133-167. Also, see Sally M. Weaver, “The Hawthorn Report: Its Use in the Making of Canadian Indian Policy” in Noel Dyck and James B. Waldram, eds., *Anthropology, Public Policy, and Native Peoples in Canada* (Montreal and Kingston: McGill-Queen’s University Press, 1993), pp. 75-97.

knowledges. In order to understand that phase of the scientization of Canadian colonialist intervention, however, it will be necessary to return once more to the global or imperial sphere of historical analysis and review the travelling science of the American geneticist James V. Neel, who invented the thrifty gene hypothesis in 1962.

Chapter Four:

James V. Neel and the Invention of the Thrifty Gene

*Here's our challenge: celebrate science when it is great, and scientists when they deserve it. And when they turn out to be awful bigots, let's be honest about that too.*²⁶⁸

- Adam Rutherford (on James Watson)

Introduction: Neel in Vancouver, 1978

Though his ideas settled here quite comfortably, the American geneticist James V. Neel – the inventor of the thrifty gene hypothesis – rarely came to Canada. As one of the foremost figures of American genetics in the post-war period, Neel was busy travelling all over the world to conduct studies on violently traumatized populations. As we shall see, his first major research project was in post-war Japan under the mandate of the Atomic Bomb Casualty Commission (ABCC). In the 1950s, Neel travelled through the Belgian Congo, British Uganda, the Gold Coast (read: Ghana) and Liberia conducting genetic studies on sickle-cell anemia. After inventing the thrifty gene hypothesis in 1962, Neel spent the rest of the decade travelling (often on military transport) through Brazil, Venezuela, Costa Rica, and Panama taking samples of human blood, milk, tissue, saliva, blood, and urine from communities of Indigenous people. Ultimately, Neel was unable to generate an assemblage of data that confirmed his hypothesis (though certainly not for lack of trying). Nonetheless, Neel became a celebrated and highly respected figure in the world of post-war genomics, which eventually did bring him to Canada.

²⁶⁸ Adam Rutherford, “He may have unravelled DNA, but James Watson deserves to be shunned”, *The Guardian*, December 1st, 2014; available online at <https://amp.theguardian.com/commentisfree/2014/dec/01/dna-james-watson-scientist-selling-nobel-prize-medal> [accessed 10 August 2017].

In 1978, Neel travelled to Vancouver, British Columbia to give a very curious paper at a symposium organized by the American Society of Human Genetics.²⁶⁹ At this point in his career, he had already organized the massive research projects in Japan, Africa, and Central and South America, headed numerous international organizations for research into genetics and Indigenous peoples, and received numerous awards for his contributions to the field. The title of this symposium was “Why Sociobiology?” - a rather controversial title in 1978. Three years earlier, E.O. Wilson had published *Sociobiology: The New Synthesis*, which received some very negative attention by the likes of Stephen Jay Gould and Richard Lewontin (touted as vanguards of evolutionary science in the aftermath of Mengelian medicine and Nazi eugenics).²⁷⁰ Thus, a conference put on by the American Society of Human Genetics with the title “Why Sociobiology?” was bound to involved spirited defenses of the productive value of research projects that studied human behaviours, cultural performances, and diseases as limited, shaped, or determined by evolution, genetics, and biology. And Neel did not disappoint.

Neel decided to give a paper on his theory of “headmanship”, or his hunch that modern civilization might experience some genetic complications from having lost a “primitive population structure” that bestowed on its fittest male members reproductive advantages.²⁷¹ Neel based this hypothesis on his research among the Yanomama peoples of South America, who he

²⁶⁹ The American Society of Human Genetics, Symposium on “Why Sociobiology”, Vancouver, British Columbia, Oct. 1-4, 1978. In his autobiography, Neel writes that, two years later, he expanded this address into a publication; see James V. Neel, “On Being Headman” in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: pp. 277-294.

²⁷⁰ A good account of this period in popular scientific debate, which arguably began with E.O. Wilson’s 1975 publication of *Sociobiology: The New Synthesis* (Cambridge: Harvard University Press), can be found in Ullica Segerstråle’s *Defenders of the Truth: The Battle for Science in the Sociology Debate and Beyond* (Oxford: Oxford University Press, 2000). It is also necessary to flag here the timing (1979) of Stephen Jay Gould and Richard Lewontin’s co-authored article that formally challenged these trends in sociobiological thinking; see “The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptionist Programme” in *The Proceedings of the Royal Society of London*, Series B, Vol. 205, No. 1161 [1979]: pp. 581-598.

²⁷¹ James V. Neel, “On Being Headman” in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: pp. 277-294; also, see footnote #2.

saw as having maintained a population structure that afforded a significant reproductive advantage to men that had what Neel called a “higher innate index ability.”²⁷² Monogamy, modern medicine, and the peace of the post-war world had, in Neel’s eyes, largely removed such reproductive advantages from ‘headmen’ in the western world by subordinating human reproduction to socio-economic logics rather than the violent but sturdy hand of evolution by natural selection. On that basis, Neel insisted that “we [geneticists] can use them [the Yanomama] as an approximate guide to the population structure and the nature of the...vectors of human evolution.”²⁷³ In a foundational way, Neel approached Indigenous peoples as manifestations of a masculine, savage essence that he saw as fading fast from the fabric of western civilization. Moving further in his Vancouver address, for example, Neel “contrast[ed] the harshness of life for the...American Eskimo with conditions in the United States today.”²⁷⁴ Commenting on the differences between the two, Neel wrote “that we who enjoy the latter are functioning in a cotton-batting existence where each zygote, whatever its frailties, is subject to few accidents and socio-economic happenstances.”²⁷⁵ Neel did not stop there: he continued to insist that research projects seeking this kind of data from “primitive populations” were the “number one objective...in any effort to understand the driving forces of human evolution.”²⁷⁶ This was certainly a spirited defense of the kind of ‘sociobiology’ that had come under fire in the wake of the Second World War.

²⁷² James V. Neel, “On Being Headman” in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: pp. 285.

²⁷³ James V. Neel, “On Being Headman” in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: p. 278. Neel’s emphasis on ‘approximate’ has been removed.

²⁷⁴ James V. Neel, “The Study of Natural Selection in Primitive and Civilized Human Populations” in *Human Biology*, Vol. 61, No. 5/6 [1989]: p. 781.

²⁷⁵ James V. Neel, “The Study of Natural Selection in Primitive and Civilized Human Populations” in *Human Biology*, Vol. 61, No. 5/6 [1989]: p. 781. The emphasis is my own.

²⁷⁶ James V. Neel, “On Being Headman” in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: pp. 278.

I think the story of Neel in Vancouver is a useful introduction to his career for three reasons: first, it locates Neel in Canada; second, it reveals how Neel saw Indigenous communities in general (and even northern Indigenous communities in particular) as places where manly men still had a reproductive advantage over their male counterparts and thereby discloses Neel's conviction that modernity or civilization itself had an antipathy towards masculinity; third, Neel's 1978 paper in Vancouver is a good representation of Neel's very influential and often relentless calls for studies on Indigenous peoples as constituting an earlier stage of the evolutionary process that gave rise to European civilization. Indeed, even if James V. Neel had not invented the thrifty gene hypothesis, it may have been necessary to dedicate an entire chapter to the forms of science he 'pioneered' in the post-war period and then so forcefully prescribed in Vancouver, 1978. Indeed, many contemporary trends concerning 'paleo diets', 'rewilding', and other forms of back-to-ancestry nutrition or fitness regimens can be loosely traced back to Neel's profound influence on scientific and popular understandings of metabolism, biological variation, and masculinity. More directly, however, Neel is central to this history of the thrifty gene mythology as the hypothesis' originator as well as an individual whose career echoes the travelling science of Charles Darwin.

Relationship to Darwin

In his autobiography, James V. Neel wrote: "I feel I have at least one bond with Charles Darwin."²⁷⁷ While Neel does not elaborate on the nature of this 'bond', it is quite clear from a reading of his life writing in general and his autobiography in particular. Take for example the following passage in which Neel described his decision to pursue studies of 'Amerindians':

²⁷⁷ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994): pp. 208.

Behind our elaborate rationalizations to do this or that are often rather simple motivations. From time to time men are driven, for reasons often difficult to articulate, to measure ourselves, each in our own way, according to our background and opportunities. Mine had thus far been a rather safe life. Thus study presented a situation in which I could test myself. I had thus far functioned in a setting where help in case of miscalculation was close at hand. This would be different. Even as a boy, I had empathized with the tragic fate of the American Indian. Now I would glimpse – and perhaps even ameliorate a bit – a vanishing world.²⁷⁸

Though we might pause to comment here on Neel’s painting of Indigeneity itself as a vanishing masculine essence, I want to read this passage over and against Darwin’s description of his own desires to shed the softness of the civilized world and embark upon a science-making journey to the lands of the ‘Indian’:

It appears to me that nothing can be more improving to a young naturalist, than a journey in distant countries. It both sharpens, and partly allays that want and craving, which... a man experiences although every corporeal sense be fully satisfied. The excitement from the novelty of objects, and the chance of success, stimulate him to increased activity.²⁷⁹

These passages, taken together, reveal the masculinist overtones of scientific travel as articulated by formative figures in the development of evolutionary thinking and genetic science.

Significantly, for my purposes, each of these passages contain what can only be described as a masculinist dissatisfaction or anxious antipathy towards civilization as something that cannot satisfy the primal needs of male subjects. The passages suggest that the very desire of Darwin and Neel to study the ‘Indian’ was in many ways animated by a need to understand their own dissatisfactions with civilization, to find out where these primal needs came from, and to do so

²⁷⁸ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 122.

²⁷⁹ Charles Darwin, *A Naturalists’ Voyage around the World: The Voyage of the Beagle* (New York: Skyhorse Publishing, 2014), pp. 607.

by producing knowledge about ‘Indians’ as stand-ins for man in his primitive condition. In travelling to the space of the Native, encountering the ‘Indians’, and collecting data, Darwin and Neel constituted themselves simultaneously as successful scientists *and* masculine subjects who had survived a journey to meet their own primal selves. Thus, embedded in the race-making discourses that they generated – discourses seen as both authoritative and objective - were some very subjective (even insecure) views on masculinity that rendered their hypotheses, ironically, quite unscientific.²⁸⁰ This recalls what Evelyn Fox Keller has written on the relationship between gender and scientific knowledge: mainly, that while “it may be idle to ask what science would have looked like had it developed in conjunction with a different gender ideology, or, even better, independent of any gender ideology, we *can* begin to examine the ways in which a commitment to a particular ideology has influenced the course of scientific development.”²⁸¹

In what follows, I propose to track the growth of a gendered and racialized ideology in the registers of post-war genetic science by and through a reading of Neel’s life-writing and scientific publications. Like Darwin, Neel travelled to Indigenous communities all over the world, often relied on military transport, and produced scientific theories that constructed ‘Indians’ as unfit to survive in the modern world because they bore bodies shaped to thrive in an environment colonialism had destroyed. Whereas Darwin succeeded in rendering colonial trauma and genocide as a natural event resulting from the interaction of civilized and savage

²⁸⁰ There is no perhaps no more comprehensive critique of masculine preoccupations and insecurities inflecting evolutionary science than Donna Haraway’s *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (London: Routledge Press, 1989). I am drawing heavily from this and other critiques of masculinism in science; see Luce Irigaray, *The Sex That is Not One*, trans. Catherine Porter and Caroline Burke (New York, Ithaca Press, 1985) and Evelyn Fox Keller, *Refiguring Life: Metaphors of Twentieth-Century Biology* (New York: Columbia University Press, 1995).

²⁸¹ Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1985), p. 65. The emphasis is original.

subjects, Neel geneticized this Darwinian discourse of disappearance and made it speak the language of diabetes.

Neel: The Early Years

In his autobiography, James V. Neel introduces himself to readers as a tough guy: we meet him on the very first page as a young boy learning to box after being roughed up in “an alley fight in Detroit (a not uncommon event in those days).”²⁸² Ten pages later, Neel writes that his most “significant” memories before going to medical school involved joining a “menage of six young bachelors... whose urgings and then rigorous instructions resulted in [his] introduction, as soon as there was a decent snow base, to an exhilarating activity [read: skiing].”²⁸³ Not only are these early descriptions of Neel’s masculinity and homosociality a fitting prelude to the story he tells about his own life and research, they also flag Neel’s somewhat desperate attempts to write like Charles Darwin, with whom (readers already know) he claimed a special “bond”.²⁸⁴ Neel’s autobiography, published in 1994, is written in a decidedly Victorian and highfalutin tone that mimics Darwin’s writings in both form and content. In any case, Neel explains that he finished a graduate thesis on the genetics of fruit flies in 1939 and applied to medical school three days before the attacks on Pearl Harbour in 1942 (though no supporting evidence is given for this decidedly convenient timeline).²⁸⁵ In the heat of the Second World War, then, Neel was

²⁸² James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 1.

²⁸³ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 11.

²⁸⁴ Neel wrote: ‘I feel I have at least one bond with Charles Darwin’ in *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994): pp. 208.

²⁸⁵ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 13.

registered as an active private “assigned to duty in medical school.”²⁸⁶ During these years, Neel had his medical training funded by the Army’s Specialized Training Program (ATSP). As someone who had already studied genetics at the graduate level and served in the US military as a medical officer, Neel was well positioned by the war’s end to help organize a genetic study in Japan under the mandate of the Atomic Energy Commission (AEC) and the Atomic Bomb Casualty Commission (ABCC).

Neel in Japan

Ostensibly, the goal of this research initiative in Japan was to produce scientific knowledge on the effects of radiation in the context of human genetics and birth defects.²⁸⁷ Treatment and the production of curative therapies was not within the mandate of the study. Neel made this much apparent in 1947, when he carefully crafted the following statement regarding the scope and potential of the atomic bomb study (which, he explains, he was careful to publish in the journal *Science* as a way to pre-empt criticisms):

Although there is every reason to infer that genetic effects can be produced and have been produced in man by atomic radiation, nevertheless the conference wishes to make it clear that it cannot guarantee significant results from this or any other study on the Japanese material. In contrast to laboratory data, this material is much too influenced by extraneous variables and too little adapted to disclose genetic effects. In spite of these facts, the conference feels that this unique possibility for demonstrating the genetic effects caused by atomic radiation should not be lost.”²⁸⁸

²⁸⁶ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 12.

²⁸⁷ Historians of science fiction will recognize this period in modern genetic science as characterized by a conviction that exposure to radioactive materials will increase the rate of mutation and in some sense alter or speed up evolutionary adaptation. The British scientist J.B.S. Haldane is usually credited as having created the sensationalism around this idea.

²⁸⁸ James V. Neel, “Genetic Effects of the Atomic Bombs in Hiroshima and Nagasaki” in *Science* Vol. 106 [1947]: pp. 331-333.

I wanted to quote this lengthy passage in its entirety to foreshadow a lot of the problems, issues, and criticisms that Neel's studies faced in the decades to come. In 1947, before flying to Japan on military transports, Neel made sure to record in print that what post-war Japan presented was a 'unique possibility' to advance genetic science. Later, in 1962, Neel articulated Indigenous communities in North, Central, and South America as constituting "favourable analytic opportunities" for studies that can reveal the effects of dietary change on primitive man.²⁸⁹ However, what is important to review at this juncture is that Neel's medical training, his scientific travel, and the trauma he was studying was all made possible by the American military in the emergent post-war global order.

"Our travel would be by military air transport", wrote Neel of his first research trip to Japan, explaining further that he "had learned that immediately after the war all of the military services had been (understandably) highly motivated to conduct firsthand studies of the biomedical aftermath of the atomic bombings."²⁹⁰ Neel continued to explain that "the Occupation" created a climate or culture of submission uniquely amenable to scientific studies of Japanese bodies. Describing that his research team enjoyed "A-bomb associated credentials", Neel recollected of his time in Japan: "This was indeed a different culture, fascinating but one not *easily penetrated*. At the moment, under the Occupation, it was *extremely pliant*: as we discussed possible follow-up studies, we were repeatedly assured by the Japanese side how easily each study could be accomplished. It was, in fact, difficult to get an objection as we explored possibilities."²⁹¹ Of course, Neel's metaphor of the pliant and penetrable Japanese

²⁸⁹ See James V. Neel, "Diabetes Mellitus: A 'Thrifty' Genotype Rendered Detrimental by 'Progress'?" in *The American Journal of Human Genetics*, Vol. 14, No. 4 [December 1962]: pp. 360.

²⁹⁰ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 58.

²⁹¹ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 61. The emphasis has been added.

nation reproduces some of the keynote racist and sexualized tropes of American military relationships with Asian countries (always rife with imagery of the submissive, sexualized feminine).²⁹² More important, at least for my purposes, is Neel's clear admission that American military occupation and dominance facilitated his research in profound ways by creating pliable subjects. In fact, Neel credits General Douglas MacArthur himself for saving the entire study from the imposing threat of a funding cut, citing MacArthur's belief that "the discontinuation of the program would create a scientific vacuum in which investigators of uncertain credibility would be drawn."²⁹³ This inclusion by Neel is suggestive that the American post-war military machine clearly understood scientific knowledge as yielding real-world power and pursued studies like the ABCC on that basis.

The most significant (and final) example of Neel's research trips in Japan come from his description of Japanese dissatisfaction with the project and its mandate – a dissatisfaction that he had predicted and tried to pre-emptively address (see above). Neel recalls: "One of the most frequent Japanese complaints has been that we (the ABCC) only examined them (*like guinea pigs*), but did not offer treatment in the event of findings of medical significance. The fact is that the terms under which the ABCC operated did not permit treatment."²⁹⁴ Like the defensive statement carefully prepared by Neel in 1947, this passage also reveals the extent to which foundational studies in post-war American genetics not only failed to produce curative therapies for subject populations, but were not even formulated for this purpose in the first place. We see a

²⁹² Lots of references can be made to fit here, though perhaps the most appropriate in terms of scope, period, and content is Neferti Tadiar's *Fantasy Production: Sexual Economies and Other Phillipine Consequences for the New World Order* (Hong Kong: Hong Kong University Press, 2004).

²⁹³ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 88.

²⁹⁴ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 85. The emphasis is mine.

similar iteration of this when reviewing Neel's studies on sickle-cell hemoglobin in the following decade.

Neel in Colonial Africa

Leaving Japan to pursue further studies of genetics and epidemiology in Africa, Neel “planned a trip to Uganda, the Belgian Congo, Liberia, and the Gold Coast.”²⁹⁵ Commenting on the colonial character of these locales, Neel writes: “This was 1955; Africa was still colonial, and British, French, and Belgian investigators seemed to have the facilities most suitable for the requisite research well in hand.”²⁹⁶ Again, we have here a clear admission that the conditions of possibility for Neel's studies of modern genetics was a pre-existing imperial, militaristic structure that made observation and data collection possible by producing ‘pliant’ subjects of study and ‘easily penetrated’ research environments. In recounting his practice of what he called “jungle medicine” throughout these years, Neel recalls: “All along the way, *with the utmost cooperation*, I was collecting blood samples.”²⁹⁷ The purpose of this research was to produce a better understanding of sickle-cell anemia - a disease whose history is deeply imbedded in the transits of empire by virtue of being “primarily associated, in the United States, with Americans of West African descent.”²⁹⁸ While Neel was able to help generate explanatory models of the transmission and behaviour of sickle-cell hemoglobin, he wrote that the disease “remains stubbornly resistant to the medical axiom that once the basis of a disease is understood, an

²⁹⁵ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 49.

²⁹⁶ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 48.

²⁹⁷ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 50 and 127. The emphasis is my own.

²⁹⁸ R.H. Ward and K.M. Weiss, “James V. Neel, M.D., Ph.D. (March 22, 195-January 31, 2000): Founder Effect” in *The American Journal of Human Genetics*, Vol. 66, No. 4 [April 2000]: pp. 755-760. Also, see Troy Duster, *Backdoor to Eugenics* (New York: Routledge Publishing, 2003), pp. 159.

effective therapy can be devised.”²⁹⁹ Thus, just as in Japan, no productive curative therapies were derived from the intensive study of the blood of racialized populations existing under conditions of empire. What these studies did produce, however, were gene-screening programs in the United States that tried to locate and isolate potential carriers of sickle-cell. As Troy Duster recounts in *Backdoor to Eugenics*, popular and often misguided ideas about sickle-cell anemia informed these screening programs, which were recruited to surveil, control, and disrupt African American communities in general and the Black Panthers in particular.³⁰⁰ And yet, Neel wrote glowingly of the productive and formative nature of these research trips in Africa, claiming that he had “by virtue of this and the program in Japan, discovered how much [he] liked the challenges of field (as opposed to laboratory) work.”³⁰¹ Again underscoring the ‘challenges’ of field work as a satisfying masculine journey, Neel turned the scope of his scientific inquiry towards Indigenous peoples on the North and South American continents. Because this third stint of research trips (mostly to Brazil and Venezuela) is the context in which Neel invented the thrifty gene hypothesis, we will spend more time on Neel in South America than we have elsewhere.

²⁹⁹ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 55.

³⁰⁰ See Troy Duster, *Backdoor to Eugenics* (New York: Routledge Publishing, 2003), pp. 43-53. I am not aware of any studies that try to explicitly link Neel’s research in colonial Africa to the oppressive genetic screening programs that arose in 1960s and 1970s America, though the project is certainly possible. Of particular interest here is the way in which African American men who *do not* have sickle-cell hemoglobin have been prevented from joining the United States Air Force on the basis of being genetically unfit to fly.

³⁰¹ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 54.

Neel in Central and South America

*The real medical pay dirt comes from the careful and intensive study of blood, saliva, urine, and stool specimens which we collect in the field.*³⁰²

- James V. Neel, 1965

“In the late 1950s”, recalls Neel, “I began to devote considerable thought to the...dietary changes that usually came with civilization.”³⁰³ Taking advantage of his credentials as an expert in the study of radiation, Neel attended a World Health Organization event in Rio de Janeiro, Brazil in 1961. The immediate purpose of the gathering was to discuss possible research projects in areas of the country with high rates of radiation. While in Brazil, however, Neel arranged to meet with contacts who could help assist him in later studies on the “dietary changes that came with civilization.”³⁰⁴ Recalling the trip, Neel noted that it “was a good opportunity to get a feeling for the *climate of acceptance*” for genetic studies on ‘Indians’, again flagging his tendency to be tenacious in the pursuit of ‘pliant’ and ‘easily penetrated’ research environments.³⁰⁵ Moreover, in this period, Neel began preliminary studies on ‘Amerindian’ subjects that were funded (again) by the Atomic Energy Commission, thus demonstrating that

³⁰² Neel to Wayne Miller of the Servicio Geodésico Interamericano, Caracas, Venezuela, 2 November 1965, Papers of JVN, APS. Quoted in Susan Lindee, “Voices of the Dead: James Neel’s Amerindian Studies” in *Lost Paradise and the Ethics of Research and Publication*, eds. F.M. Salzano and A.M. Hurtado (New York: Oxford University Press, 2004): p. 28.

³⁰³ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 118.

³⁰⁴ I am referring here to Franciso Salzano of the University of Rio Grande do Sol. Science historian M. Susan Lindee argues that Salzano was a key local actor in facilitating Neel’s access to Indigenous subjects in Brazil; see her “Voices of the Dead: James Neel’s Amerindian Studies” in *Lost Paradise and the Ethics of Research and Publication* (New York: Oxford University Press, 2004), pp. 31-33. Salzano, it should also be stated clearly, is one of Neel’s most strident defenders; for example, see Franciso Salzano, “James V. Neel and Latin America - or how scientific collaboration should be conducted” in *Genetics and Molecular Biology*, Vol. 23, No. 3 [2000]: pp. 557-551.

³⁰⁵ See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 120-121. The emphasis is mine.

Neel's financial support continued to be provided by the same military institutions that funded his work in Japan.³⁰⁶ There is little question, then, that Neel's contributions to evolutionary theory and genetic science were made possible by American imperial power in the same way that Darwin's formative voyage on the *Beagle* was made possible by the travelling power of the British Admiralty.

1962 was also a formative year in the history of genetic science for two reasons beyond the invention of the thrifty gene: first, it was the year the International Council of Scientific Unions instituted the International Biological Program (in which Neel was heavily involved); second, it was the year the World Health Organization held a convention in Geneva titled the "Scientific Group for Research in the Population Genetics of Primitive Groups" (a summit that was chaired by Neel). In this scientific atmosphere, Neel became one of the chief proponents for an accelerated program on the study of the genetics of Indigenous populations worldwide. As stated above, his well-received thrifty gene paper articulated recently contacted Indigenous populations as presenting "favourable analytic opportunities" for studies that could reveal the differential workings of evolution on human populations separated both geographically and developmentally.³⁰⁷ Writing of this period in genetic science, Neel justified the urgency of genetic studies on the basis that "the relatively few remaining primitive populations of the world were so rapidly being disrupted that ours was almost surely the last generation to encounter any of them in a *relatively* undisturbed condition."³⁰⁸ It is important to note here that Neel was

³⁰⁶ Neel writes of this continuity of funding in the following terms: "I consider it a tribute to the then Atomic Energy Commission that their view of the population genetics we needed to know to understand the effects of radiation was broad enough to support our Amerindian study"; see James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 130.

³⁰⁷ See James V. Neel, "Diabetes Mellitus: A 'Thrifty' Genotype Rendered Detrimental by 'Progress'?" in *The American Journal of Human Genetics*, Vol. 14, No. 4 [December 1962]: pp. 353-362.

³⁰⁸ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 119-120. The emphasis is original.

neither an outlier, an aberration, nor a tangential character in the story of modern genetics science: as many sources claim, Neel was the “father of modern human genetics”, a “pioneer” in the field, an award-winning and highly decorated academic, and a figure who was absolutely central to shaping the discipline in its most formative moments of emergence.³⁰⁹

Neel’s 1962 trip to South America was, in his words, via “Brazilian military transport”, and he was thereby enabled to collect “blood, stool samples, saliva, urine, viruses, dental casts, human milk, tissue samples and texts describing physical examinations and family relationships” of the Xavante people.³¹⁰ In fact, discussing the need for an electric generator in the field to properly store biological samples, a colleague of Neel’s underscores the material conditions of access when he recalled that “the transportation of such a weighty apparatus was only *made possible* because the Brazilian Air Force made a DC-3 airplane available for our exclusive use in the trip to the field.”³¹¹ It was on these early trips to Brazil that Neel most overtly fetishized the masculinity of the pre-modern. For example, describing his first scientific encounter examining the bodies of Indigenous subjects, Neel wrote: “Let me say only that the males were collectively the most superb physical specimens I had ever seen.”³¹² Elsewhere, Neel wrote that “the males,

³⁰⁹ See University of Michigan, Department of Human Genetics, “James V. Neel, father of modern human genetics, died Feb. 1”. See <http://www.ns.umich.edu/new/releases/3310-james-neel-father-of-modern-human-genetics-died-feb-1> [accessed June 4, 2014]. The emphasis is mine. Also see “Scientist was Pioneer in Human Genetics”, *The Globe and Mail*, Feb. 03, 2000. Interestingly, Francis Collins (the leader of the human genome project, described Neel as “having birthed the field of human genetics” and referred to his research as “seminal” in J. Glanz, “James V. Neel is dead at 84; leading genetics researcher” in *The New York Times*, Feb. 3, 2003. These metaphors of the sexual, the reproductive, and the frontier are obviously no coincidence, given that Neel studied reproductive advantages of men in Indigenous communities on the colonial frontier.

³¹⁰ M. Susan Lindee, “Voices of the Dead: James Neel’s Amerindian Studies” in *Lost Paradise and the Ethics of Research and Publication* (New York: Oxford University Press, 2004), p. 28. The added emphasis here underscores the conditions of *possibility* for Neel’s scientific research in Central and South America.

³¹¹ The DC-3 is an American made military airplane. See Francis Salzano, “James V. Neel and Latin America - or how scientific collaboration should be conducted” in *Genetics and Molecular Biology*, Vol. 23, No. 3 [2000]: pp. 557-551.

³¹² James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 126.

in general, present a picture of exuberant vitality” and noted that “some of the young women were pleasingly plump.”³¹³

After being elected to the National Academy of Sciences and winning the Allan Award from the American Society of Human Genetics, Neel continued research trips to study the Yanomama peoples of central Brazil in 1966. Throughout his travel writings are daring stories of bravery and danger where Neel writes of his ability to expertly negotiate with or cleverly intimidate local men in order to secure access to Indigenous blood (or to save his own skin).³¹⁴ Neel also writes in his autobiography that he “promised his two sons that when they could carry a full load they could join one of these expeditions;” eventually, Neel’s eldest son James (then in medical school) did join him on one such trip (a deeper suggestion that, like Darwin, Neel saw field research as a kind of masculine rite-of-passage).³¹⁵

Throughout the 1960s, Neel continued to collect samples in Brazil, Venezuela, Costa Rica, and Panama, where he conducted similar studies and experiments on ‘relatively undisturbed primitive populations’ and his hunches about their dietary biologies. Infamously, when a measles epidemic took hold of the communities within his research area in 1968, Neel continued to collect samples.³¹⁶ This prompted journalist Patrick Tierney to suggest that Neel played an active role in the circulation of the disease, whereas other critics have insisted that “the

³¹³ Neel, *Physician to the Gene Pool*, 150-151.

³¹⁴ For example, Neel writes of “the time, in a remote village, when the Yanomama who was traveling with Nap [read: Napoleon Chagnon] and myself overheard the young bucks discussing a plan to overpower us and steal our trade goods that night. At dusk Nap casually blasted the tips off a tree branch overhanging the *shabano* where we were sleeping, and we retired with the shotgun leaning against the hammock – to a quiet night.” See James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 146.

³¹⁵ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994): pp. 142. Neel’s decision to bring his son has gone, to my knowledge, unmentioned upon in the considerable literature discussing his field research.

³¹⁶ This claim is contested by the AAA but supported in the broader literature on Neel’s practices of blood-taking in the midst of an epidemic.

blood samples remained a very high priority for Neel, even as those around him were dying.”³¹⁷

The allegations of Tierney provoked a very large-scale debate in the American Anthropological Association (AAA).³¹⁸ Because I am more engaged with racism in Canadian healthcare than with debates in American anthropology, I leave this larger controversy associated with Neel to the footnotes, and prefer to conclude this section on Neel’s research trips through Central and South America with the following final example. This passage – taken from Neel’s autobiography – describes an affective revelation he claims to have had while sleeping in an “Indian village” on one such research trip:

Suddenly the thought came to me that I was witness to a scene which, in one variation or another, had characterized our ancestors for the past several million years. The sudden realization of this contact with the thread of evolution resulted in another of those very emotional professional moments; this time I could feel the hair on the nape of my neck stirring, in a manner more often characteristic of physical fright than intellectual delight. Here was the basic unit of human evolution – the band or village – considering its interaction with other similar units and the environment. We were as close as modern man can come to the circumstanced under which our species had evolved, under which our present attributed had risen. What insights into the process could we, or any other group of investigators, hope to gain? I was momentarily encased in a temporary capsule of bygone time.³¹⁹

³¹⁷ M. Susan Lindee, “Voices of the Dead: James Neel’s Amerindian Studies” in *Lost Paradise and the Ethics of Research and Publication* (New York: Oxford University Press, 2004), pp. 28. Also, see Patrick Tierney, *Darkness in El Dorado: How Scientists and Journalists Devastated the Amazon* (New York: W.W. Norton and Company Publishing, 2000). The most spirited and evidence-based critique of Tierney’s claims can be found in Alice Dreger, “Darkness Descends on the American Anthropological Association: A Cautionary Tale” in *Human Nature* Vol. 22, No. 3 [September, 2011]: pp. 225-246.

³¹⁸ This episode, ‘The El Dorado Controversy’, was easily the most contentious episode in the associations’ history (at least until the more recent debates on the question of boycotting, sanctioning, and divesting from the settler state of Israel). In 2005, however, the AAA ultimately rejected Tierney’s evidence and cited his claims as baseless and sensationalist, see “AAA Rescinds Acceptance of the El Dorado Report”; American Anthropological Association, 2005.

³¹⁹ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994): pp. 129.

As is obvious from this and other passages, Neel was very clearly using Indigenous peoples as an approximation for a stage in the development of European civilization within the narrative frame of western historicism (an orientation towards Indigeneity that he defended, rather aggressively, in his 1978 paper delivered in Vancouver). Throughout the 1950s, 1960s, and 1970s, Neel was a world-leader in denying Indigenous peoples what Fabian called “coevalness” or contemporaneity - that is, he analyzed and articulated Indigenous bodies as scientific things that could yield diagnostic knowledges that would help western civilization cope with having lost a primitive population structure.³²⁰ Within this narrative frame and evolutionist imaginary, Neel made baseless assumptions about Indigenous peoples’ capacity to feed themselves that became the foundation of some pernicious and long-standing ideas about Indigenous propensities to nutrition-related diseases. What is more, the conditions that he studied (that is, exposure to atomic radiation, sickle-cell hemoglobin, and the onset of dietary diseases) were all conditions that were themselves made possible by the exercise of colonial power and the imperial choreography of racialized bodies (that is, atomic bombs, the creation of a Black diaspora, and the disruption of Indigenous national patterns). Thus, when Neel wrote about “how far modern man has departed from the circumstances under which he evolved”, he was taking part in an anthropological project of genetic knowledge production that configured the Indigenous body and environment as the proper destination for scientific travel, interrogation, and data collection. Of course, this was not a breaking free from earlier modes of evolutionary theorizing and knowledge production; rather, Neel’s attitudes were very much consistent with the history of Darwinian thinking itself. The way in which Neel describes the hair on his neck stirring and the sensation of physical fright in connection with his intellectual delight is reminiscent of Darwin’s

³²⁰ See Johannes Fabian, *Time and the Other: How Anthropology Makes Its Object* (New York: Columbia University Press, 1983).

thrill and terror upon seeing ‘Indians’: “The sight of a naked savage in his native land is an event which can never be forgotten.”³²¹

This treatment of the Indigeneity by modern genetic science and anthropology was something that Neel himself had carefully shaped, painstakingly built, intimately practiced, fully normalized, and consistently benefitted from in a long and distinguished career stretching across multiple continents and decades.³²² In the same way that Darwin reordered 17 and 18th-century notions of racial difference and white supremacy into an evolutionary schema endowed with the objectivity afforded to Victorian science, Neel reorganized Darwin’s 19th century notions of human variation into an emergent order of genetic knowledge that consolidated the continuity of epistemic violence and white supremacy within 20th-century modes of American scientific knowledge production. As a highly celebrated and award-winning geneticist, moreover, Neel is particularly emblematic of a particular moment in the post-war history of modern scientific knowledge production – one that was characterized by a rigid spatio-temporal schematic that saw ‘beyond Europe as before Europe.’³²³ These studies probed the Indigenous body for answers not on its own terms but in a schematic that correlated to the western historical subject’s own experience of modernity or civilization (even masculine anxieties and ‘primal’ desires). It was for these reasons that Neel travelled the world studying violence, survival, sexual reproduction, epidemiology, warfare, and disease in a way that viewed Indigenous peoples as repositories of profound self-knowledge for the western biohistorical subject. Literally and metaphorically, Neel thought he could answer questions about *himself* on these research trips – both the biological

³²¹ Darwin, Charles, *The Autobiography of Charles Darwin 1809-1882*, Barlow, Nora, ed., London and Glasgow: Collins Clear-Type Press, 1958, pp. 80

³²² James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994): pp. 149.

³²³ My phrasing here is borrowed from Bernard Mcgrane, *Beyond Anthropology: Society and the Other* (New York: Columbia University Press, 1989).

constitution of his own evolved body and the masculine potential of his own character (recall, Neel wrote of field research: “many men can’t make it”).³²⁴ This might help explain why, in 1978, Neel was willing to throw around words like ‘eugenic’ and ‘index of innate ability’ at the “Why Sociobiology?” conference put on in Vancouver by the American Society of Human Genetics: he was defending not only an analytic territory for potential research but a legacy of genetic studies on traumatized populations in Japan, Africa, and South America.

Neel: The Later Years

After delivering his rather aggressive and arguably outmoded 1978 paper in Vancouver, Neel’s tone began to change. To his credit, his tone would continue to change at an accelerated pace until his death in February of 2000. For example, in 1983, Neel did something rather surprising: he began to make efforts to financially compensate his test subjects. In this year, Neel wanted access to the Cuna and Bokota peoples of Panama and wrote to a Costa Rican colleague: “I think we would have to be prepared to reimburse them for blood samples; we need your suggestion as to how much this should be per individual.”³²⁵ While this might have been a begrudging accommodation towards the new climate of genetic and anthropological research, this was a considerably large step for a man who, five years earlier, had loudly insisted that getting access to Indigenous blood to test his ‘headmanship’ theory was literally the “number one objective...in any effort to understand the driving forces of human evolution.”³²⁶ In 1985, Neel was forced into compulsory retirement and continued his research and contributions as a

³²⁴ Neel to Frank Davidson, 17 February 1965, Papers of JVN, APS. Quoted in Lindee, “James Neel’s Amerindian Studies”, 31.

³²⁵ Neel to Ramiro Barrantes, Escuela de Biología, Universidad de Costa Rica, San José, Costa Rica, 19 December 1983. Quoted in Lindee, “James Neel’s Amerindian Studies”, 40.

³²⁶ James V. Neel, “On Being Headman” in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: pp. 278.

professor emeritus. Six years later, in 1989, Neel started to undertake efforts to call attention to the lack of data supporting his thrifty gene hypothesis. In characteristic language (that is, both frank and masculinist), Neel wrote that “the data which that (rather soft) hypothesis was based has now largely collapsed.”³²⁷ We might pause here to recall that Neel’s 1962 paper that put forth the hypothesis was not derived from an empirical study of blood collected in Central and South America, but was instead based on past studies by population geneticists of questionable methods and reputations/dispositions. It was, in other words, pure speculation. It is therefore highly questionable as to what ‘data’ Neel saw as having collapsed given that his theory was mostly a rationalist and evolutionist abstraction rather than an empirically-fashioned scientific observation. In any case, in 1994, while writing his autobiography, Neel penned the following passage: “As we examined the Indians and collected our samples, all this the basis of learned papers that would ultimately contribute to our professional reputations, were we only the latest of the exploiters, now for scientific reasons?”³²⁸ Clearly, it is not only his critics but the man himself who came to see his research as another iteration of exploitative colonialism that treated Indigenous peoples and bodies as raw materials for the taking. In fact, beyond my focus on his masculinist preoccupations with primitive population structures, I do not think I am saying anything of Neel that he has not already admitted about himself. Thus, while I am critical of Neel, I want to be fair in my representation of his career particularly in its later stages (and especially given that he is no longer here to defend himself).

In 1998, Neel wrote a follow-up article on the thrifty gene hypothesis which explained that it was very difficult to isolate potential genetic carrier states in specific populations because

³²⁷ James V. Neel, “Update to ‘The Study of Natural Selection in Primitive and Civilized Human Populations’” in *Human Biology*, Vol. 61 [Dec. 1989]: pp. 811–823.

³²⁸ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994): pp. 171.

“the enormous range of individual or group socioeconomic circumstances in industrialized nations badly interferes with an estimate of genetic susceptibilities.”³²⁹ This is especially the case in northern Ontario and Sandy Lake First Nation, as the history of outposts, grocery stores, and food security in the community make it almost impossible to disentangle political from biological causative elements. Most significantly, however, in 1999, Neel went even further and wrote in no uncertain terms that his hypothesis did not work in a settler colonial context. In this article, Neel wrote that there was “no support to the notion that high frequency of Non-Insulin Dependent Diabetes Mellitus (NIDDM) in reservation Amerindians might be due simply to an ethnic predisposition - rather, it must predominantly reflect lifestyle changes.”³³⁰ Months later, Neel passed away (just as the Canadian iteration of the thrifty gene mythology was gaining international attention).

Conclusion

Looking at the life and career of James V. Neel, it is easy to see the very unsettling continuities in the connections between modern evolutionary science, genetic studies on human populations, and the co-formation of western knowledge and power on the frontiers of empire. We can note here how Neel needed military transports and pre-existing imperial occupations to access these spaces. More than this, the story of Neel allows one to appreciate how modern genetic studies on human subjects followed a racialized trajectory of imperial violence through post-war Japan, colonial Africa, and South America. Neel made a career taking military transports to study the outcomes of imperial and military violence and encode them biologically as genetic rather than political events. As M. Susan Lindee noted, Neel’s “subjects were uniquely

³²⁹ James V. Neel, “The Thrifty Genotype” in *Perspectives in Biology and Medicine* No. 42 (1998): 44-74.

³³⁰ James V. Neel, “The ‘Thrifty Genotype’ in 1998” in *Nutrition Reviews* Vol. 57, No. 5 [1999]: S2-S9.

vulnerable products of history and of science.”³³¹ Neel’s ‘bond’ with Charles Darwin is ultimately ironic, then, at least in my reading, as each participated in the obfuscation of biological realities by and through travelling science projects made possible by the violence of imperial expansion.

And yet the story of Neel is also the story of a man who, despite his efforts, was unable to outlive the hypothesis that he himself created. I find it especially significant that, months before his death, Neel made a point of rejecting the viability of the thrifty gene hypothesis in the context of the ‘Amerindian’ who lives on the ‘reservation.’ Thus, while Neel is responsible for creating the hypothetical narrative structure of the thrifty gene mythology, he is not responsible for using it to erase the Canadian government’s destruction of Indigenous foodways in the post-war period. As we shall see in the chapter that follows, culpability for the Canadian construction of ‘Aboriginal Diabetes’ as a genetic condition belongs to a series of Canadian scientists who made rather lucrative careers hijacking Neel’s hypothesis to administer settler colonial science in the provincial north of Ontario.

³³¹ M. Susan Lindee, “Voices of the Dead: James Neel’s Amerindian Studies” in *Lost Paradise and the Ethics of Research and Publication* (New York: Oxford University Press, 2004), pp. 32.

Chapter Five:

Robert Hegele and the Re-Invention of the Thrifty Gene Hypothesis in Northwestern Ontario

Introduction: The Re-Discovery, 1999

*Canadian Scientists are in the Vanguard.*³³²
- The Financial Post, 1998

In this chapter, I tell the story of the Canadian revival of the thrifty gene hypothesis. The specific paper and generative moment under discussion came in 1999 when a team of Canadian scientists published a paper in *The Journal of Clinical Endocrinology* titled “The Hepatic Nuclear Factor-1a G319S Variant Is Associated with Early-Onset Type 2 Diabetes in Canadian Oji-Cree.”³³³ To be clear, the paper in question never actually cited the thrifty gene hypothesis or its creator, James V Neel. Instead, it was the geneticist associated with the project, Dr. Robert Hegele of the University of Western Ontario, who popularized this study as a discovery of a thrifty gene. For example, on the 9th of March, 1999, Hegele and his team held a press conference in London, Ontario to announce the findings of their study in Sandy Lake on the genetic determinants of type-II diabetes.³³⁴ Carolyn Abraham of *The Globe and Mail* interviewed Hegele and covered the press conference in two articles published on the 9th and 11th of March. In these articles, Abraham explained that:

³³² This epigraph is taken from a 1998 article in *The Financial Times* reporting upon the Sandy Lake Study; see Margaret Brady, “Researchers are making major strides in being able to identify genes linked to specific diseases and Canadian scientists are in the vanguard”, *The Financial Post*, September 12th, 1998.

³³³ See Robert Hegele, Henian Cao, Stewart Harris, Anthony Hanley, and Bernam Zinman, “The Hepatic Nuclear Factor-1a G319S Variant Is Associated with Early-Onset Type 2 Diabetes in Canadian Oji-Cree” in *The Journal of Clinical Endocrinology and Metabolism*, Vol. 84, No. 3 [1999]: pp. 1077-1082.

³³⁴ Carolyn Abraham, “Genetic Trait for Diabetes Uncovered: Researchers to Reveal Link Today Between Disease and High Incidence for Northern Ontario Reserve”, *The Globe and Mail*, March 9th 1999, p. A10.

Scientists from the University of Western Ontario and the University of Toronto have been scouring the DNA of the Sandy Lake natives for four years to find the genetic link. As with most hunts for a mutated gene, the expectation is that the scientists will now be able to figure out how to correct the mutation and better treat diabetes at Sandy Lake.³³⁵

These articles also quoted Hegele as saying the particular genetic variant unearthed by the study "certainly has all the earmarks of what a thrifty gene would be."³³⁶ Hegele expressed that he felt "very gratified because there was a lot of doubt that this could be done, that a mutation could be found."³³⁷ The scale of press coverage following Hegele's claim that a thrifty gene had been discovered points to the presumed power and impact of the scientific finding. For example, the *British Medical Journal* reported that "a study conducted in a reservation in northern Ontario has identified a genetic mutation that seems to have allowed the Indians there to survive famines in the past but to have triggered diabetes when food became plentiful and their lives became sedentary."³³⁸ A Chinese news agency also found the study newsworthy, reporting in March of that year: "Canadian researchers have found that a 'thrifty' gene, or genes, may account for the world's third highest rate of diabetes in the Ojibway-Cree native reserve at Sandy Lake in Northern Ontario province of Canada."³³⁹ The *Canadian Medical Association Journal* also ran an article "Gene Defect Driving Diabetes Epidemic on Ontario Reserve."³⁴⁰ As Jennifer Poudrier recalls, moreover, an edition of CBC's *The Nature of Things* in 2005 titled "The Weight of the

³³⁵ Carolyn Abraham, "Genetic Trait for Diabetes Uncovered: Researchers to Reveal Link Today Between Disease and High Incidence for Northern Ontario Reserve," *The Globe and Mail*, March 9th 1999, p. A10.

³³⁶ Carolyn Abraham, "Genetic Link Found to Natives' Diabetes if Mutation at Sandy Lake can be overcome, it could lead to new treatment, scientist says," *The Globe and Mail*, March 11th 1999, p. A11.

³³⁷ Carolyn Abraham, "Genetic Link Found to Natives' Diabetes if Mutation at Sandy Lake can be overcome, it could lead to new treatment, scientist says," *The Globe and Mail*, March 11th 1999, p. A11.

³³⁸ See Greg Basky, "Gene defect driving diabetes epidemic on Ontario reserve" in *The Canadian Medical Association Journal*, Vol. 160, No. 12 [June 1999]: p. 1692; also, see David Stergeon, "'Thrifty Gene' Identified in Manitoba Indians" in *The British Medical Journal*, Vol. 318 [March, 1999]: pp. 828.

³³⁹ "Canadian Researchers Uncover Genetic Link for Diabetes", Xinhua News Agency, March 9th, 1999.

³⁴⁰ See Greg Basky, "Gene defect driving diabetes epidemic on Ontario reserve" in *The Canadian Medical Association Journal*, Vol. 160, No. 12 [June 1999]: p. 1692

World” popularized the thrifty gene narrative in Sandy Lake First Nation when it described the community as battling “a thrifty genetic predisposition to obesity and NIDDM [read: type-II diabetes].”³⁴¹ Put simply, the ‘discovery’ of the thrifty gene in Sandy Lake was an internationally discussed finding that put Canadian science on the genomic map, so to speak, as it placed a research project conducted in the provincial north of Ontario into conversation with a burgeoning global discourse on the promise and potential of the Human Genome Project (completed in April of 2003).

In short, this chapter seeks to answer the question of ‘How did Sandy Lake First Nation become the site of a major research project conducted by medical scientists from universities in southern Ontario, and what were the impacts of this study?’ I aim to answer this question as I have in previous chapters: mainly, by a historical and material critique of the conditions of access that white male scientists have had to Indigenous bodies. As is evident from the above, I am focusing mainly on the geneticist and endocrinologist Dr. Robert Hegele, as I view him as uniquely responsible for the circulation and consolidation of the thrifty gene in Canada. Not only was Hegele the member of the research project who first popularized the findings as that of a ‘thrifty allele’, he also appears to have been the primary figure in medical journals advancing the hypothesis as a viable one in the context of First Nations communities in northern Ontario. For example, while the original and co-authored 1999 article never once mentioned thrifty genes, Hegele published his own article in *The Canadian Medical Journal* in 2001 which claimed that the “HNF1A S319 has all the attributes of a thrifty allele in the Oji-Cree”; further, the article explained high rates of coronary heart disease (in addition to type-II diabetes) as “the result of

³⁴¹ See Jennifer Poudrier, “The Geneticization of Aboriginal Diabetes and Obesity: Adding Another Scene to the Story of the Thrifty Gene” in *Obesity in Canada: Critical Perspectives*, edited by Jenny Ellison, Deborah McPhail, and Wendy Mitchinson (Toronto: University of Toronto Press, 2016), pp. 89-121.

the expression of diabetes susceptibility due to HNF1A S319.”³⁴² It is on this basis that I centre Hegele in the Canadian history of the thrifty gene; however, as we shall see in what follows, Hegele himself was deeply embedded in a long history of Canadian settler colonial science wherein medical figures from southern universities were called upon to conduct health surveys and data-based interventions in First Nations communities across northern Ontario. Thus, before getting to the story of the Sandy Lake study in the mid-1990s, it will be necessary to connect the story of Robert Hegele to the career of Percy Moore and the foundations of settler science as discussed in Chapter Three. In this way, I hope to create an unbroken chronological narrative that ties together Moore and Hegele through the history of the Sioux Lookout Project, which first opened up First Nations communities in northern Ontario to southern scientists in the 1960s (the same decade that Moore retired and the thrifty gene hypothesis was invented). Accordingly, I am reverting in this chapter back to archival source materials corresponding to the making of colonialist health interventions in northern Ontario. To that end, we begin with a little historical patchwork to regionalize the larger story here being told and to give readers some necessary background information on the foundations of colonial health interventions in northwestern Ontario.

Post-War Healthcare Provision Schemas in Northwestern Ontario

A useful starting point in this history is 1938, when the federal government agreed to undertake a survey to secure the placement of a reserve for the ‘Deer Lake Band’.³⁴³ I use single quotation marks here because, at that time, ‘Deer Lake Band’ was used by the state to refer not

³⁴² Robert Hegele, “Genes and Environment in Type 2 Diabetes and Atherosclerosis in Aboriginal Canadians” in *Current Atherosclerosis Reports*, Vol. 3, No. 3 [2001]: pp. 216.

³⁴³ Sandy Lake First Nation, “A Brief History of Sandy Lake”, 2017; available online, see: <http://sandylake.firstnation.ca/?q=history> [accessed 5 Aug. 2017].

only to the Deer Lake Band, but to the Sandy Lake and North Spirit Lake bands, who had taken treaty in 1910 in an adhesion to Treaty No. 5.³⁴⁴ It was not until 1945 – seven years after the survey and 35 years after the taking of treaty – that an order-in-council approved the creation of the actual reserve.³⁴⁵ Notably, 1945 was a tumultuous year administratively as it saw the responsibility for Indian Health Services transfer from the Department of Indian Affairs to the Medical Services Branch of the Department of National Health and Welfare. That this transfer took place in the chaos of post-war governmental restructuring did little to inspire confidence in Indigenous leadership that treaty rights related to health and medicine would be upheld. As the TRC Report explains:

The Numbered Treaties also established additional legal obligations concerning Aboriginal health and wellness. The right to medical care was recognized in Treaties 6, 7, 8, 10, and 11. Treaty 6 explicitly included provision of a “medicine chest” and relief from “pestilence.” However, the right to health is not limited to these Treaties. The Treaty negotiations included many references to the protection of, and non-interference with, traditional ways of life.³⁴⁶

If there is any debate as to whether or not the department understood its post-1945 role as including the provision of healthcare to First Nations people in northwestern Ontario (Treaty Nos. 3, 5, and 9), it can be settled with reference to the fact that, in 1950, the construction of the Sioux Lookout Zone Indian Hospital was completed, thereby indicating that the Department of National Health and Welfare was acknowledging its responsibility for the administration of healthcare in what became known as the Sioux Lookout Zone.³⁴⁷ One archival record – a clinical

³⁴⁴ Sandy Lake First Nation, “A Brief History of Sandy Lake”, 2017; available online, see: <http://sandylake.firstnation.ca/?q=history> [accessed 5 Aug. 2017].

³⁴⁵ Sandy Lake First Nation, “A Brief History of Sandy Lake”, 2017; available online, see: <http://sandylake.firstnation.ca/?q=history> [accessed 5 Aug. 2017].

³⁴⁶ The Truth and Reconciliation Commission, *Canada’s Residential Schools: The History – Part I: Origins to 1939* (Montreal: McGill-Queens University Press, 2016), p. 160.

³⁴⁷ Mary Hunter, *Clinical Assessment Survey Report: 1975, Sioux Lookout Project* (Toronto: University of Toronto Behavioural Science Department, 1975), UTARMS, A-2014-0500, Box 002, File #12, *Mary Hunter’s Files*, p. 22.

assessment survey – explains that, “for health service administration purposes, the Sioux Lookout Zone is designated as that area of northwestern Ontario bounded on the east by a line draw south from a point between Fort Severn and Winisk on Hudson Bay, to just east of Ogoki, down to a point west of Armstrong...going over 500 miles along the main transcontinental Canadian National Railway Line to the Manitoba border on the west.”³⁴⁸ Importantly, however, the Sioux Lookout Zone Indian Hospital was only meant to provide obstetric, surgical, and emergency care for First Nations people in the region, as primary care was to be accessed at Nursing Stations built in the communities themselves. Revealingly, however, only seven such stations were built to service a region roughly the same size as Norway.³⁴⁹ Thus, only seven of the twenty five communities received nursing stations; these communities included Sandy Lake, Big Trout Lake, Pikangikum, Fort Hope, New Osnaburgh (or Mishkeegogamang), and Round Lake First Nations.³⁵⁰ All other First Nations were expected to travel to these seven communities as their point of primary healthcare access. If ‘field nurses’ at these stations deemed it necessary, patients would then be sent to the city of Sioux Lookout for admittance to the Indian Hospital (or on to Thunder Bay or Winnipeg if the procedure or specialist required was not available in Sioux Lookout).³⁵¹ As a point of reference, the Sandy Lake Nursing Station was built in 1962.³⁵² A map and representation of this healthcare provision schema for the Sioux Lookout Zone can be

³⁴⁸ Mary Hunter, *Clinical Assessment Survey Report: 1975, Sioux Lookout Project* (Toronto: University of Toronto Behavioural Science Department, 1975), UTARMS, A-2014-0500, Box 002, File #12, *Mary Hunter’s Files*, p. 15.

³⁴⁹ See Mary Hunter, *Clinical Assessment Survey Report: 1975, Sioux Lookout Project* (Toronto: University of Toronto Behavioural Science Department, 1975), UTARMS, A-2014-0500, Box 002, File #14, *Mary Hunter’s Files*, p. 15.

³⁵⁰ Sioux Lookout Zone Hospital, *The Social System of Hospitalization*, 1971; UTARMS, A-2014-0500, Box 002, File #1, *Mary Hunter’s Files*, p. 3-4.

³⁵¹ Mary Hunter, *Clinical Assessment Survey Report: 1975, Sioux Lookout Project* (Toronto: University of Toronto Behavioural Science Department, 1975), UTARMS, A-2014-0500, Box 002, File #12, *Mary Hunter’s Files*, p. 22.

³⁵² Sandy Lake First Nation, “A Brief History of Sandy Lake”, 2017; available online, see: <http://sandylake.firstnation.ca/?q=history> [accessed 5 Aug. 2017].

seen below, which includes representations of transportation routes and vectors of planned patient transfers.

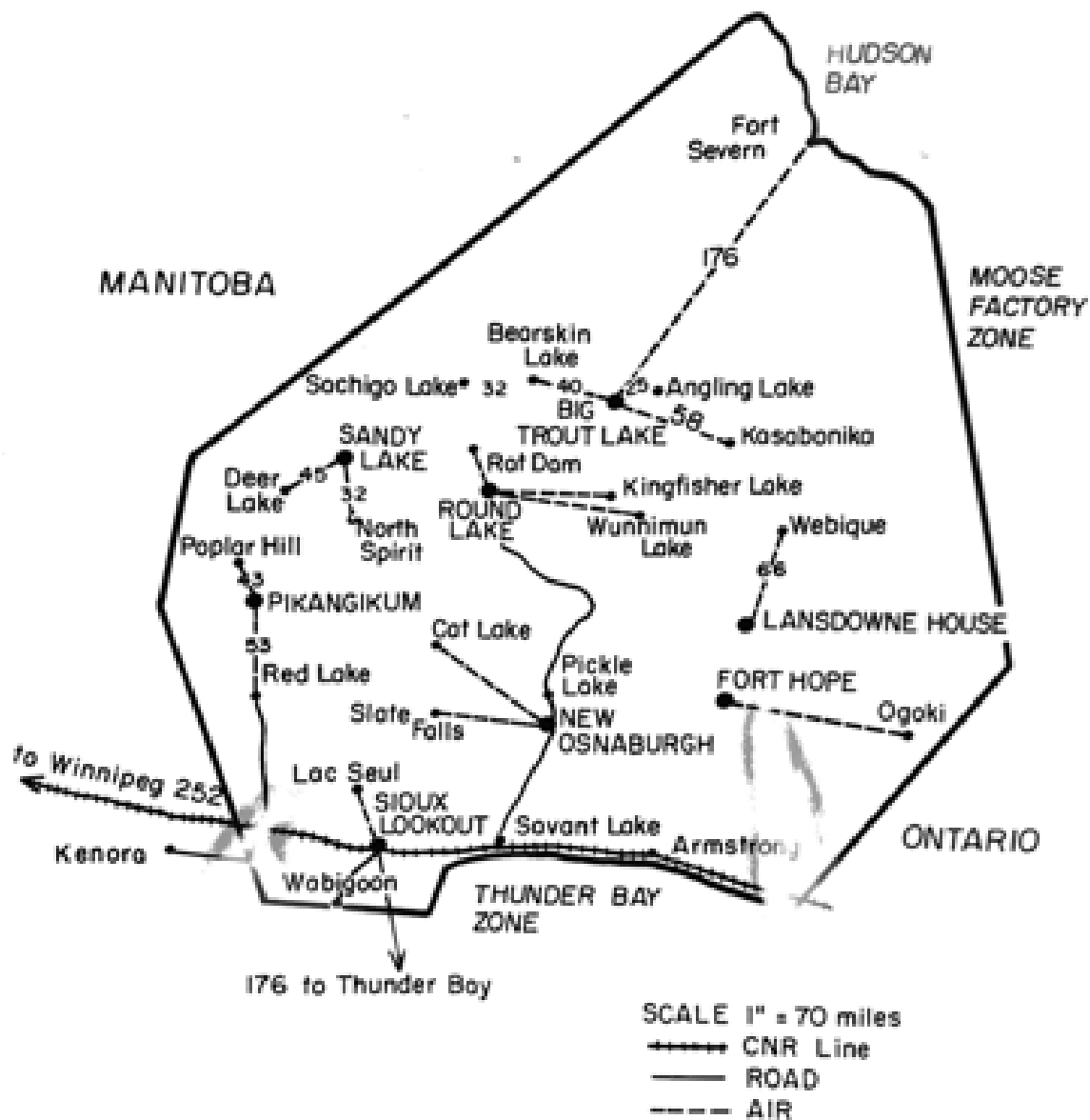


Figure 1³⁵³

³⁵³ Mary Hunter, *Clinical Assessment Survey Report: 1975, Sioux Lookout Project* (Toronto: University of Toronto Behavioural Science Department, 1975), UTARMS, A-2014-0500, Box 002, File #12, *Mary Hunter's Files*, p. 24.

The University of Toronto and the Sioux Lookout Project

To say the least, this extremely limited schema did not facilitate fast, immediate, and easy access to healthcare for First Nations people in the Sioux Lookout Zone. The political ramifications of this inequality came to the fore following the passage of the Medical Care Act in 1968, which granted universal health insurance to Canadian citizens. In that same year, the annual report from the Sioux Lookout Zone spoke to a poorly functioning and already-failing system that was under-funded, contributing to higher rates of TB, and wracked by communication issues:

The main purpose of this Zone is to look after the 16, 432 treaty Indians in this area...If we have to summarize what we did in 1968 we can only say that we survived and from the point of view of improvement in the medical care, 1968 can be termed a lost year, because our medical staff was reduced from five at the start of the year to one by the end of 1968. Some of the nursing stations had to be closed because of shortage of nurses...There is a definite increase of Tuberculosis among the Indians here...much has been said that our daily rate of \$13.45 which is allowed by the Ontario Hospital Services Commission should be up-graded to \$28.60, but nothing had been done yet. Let us hope that a better system of communication such as a radio system will be installed so that we can speak to all the nursing stations 24 hours a day.³⁵⁴

Despite the complete structural breakdown and under-funded nature of the healthcare provision system in the Sioux Lookout Zone in 1968, this same report nonetheless concluded: “In view of the increase in the TB rate and reactivations, any suggestion that we can now scrap our annual Treaty survey is completely out of the question. *We should increase our surveys* and do a

³⁵⁴ Sioux Lookout Zone, *Annual Report*, 1968; UTARMS, A-2014-0500 Box 2, Folder No. 1, *The Mary Hunter Files*, p. 1.

complete survey twice a year to be on the safe side.”³⁵⁵ I find it at the same time both shocking and thoroughly unsurprising that the logic of Indian healthcare administration remained so wedded to an ethos of surveillance and data collection in the continued midst of healthcare inequities and structural racism visited upon First Nations people: TB rates were increasing, the system was wracked by underfunding, nurses were quitting, and there was little if any communicative capacities in the on-reserve nursing stations if and when they were staffed. Even still, the suggestion was still made to double down on health surveys, data collection, and medical surveillance. It was at this point in the history of health interventions in northwestern Ontario that the University of Toronto entered more fully into the colonial fray.

In 1969, the Medical Services Branch partnered up with the University of Toronto’s Faculties of Medicine and Dentistry as well as the Hospital for Sick Children to begin a massive health survey project targeting the Sioux Lookout Zone.³⁵⁶ The celebrated pediatrician Dr. Harry Bain of the University of Toronto claimed the collaboration as his brainchild, whereas Dr. Keith Davey – Chief of Dentistry at the Hospital for Sick Children – was named as the project’s head of dentistry.³⁵⁷ Dr. William Paul, Professor of and Chairman of the Department of Obstetrics and Gynaecology at the University of Toronto was also named as a participant in the Sioux Lookout Project.³⁵⁸ As one article in the *Canadian Medical Association Journal* reported, the “scheme [was] a collaborative one in which universities, governments, doctors, dentists, nurses, communities, and consumers participate[d].”³⁵⁹ The article continued to explain that the Sioux

³⁵⁵ Sioux Lookout Zone, *Annual Report*, 1968; UTARMS, A-2014-0500 Box 2, Folder No. 1, *The Mary Hunter Files*, p. 1.

³⁵⁶ M.E. Hunter and M.I. Sharp, “A Health Survey of the Indians in the Isolated Communities of the Sioux Lookout Zone”, UTARMS, A-2014-0500, Box 002, File #14, *Mary Hunter’s Files*, p. 1.

³⁵⁷ H.W. Bain, “The Sioux Lookout Project”, March 9th, 1970; UTARMS, A97-0012 Box 2, Folder No. 18, p. 1.

³⁵⁸ Sioux Lookout Zone, *Annual Report*, 1968; UTARMS, A97-0012, Box 2, Folder No. 18, *The Sioux Lookout Project Files*, p. 3.

³⁵⁹ H.W. Bain and Gary Goldthorpe, “The University of Toronto ‘Sioux Lookout Project’ – a model of healthcare delivery” in *The Canadian Medical Association Journal* Vol. 107 [September 1972]: p. 523.

Lookout Project was supposed to produce “after three years of operation...a feasible model for delivery of healthcare in a remote area under extremely adverse conditions.”³⁶⁰ Though the University of Toronto had long been involved in the creation of the colonial health archive (see Chapter Three), this 1969 partnership marks a development in the regional history of settler colonialism in northwestern Ontario, as it more robustly opened up First Nations communities not merely as sites of data collection but also as opportunities for the training of graduate students in developing fields of science and medicine (and, later, genetics, endocrinology, and epidemiology). Revealingly, reports as late as 1989 described the project’s priorities quite clearly:

The Sioux Lookout Project has two components:

- 1) Teaching of undergraduate and postgraduate students in the health sciences field.
- 2) Assurance of adequate health care provisions for the Native Canadian residents residing in the Sioux Lookout Zone.³⁶¹

This ordering of objectives is extremely significant for the purposes of this chapter, as it reveals that the Sioux Lookout Project, formulated in the late 1960s, openly structured itself so as to facilitate the access of settler scientists to First Nations communities where they could receive on the ground training in real-world epidemics that would assist them in their professionalization and development into competent Canadian doctors. That health care provision was to be ‘adequate’ is at odds with the first objective of the program, as it is difficult to provide quality healthcare with undertrained medical professionals lacking in experience. The same be said of the training of nurses in the Sioux Lookout Zone; for example, the 1969 annual report of the

³⁶⁰ H.W. Bain and Gary Goldthorpe, “The University of Toronto ‘Sioux Lookout Project’ – a model of healthcare delivery” in *The Canadian Medical Association Journal* Vol. 107 [September 1972]: p. 523.

³⁶¹ Fred Baker, Director of University of Toronto Sioux Lookout Project, “Memorandum of 9/22/89”, UTARMS, A97-0012, Box, Folder No. 15, *Sioux Lookout Program Files*.

project reported that

The Hospital for Sick Children School of Nursing plans to send its senior nurses to S.L.I.H. [read: Sioux Lookout Indian Hospital] for one month of their training (in groups of four at a time). In addition, appropriate instructors and nursing consultants will accompany the student nurses. This plan has been worked out by the Nursing Division of Medical Services Branch of the Federal Government and of the Ontario Hospital Services Commission and the Hospital for Sick Children School of Nursing...It is hoped that within this program we shall be able to develop a course for the training of so-called nurse-practitioners who have training in Paediatrics, Midwifery, etc.³⁶²

What is revealed in the archival record, then, is a history in which non-Indigenous medical professionals and healthcare practitioners received a kind of accelerated and intensive experiential training by being sent to northern reserves to treat communities facing high rates of diseases that have demonstrable socio-economic components and causative elements (such as TB and type-II diabetes). It is also relevant here to point to the fact that the collaboration, funding, and organizational labour required to undertake the Sioux Lookout Project was enacted *before* the federal government decided to build a hostel for First Nations people travelling to Sioux Lookout to receive healthcare in 1971.³⁶³ Specifically, in 1968, the annual report of the project reported that “to date, five medical students have availed themselves of this elective and one such elective per month is available. Students are provided with the cost of transportation to and from Sioux Lookout and room and board, uniforms, etc., while in the area.”³⁶⁴ The annual report from the following year, in 1969, updated this story and reported that these “five medical students from the final year of medicine at the University of Toronto have spent an elective period of four

³⁶² Sioux Lookout Zone, *Annual Report*, 1969; UTARMS, A97-0012, Box 2, Folder No. 18, *The Sioux Lookout Project Files*, p. 6.

³⁶³ Sandy Lake First Nation, “A Brief History of Sandy Lake”, 2017; available online, see: <http://sandylake.firstnation.ca/?q=history> [accessed 5 Aug. 2017].

³⁶⁴ Sioux Lookout Zone, *Annual Report*, 1968; UTARMS, A97-0012, Box 2, Folder No. 18, *The Sioux Lookout Project Files*, p. 7.

weeks at the Sioux Lookout Indian Hospital. All have been tremendously impressed and enthusiastic and it seems likely that all our full quota of twelve elective students will be realized for the upcoming year.”³⁶⁵ That these students found the experience so impressive and exciting can be read alongside James V. Neel’s writings on his field trips to study Indians or, indeed, Charles Darwin’s words on the necessity of travel for the production of an astute scientific mind. More expressly, however, the point to be made here is the Sioux Lookout Project sent funded medical students from the University of Toronto to study Indigenous public health at the Sioux Lookout Indian Hospital *before* the federal government had even created travel accommodations for the Indian patients whose ill-health was being studied at that very same hospital. To be clear, I am sure that these doctors, students, nurses, and medical professionals had the best of intentions and did not consciously and purposefully construct the relationship between themselves and the First Nations communities as a predatory, extractive, and colonialist schema; rather, the governmentalities that structured the departmental history of Indian Health Services were so deeply imbedded in the culture of Canadian federal Indian policy that this approach to Indigenous public health was (and continues to be) seen as progressive. Thus, a main finding of this study is that Sandy Lake First Nation’s treatment by medical authorities, universities, and the federal government is not unique, as almost all northern First Nations communities were used as training grounds and laboratories for the benefit of non-Indigenous travelling medical personnel seeking to get a leg-up in their careers.

Under the auspices of the Sioux Lookout Project, health experts from the University of Toronto began to travel in the early 1970s to Indigenous communities in the Sioux Lookout Zone to assess the feasibility of large scale health surveys; for example, an annual report from 1970

³⁶⁵ Sioux Lookout Zone, *Annual Report*, 1968; UTARMS, A97-0012, Box 2, Folder No. 18, *The Sioux Lookout Project Files*, p. 4.

recorded that “Dr. William Paul, Professor and Chairman of the Department of Obstetrics and Gynaecology, University of Toronto, visited Sioux Lookout Indian Hospital, Big Trout Lake nursing state, Round Lake nursing station, and New Osnaburgh nursing station in January of 1970.”³⁶⁶ A broader reading of these annual reports reveals that, like 1968, little was done in terms of advancing healthcare access in the following years despite the original plan to produce a viable model of healthcare provision in remote communities in three years. What is more, these reports intimate the extent to which medical figures of the period saw in the ‘Indian’ a biologically distinct medical subject whose cause and experience of illness was necessarily different from that of non-Indigenous peoples. In 1971, a review of medical services in the region stated clearly that patients in the hospital were first and foremost identified (read: racialized) as ‘Indians’:

From the perspective of this report... the salient fact is that the patient, as patient, is clearly a member of a discernible group...The patients are almost without exception Indian people. The patient here is not simply a person seeking medical help. By the very fact of being a patient he is an identifiable member of a single minority group. His temporary status or identity is that of ‘patient’, but his more permanent identity is that of Indian.³⁶⁷

This passage recalls what Mary Jane McCallum has written of the experience of Indigenous peoples in the colonial health care system: mainly, that “if they are identified as Indigenous, they are regularly branded as ‘high risk’ and subject to a set of ill- health data and treatment responses generalized to Indigenous people in Canada.”³⁶⁸

³⁶⁶ H.W. Bain, “The Annual Report of the University of Toronto: The Sioux Lookout Project”, 1970; UTARMS – A97-00012, Box 2, Folder No. 18, *The Sioux Lookout Project Files*, p. 1.

³⁶⁷ Sioux Lookout Zone Hospital, *The Social System of Hospitalization*, 1971; UTARMS, A-2014-0500, Box 002, File #1, *Mary Hunter’s Files*, p. 2.

³⁶⁸ Mary Jane Logan McCallum, “Starvation, Experimentation, Segregation, and Trauma: Words for Reading Indigenous Health History” in *The Canadian Historical Review*, Vol. 98, No. 1 [March 2017]: p. 112.

Significantly, in 1973, before any major healthcare surveys were conducted, the Medical Services Branch co-ordinated with various members of the University of Toronto to plan a pilot study or test survey in a satellite community (that is, one without a nursing station) in order to workshop the process of collecting health data in remote First Nations communities.³⁶⁹ Following this experimental survey designed to workshop the data collection process, large-scale health surveys were then carried out across First Nations communities in the Sioux Lookout Zone (which were approved in a meeting of July, 1973 by a meeting of the Human Experimentation Committee of the University of Toronto).³⁷⁰ As one report detailed, this field work “comprised visits to the communities to collect the data using native interviewers and interpreters. It began June 4, 1973 and was completed in February 1974. In this time, visits into the communities were made and...physical examinations were made on 1055 respondents” who were asked up to 350 specific questions about their health, wellness practices, and attitudes towards the ‘white man’s medicine.’³⁷¹ Though these early health surveys undertaken in the 1970s hardly ever mentioned diabetes, it is nonetheless possible to find in them what appear to be proto-articulations of the thrifty gene hypothesis, thereby signaling the pre-existence of these discourses of Indigenous susceptibility in Canadian healthcare networks before the Canadian reinvention of the thrifty gene hypothesis in the 1990s. I will quote one passage of this sort at length before carrying on, taken from a report produced by the Director of the Health Survey Project, Dr. Mary Hunter of University of Toronto:

the Canadian native Indian population is held to be distinct from those Canadians of European descent in several important ways related to

³⁶⁹ Mary Hunter, *Clinical Assessment Survey: Sioux Lookout Project II*, 1975; UTARMS, A-2014-0500, Box 002, Folder No. 12, *Mary Hunter’s Files*, p. 28.

³⁷⁰ Mary Hunter, *Clinical Assessment Survey: Sioux Lookout Project II*, 1975; UTARMS, A-2014-0500, Box 002, Folder No. 12, *Mary Hunter’s Files*, p. 30.

³⁷¹ Mary Hunter, *Clinical Assessment Survey: Sioux Lookout Project II*, 1975; UTARMS, A-2014-0500, Box 002, Folder No. 12, *Mary Hunter’s Files*, p. 30.

health. First, both Indian and white groups consider the Indian to have illnesses and disease patterns and vulnerabilities distinct and different from the white man. Secondly, Indians in Ontario have, until recently, been a relatively traditional people, living as hunters and gatherers. They now find themselves emerging into a more complex way of life as offered by the neighbouring white society. At present, they are only part way along in this transition period.³⁷²

As is evident from this passage, the thrifty gene hypothesis found in the ideologies of racial difference in Canadian healthcare fertile soil for growth as it grafted itself to pre-existing

The Rise of Diabetes ‘Epidemics’ and the Healthcare Hunger Strike

Archival documents, external reviews, and annual reports in the 1980s suggest that the Sioux Lookout Project continued to be characterized by a problematic orientation towards data collection and the training of medical students over and against dedication to community service and the expansion of healthcare access across the region. In fact, it seems that this particular issue (combined with appears in the archives as a rather serious controversy or ‘underbilling’ of physicians) put the program into deep waters in the latter half of the decade. For example, an external review in 1987 reported that a major reason for its inception was because “it was recognized that further definition of the relationship between the University of Toronto and the Medical Services Branch was required to allow for the meaningful continuation of the project.”³⁷³ Moreover, the report made official recommendations that “the program should develop a mission statement with stated goals and objectives consistent with the University of Toronto” and that “the roles of the government of Canada and the University of Toronto must be clearly defined”, which suggests a growing rift between the university and the healthcare

³⁷² Mary Hunter, *Clinical Assessment Survey: Sioux Lookout Project II*, 1975; UTARMS, A-2014-0500, Box 002, Folder No. 12, *Mary Hunter’s Files*, pp. 5-6.

³⁷³ Frederik H. Lowry, *Report of External Review: University of Toronto, Sioux Lookout Project*, 1987; UTARMS, A97-0012, Box 2, Folder No. 21, p. 1.

institutions with which it was affiliated through the Sioux Lookout Project.³⁷⁴ Most significantly, however, this report also noted that “diabetes mellitus has emerged as a highly prevalent disease in the native population of Canada.”³⁷⁵ The relative absence of discussions of diabetes in previous health surveys (specifically, those conducted in 1973 and 1974) points to the rapid emergence of type-II diabetes across the region after 1975. By the late 1980s, the violence of diabetes and a lack of access to healthcare was enough to force community members to take drastic measures.

On the 18th of January, 1988, five members of the Sandy Lake Band began a hunger strike at the Sioux Lookout Zone Hospital to protest the continued lack of access to healthcare in their community. Their names were Josias Fiddler, Luke Mamakeesick, Peter Fiddler, Peter Goodman, and another unnamed man who I am assuming was a community member (though this is not certain and, as noted in Chapter One, I refuse to travel to Sandy Lake to undertake extractive story-work).³⁷⁶ Nonetheless, the 1988 hunger-strike suggests, whatever the intentions of those involved, the Sioux Lookout Project failed to secure for the region meaningful access to healthcare and immediate and urgent political actions were required in order to address the situation. As a report on the Sioux Lookout Region reported that year, “the five men wanted to draw attention to what they described as years of frustration, meaningless consultations, worsening health and deteriorating relations between aboriginal communities and the Medical

³⁷⁴ Frederik H. Lowry, *Report of External Review: University of Toronto, Sioux Lookout Project*, 1987; UTARMS, A97-0012, Box 2, Folder No. 21, p. 10.

³⁷⁵ Frederik H. Lowry, *Report of External Review: University of Toronto, Sioux Lookout Project*, 1987; UTARMS, A97-0012, Box 2, Folder No. 21, p. 2.

³⁷⁶ Scott McKay Bane Health Panel, *From Here to There: Steps Along the Way, Achieving Health for All in the Sioux Lookout Zone*, 1988; UTARMS - UTARMS, A97-0012, Box 2, Folder No. 25, *Sioux Lookout Project Files*, p. 1.

Services Branch (Health and Welfare Canada) which proved health services in the zone.”³⁷⁷ On the 20th of January, the Assistant Deputy Minister of Health and Welfare Canada arrived in Sioux Lookout to commit to renewing and rebuilding relationships with Sandy Lake as well as Nishnawbe Aski Nation (NAN) – a political organization representing most northern communities in the Sioux Lookout Zone who are signatories to Treaty Nos. 5 and 9.³⁷⁸ In a foundational way, then, the hunger strike created the political impetus for healthcare reform in northwestern Ontario in the late 1980s.

In March of 1989, a report on the Sioux Lookout Project prompted by the hunger strike at the Indian Hospital “recommended a move towards Native self-government with the full participation of First Nations communities for the ongoing responsibility of health care”, which was strong endorsed by NAN.³⁷⁹ In 1991, the Chief and Council of Sandy Lake First Nation approached Stewart Harris, the medical director of the Sioux Lookout Region (as well as a future on the 1999 thrifty gene paper), to discuss the alarmingly high rates of type-II diabetes in their community.³⁸⁰ For the following two years, preliminary studies and collaborative agreements were undertaken as a way to organize a more comprehensive and less qualitative research project. Because the Medical Director of the Sioux Lookout Program had for so long enjoyed a relationship with the University of Toronto, it is unsurprising that he wasted little time in

³⁷⁷ Scott McKay Bane Health Panel, *From Here to There: Steps Along the Way, Achieving Health for All in the Sioux Lookout Zone*, 1988; UTARMS - UTARMS, A97-0012, Box 2, Folder No. 25, *Sioux Lookout Project Files*, p. 1.

³⁷⁸ Scott McKay Bane Health Panel, *From Here to There: Steps Along the Way, Achieving Health for All in the Sioux Lookout Zone*, 1988; UTARMS - UTARMS, A97-0012, Box 2, Folder No. 25, *Sioux Lookout Project Files*, p. 1.

³⁷⁹ Sioux Lookout First Nations Health Authority, *History*, 2014; available online at: <http://www.slfaha.com/about/history/> [accessed 7 Aug. 2017].

³⁸⁰ See KE Kakekagumick et. al., “Sandy Lake Health and Diabetes Project: A Community-Based Intervention Targeting Type-2 Diabetes and Its Risk Factors in a First Nations Community” in *Frontiers in Endocrinology*, Vol. 4 [Nov. 2013]: pp. 1-9.

contacting scientists at the university to see what they could contribute to community health projects in Sandy Lake.

By 1993, graduate student Anthony Hanley – who acted as the Canadian Research Chair in Diabetes during the writing of this dissertation – had moved to Sandy Lake under the direction and recommendation of Dr. Robert Hegele, endocrinologist at the University of Toronto.³⁸¹ Hegele had been contacted by Stewart Harris earlier that year for the purposes of working with the Sandy Lake Band Council and co-ordinating a larger study on diabetes and obesity.³⁸² As a point of reference, this was the same year that the American Diabetes Association launched the Genetics of Non-Insulin Dependent Diabetes (GENNID) initiative, which further oriented research in the field to take the form of genetic studies that paid more attention to biology. Interestingly, this was also the year that the Northern Store program was initiated in Sandy Lake First Nation, which has been identified by Skinner et. al. as having contributed in a serious way to food insecurity and therefore nutrition related diseases in the provincial north.³⁸³ In any case, from July of 1993 to March of 1995, biological materials were taken from 1401 members of Sandy Lake First Nation for the purposes of scientific study in relation to type-II diabetes and impaired glucose tolerance.³⁸⁴ These biological samples were the raw materials used to reinvent the thrifty gene.

³⁸¹ Personal Correspondence, Monday July 10th, 2017.

³⁸² Personal Correspondence, Monday July 10th, 2017.

³⁸³ See KE Kakekagumick et. al., “Sandy Lake Health and Diabetes Project: A Community-Based Intervention Targeting Type-2 Diabetes and Its Risk Factors in a First Nations Community” in *Frontiers in Endocrinology*, Vol. 4 [Nov. 2013]: pp. 1-9. Also, see Kelly Skinner, Kristin Burnett, Lori Chambers, and Travis Hay, “Retail Food Environments, Shopping Experiences, First Nations, and the Provincial Norths” in *Health Promotion and Chronic Disease Prevention in Canada*, Vol. 37, No. 10 [October 2017].

³⁸⁴ As one article in 1995 reported, “Plasma for glucose, creatinine and urea was shipped to the Sioux Lookout Zone Hospital laboratory. Glucose, creatinine and urea levels were determined using standard clinical laboratory methods.” See Anthony JG Hanley, Stewart B Harris, Annette Barnie, Joel Gittelsohn, Thomas MS Wolever, Alexander Logan and Bernard Zinman, “The Sandy Lake Health and Diabetes Project: Design, Methods and Lessons Learned” in *Chronic Diseases in Canada*, Vol. 16, No. 4 [1995]: n.d..

The Publication of the Paper and the Inception of the Aboriginal Diabetes Initiative

In 1995, Dr. Anthony Hanley (who had just spent two years on-reserve assisting with the Sandy Lake Diabetes and Health Project) was the primary author on a paper published in *Chronic Diseases in Canada* that discussed diabetes in Sandy Lake and the methodologies of the research project.³⁸⁵ This paper named the destruction of Indigenous foodways and the construction of a North West Company Northern Store in 1993 as configured within the determinants of diabetes in the community.³⁸⁶ In 1999, recall, the study that named the Sandy Lake variant did not explicitly reference the thrifty gene hypothesis nor did it cite James V. Neel. In 2000, however, Hegele (along with Hanley, Stewart Harris [former Director of the Sioux Lookout Zone], and other scientists) published a paper in *Diabetes Care* titled “Clinical Utility of HNF1A Genotyping for Diabetes in Aboriginal Canadians.”³⁸⁷ Though this paper explained that the knowledge gained by the study was not directly transferable outside the context of Sandy Lake, it nonetheless called for further such genetic susceptibility studies in a fashion consistent with the history of healthcare in the region:

The results from the Oji-Cree emphasize that population-specific susceptibility alleles likely exist for complex diseases such as diabetes. The *HNF1A* G319S genotyping assay would have no clinical utility in populations other than the Oji-Cree because this mutation is absent in all other ethnic groups. Thus, the development of a panel of genetic tests to predict the risk of diabetes will need to account for

³⁸⁵ Anthony JG Hanley, Stewart B Harris, Annette Barnie, Joel Gittelsohn, Thomas MS Wolever, Alexander Logan and Bernard Zinman, “The Sandy Lake Health and Diabetes Project: Design, Methods and Lessons Learned” in *Chronic Diseases in Canada*, Vol. 16, No. 4 [1995]: n.d.; available online, see: http://www.collectionscanada.gc.ca/webarchives/20071127090635/http://www.phac-aspc.gc.ca/publicat/cdic-mcc/16-4/d_e.html [accessed 14 Sept. 2015].

³⁸⁶ Anthony JG Hanley, Stewart B Harris, Annette Barnie, Joel Gittelsohn, Thomas MS Wolever, Alexander Logan and Bernard Zinman, “The Sandy Lake Health and Diabetes Project: Design, Methods and Lessons Learned” in *Chronic Diseases in Canada*, Vol. 16, No. 4 [1995]: n.d.; available online, see: http://www.collectionscanada.gc.ca/webarchives/20071127090635/http://www.phac-aspc.gc.ca/publicat/cdic-mcc/16-4/d_e.html [accessed 14 Sept. 2015].

³⁸⁷ Robert Hegele, H. Cao, Anthony Hanley, Bernard Zinman, Stewart Harris, and C. Anderson, “Clinical Utility of HNF1A Genotyping for Diabetes in Aboriginal Canadians” in *Diabetes Care* Vol. 23 No. 6 [2000]: pp. 775–778.

ethnicity, at least in the case of certain susceptibility alleles such as S319.³⁸⁸

I believe this advocating of further genetic studies recalls the 1968 call for even more health surveys in the Sioux Lookout Zone despite the well-known and even reported upon issue of poverty, funding structures, and colonial marginality. In any case, it is clear that publications of this sort worked not only to consolidate the thrifty gene as a viable explanation for ‘Aboriginal diabetes’, but as an idea that had to be incorporated into clinical guidelines and state-sponsored health interventions.

In March of 2000, *Health Canada* released a report titled: “Diabetes Among Aboriginal (First Nations, Inuit, and Métis) Peoples in Canada: The Evidence.”³⁸⁹ This reported stated that

due to the nomadic lifestyles and feast/famine cycles of their ancestors, Aboriginal peoples in Canada are likely to be genetically predisposed to store energy from the diet very efficiently. The adoption of a market diet high in energy, saturated fat, and simple sugars, along with an increased tendency towards sedentary lifestyles and reduced physical activity, leads to a rise in the prevalence of obesity and subsequently diabetes.³⁹⁰

We can see in this passage the (re)production of the thrifty gene hypothesis as an ‘evidence’ based reality of Canadian public health. More precisely, however, we can see the positioning of pathology firmly on the Indigenous body, both in its alleged susceptibility to disease and its assumed physical inertia. Despite the foundational critiques of the thrifty gene hypothesis by Jennifer Poudrier in 2003 (which critiqued the construction of genetic homogeneity in Sandy lake) and John Speakman in 2006 (which underscored that the hypothesis was based on

³⁸⁸ Robert Hegele, H. Cao, Anthony Hanley, Bernard Zinman, Stewart Harris, and C. Anderson, “Clinical Utility of HNF1A Genotyping for Diabetes in Aboriginal Canadians” in *Diabetes Care* Vol. 23 No. 6 [2000]: p. 775.

³⁸⁹ Health Canada, *Diabetes Among Aboriginal (First Nations, Inuit, and Métis) Peoples in Canada: The Evidence*, March 10th, 2000.

³⁹⁰ Health Canada, *Diabetes Among Aboriginal (First Nations, Inuit, and Métis) Peoples in Canada: The Evidence*, March 10th, 2000.

unsubstantiated assumptions about famine cycles), the thrifty gene hypothesis continued to be cited (sometimes obliquely) in state literature. For example, in 2009, *Indian and Northern Affairs Canada* published a report that spoke of

...a growing concern among health authorities over the rapid emergence of lifestyle diseases, such as diabetes, cardiovascular disease, colorectal and breast cancer, as well as hypertension to which lifestyle is a contributing factor. All of these diseases appear to be directly related to the degree of acculturation or adaptation to a southern diet and lifestyle.³⁹¹

Though the thrifty gene is not openly cited in this passage above, it is embedded in the assumption that the inability of Indigenous to ‘acculturate or adapt’ leads not only to diabetes but to a whole host of diseases. Also of note here is the way in which ‘lifestyle’ is invoked as a way to capture determinants of health in Indigenous bodies, as they retain voluntarist undertones of choice despite the complete lack of freedom associated with living on a fly-in reserve in northwestern Ontario, wherein ‘choices’ related to food, diet, and exercise are structurally limited and overdetermined by settler colonial interventionist and statist schemas of ‘northern development.’

Discourses on diabetes in Ontario similarly constructed diabetes as a problem in Indigenous communities due to both biological susceptibility and an inability to replicate settler domesticities. In 2011, a pamphlet from the *Canadian Diabetes Association* (CDA) with the title “Just The Basics” communicated, in very patronizing and infantilizing rhetoric, the following advice to Native people:

Eat meals with your family: Why? Eating together is important. This makes mealtimes enjoyable and sets a good example for your children. It is a way to show respect and thanksgiving for the gifts of life and

³⁹¹ Indian and Northern Affairs Canada Devolution and Territorial Relations Branch, *Food Mail Review: Interim Report*, March, 2009.

food that you have been given. Eat three meals a day. Space them no more than six hours apart. Why: Eating the right amount at the right time helps keep your blood glucose in balance. This is the way that the Creator made the body to work.³⁹²

The notion that Indigenous peoples require special domestic instruction is here coupled together with a suggestion that this mode of eating will balance blood glucose and thereby mediate complications related to diabetes. It is through discourses such as this that ‘acculturation’ or a failure on the part of Indigenous peoples to properly ‘adapt’ to settler domesticities becomes the locus of pathology. Though I do not want to linger much longer on reproductions of the hypothesis, it is necessary to review more contemporary examples as a way to demonstrate the foundational way in which the Sandy Lake study in 1999 came to inform broader constructions of ‘Aboriginal Diabetes.’

For example, in 2011 (long after Hegele had already rejected his findings), *Health Canada* issued a report entitled “Diabetes in Canada”; under the subtitle of “genetic risk factors” the report in question suggested that the “‘thrifty gene effect’ plays a role in the increased rates of obesity and diabetes in the Aboriginal population.”³⁹³ In 2014, moreover, *Eatright Ontario* released a report on risk reduction for type-II diabetes in ‘Aboriginal people’; this report contained the following passage:

Traditionally, Aboriginal people lived off the land, which meant sometimes they had little food and at other times there was more than enough. This meant that the Aboriginal people had the genetics to store fat easily to help provide energy when there was little food. Today Aboriginal people still have the genes to store

³⁹² Canadian Diabetes Association, *Just the Basics*, February 2011.

³⁹³ Health Canada, *Diabetes in Canada: Facts and Figures from a Public Health Perspective*, December, 2011; this document is widely available online, see: <http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/chap6-eng.php> [accessed 7 June 2017].

fat easily but because of easy access to high calorie food and less active lifestyles, this is leading to overweight and obesity.³⁹⁴

More troublingly, however, the Canadian Pediatric Society's (CPS) "Position Statement" on "Risk Reduction for Type-II Diabetes in Aboriginal Children in Canada" (affirmed on March 1st, 2016) cites Hegele et. al.'s 1999 paper so widely covered across Canada and the globe for its alleged 'discovery' of a thrifty gene.³⁹⁵ We also find this 1999 study cited in the footnotes of the 2013 Clinical Practical Guidelines of the Canadian Diabetes Association.³⁹⁶ The inclusion of the 1999 study in today's clinical guidelines is particularly troublesome not only because of the lack of the study's scientificity, but because of its problematic potential for clinical application. As Hegele himself admitted in print, community members sometimes understood the identification of their alleged genetic susceptibility as defeating. Hegele wrote in 1998, for example, that when he informed "family members about their gene susceptibility, some of them incorrectly inferred that the development of the condition was genetically predestined and that its future expression was outside their control."³⁹⁷ Hegele claims that he was able to circumnavigate these concerns by underscoring that environmental components and lifestyle regimes related to diet and exercise were a larger determinant of diabetes and obesity, and that the genetic marker was not a fatalistic diagnosis but a sign that the at-risk subjects could mediate the likelihood of disease through lifestyle.³⁹⁸ There is a big problem with this line of reasoning, as pointed out by Jennifer

³⁹⁴ EatRight Ontario, *Aboriginal People Can Reduce Their Risk for Developing Type 2 Diabetes*, 2014. This document is available online, see: <http://www.eatrightontario.ca/en/Articles/Aboriginal-Health/Aboriginal-people-can-reduce-their-risk-for-develo.aspx#.U7rdjI1dVAs> [accessed July 7th, 2014].

³⁹⁵ Canadian Pediatric Society, "Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada", 2005 (reaffirmed 1 March 2014); available online, see <http://www.cps.ca/documents/position/risk-reduction-type-two-diabetes-aboriginal-children> [accessed 24 June 2017].

³⁹⁶ Canadian Diabetes Association, *Clinical Practical Guidelines*, 2013; available online, see <http://guidelines.diabetes.ca/browse/chapter38#sec1> [accessed 24 June 2017].

³⁹⁷ Robert Hegele, "Lifestyle and Genetic Susceptibility" in *Canadian Medical Association Journal* Vol. 159, No. 5 [1998]: pp. 1085.

³⁹⁸ Robert Hegele, "Lifestyle and Genetic Susceptibility" in *Canadian Medical Association Journal* Vol. 159, No. 5 [1998]: pp. 1085–7.

Poudrier: mainly, if ‘Aboriginal’ was already a risk category for the onset of type-II diabetes because of the particular environmental and economic realities associated with Indigenous peoples in Canada (as is demonstrated from Health Canada literature before 1999), what kind of intervention or application can genetic marker studies yield, given that individuals identified as ‘at risk’ are already treated by the state as fertile soil for the development of diabetes? Poudrier outlines this problematic logic for us:

Aside from surveillance pressure, what do those inscribed with genetic risk have to gain by learning of their genetic predisposition, particularly when the general course of preventative action would be the same as it would were they not informed of their genetic susceptibility?³⁹⁹

Thus, it appears that genetic marker studies on diabetes in First Nations and Inuit communities hold the capacity only to encourage fatalist understandings of the disease, while at the same time generating no new therapeutic, curative, or interventionist treatment associated with this identification of risk. This is remarkably consistent with James V. Neel’s research trips in Japan, colonial Africa, and Central and South America, which established him as a popular scientist with a lucrative career but did little to help the communities who provided the lifeblood of his scientific research. I am tempted here to recall what Neel wrote of sickle cell anemia – that is was “stubbornly resistant to the medical axiom that once the basis of a disease is understood, an effective therapy can be devised.”⁴⁰⁰ It seems the same can be said of ‘Aboriginal Diabetes.’

Conclusion

As readers will recall from my introduction, Robert Hegele (like Neel before him)

³⁹⁹ Jennifer Poudrier, “The Geneticization of Aboriginal Diabetes and Obesity: Adding Another Scene to the Story of the Thrifty Gene” in *Obesity in Canada: Critical Perspectives*, edited by Jenny Ellison, Deborah McPhail, and Wendy Mitchinson (Toronto: University of Toronto Press, 2016), p. 108.

⁴⁰⁰ James V. Neel, *Physician to the Gene Pool: Genetic Lessons and Other Stories* (New York: Wiley and Sons Publishing, 1994), p. 55.

eventually came to reject his own findings on the thrifty gene. The earliest inklings of these apprehensions (at least in print) came in a 2005 article published in *The Journal of Human Genetics*, which analyzed the Sandy Lake findings in light of the technologies of genome scanning and variant linkage analysis which offered a different method from studies sequencing single nucleotide polymorphisms (SNP). This paper reported:

In parallel experiments designed to find the genetic determinants of type 2 diabetes in Oji-Cree, we identified several linked chromosomal regions, using genomic scanning, in addition to a private diabetes-associated mutation, namely *HNF1A* G319S, using candidate gene sequencing. The genome scan did not identify the region harbouring *HNF1A* as being linked with diabetes. Also, the *HNF1A* mutation, when used directly in sib-pair linkage analysis, was not linked with diabetes.⁴⁰¹

This rollback on the 1999 ‘discovery’ was obviously not popularized to the same extent as the original claim that thrifty allele had been found in Sandy Lake. In 2006, Dr. John Speakman’s critique of the thrifty gene hypothesis’ empirically unsubstantiated assumptions about food shortages and famine cycles put the hypothesis into serious doubt.⁴⁰² In 2008, for example, Hegele admitted in print that “the modern revolution in molecular genetics and biology has focused our attention on the genetic component of disease, at the expense of the environmental component.”⁴⁰³ In 2009, an article in *Diabetologia* titled “Is the thrifty genotype hypothesis supported by evidence based on confirmed type-II diabetes – and obesity – susceptibility

⁴⁰¹ Robert Hegele, Anthony Hanley, Bernard Zinman, Steward Harris, and Carol Anderson, “Disparity Between Association and Linkage Analysis for *HNF1A* S319 in type 2 diabetes in Oji-Cree” in *The Journal of Human Genetics*, Vol. 45 [2005]: p. 184-187.

⁴⁰² J.R. Speakman, “Thrifty genes for obesity and the metabolic syndrome – time to call off the search?” in *Diabetes and Vascular Disease Research*, Vol. 3, Issue 1 (May 2006): pp. 7-11.

⁴⁰³ Robert Hegele and Rebecca Pollex, “Genetic Susceptibility” in *Health Transitions in Arctic Populations*, eds. T. Kue Young and Peter Bjerregaard (Toronto: University of Toronto Press, 2008): p. 243.

variants?” answered in the negative.⁴⁰⁴ In 2011, Hegele told the *Globe and Mail* that “newer genetic data suggest it’s incorrect to pin the blame for type 2 diabetes on a single gene in any population” and that “the whole thrifty-gene idea seems to me not to capture the subtlety and complexity... of type 2 diabetes in First Nations communities.”⁴⁰⁵ Significantly, in 2012, Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans cited “genetic research on diabetes in a First Nations community” as an example of a scientific study that is “unlikely to benefit the community in the short term.”⁴⁰⁶ Finally, in 2013, Hegele wrote that while “the ‘thrifty gene’ hypothesis might have seemed like a good idea many years ago... current research suggests that in most cases a single mutation in a single gene is unlikely to predispose an entire group of people to a complex outcome like type 2 diabetes.”⁴⁰⁷ Even so, as noted in my introduction, the Canadian Pediatric Society’s (CPS) “Position Statement” on “Risk Reduction for Type-II Diabetes in Aboriginal Children in Canada” (affirmed on February 28th, 2018) cites Hegele et. al.’s 1999 study.⁴⁰⁸ We also find Hegele’s study in the footnotes of the 2018 Clinical Practical Guidelines of the Canadian Diabetes Association, as well as in state

⁴⁰⁴ L. Southam, N. Soranzo, S. B. Montgomery, T. M. Frayling, M. I. McCarthy, I. Barroso, and E. Zeggini, “Is the thrifty genotype hypothesis supported by evidence based on confirmed type 2 diabetes- and obesity-susceptibility variants?” in *Diabetologia*, Vol. 52 [2009]: pp. 1846–1851.

⁴⁰⁵ Robert Hegele quoted in Carolyn Abraham, “The Life and Death of a Seductive Theory,” *The Globe and Mail*, Feb 26, 2011.

⁴⁰⁶ Canadian Institute of Health Research, Nation Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, *Tri Council Policy Statement: Ethical Conduct for Research Involving Humans*, December 2012.

⁴⁰⁷ Robert Hegele quoted in *Indigenous Peoples’ Food Systems and Well-Being: Interventions and Policies for Healthy Communities* (Rome: Food and Agricultural Organization of the United Nations Centre for Indigenous Peoples’ Nutrition and Environment, 2013), p. 14.

⁴⁰⁸ See K. Saylor, “Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada” in *Pediatric Child Health*, Vol. 10, No. 1 [2005]: pp. 49-52. Also, see Canadian Paediatric Society, *Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada*, January 1st, 2005; reaffirmed February 28th, 2018; available online: <https://www.cps.ca/en/documents/position/risk-reduction-type-two-diabetes-aboriginal-children> [accessed 10 May 2018].

literature more broadly.⁴⁰⁹

The purpose of reviewing this history has been two-fold: first, to demonstrate beyond a shadow of a doubt that the thrifty gene hypothesis is an unscientific, baseless, and racist account of diabetes and obesity in First Nations and Inuit communities, and that the citing of the 1999 study by Hegele et. al. in today's clinical guidelines can be read as a sign of settler power over Indigenous bodies and the knowledges produced about them; secondly, I wanted to show how Dr. Robert Hegele was in some sense trapped in his history as a Canadian scientist studying metabolism and endocrinology. As is obvious from the larger story told in this chapter, Hegele did not emerge out of nowhere as a global discipline (Chapter Four) came together with a federal colonial project (Chapter Three) to produce Hegele's research project in northwestern Ontario in the mid-1990s. This was a perfect storm, so to speak, for the reinvention of the thrifty gene. Not only had Canadian statesmen and medical figures long viewed Indigenous peoples as biologically susceptible to diseases that had obvious socio-economic determinants, but Neel's influential legacy also provided the scientific excitement and impetus to see in Sandy Lake the chance to make a great 'discovery' or, otherwise, gave Hegele the hubris to think that he could help Sandy Lake First Nation in a 'science as savior' style narrative.

⁴⁰⁹ See L. Crowshoe, D. Dannenbaum, M. Green, R. Henderson, M.N. Hayward, and E. Toth, "Clinical Practical Guidelines: Type 2 Diabetes and Indigenous Peoples" in *The Canadian Journal of Diabetes*, Vol. 42 [2018]: S296-S306.

Concluding Thoughts on the Science of Settler Colonialism

Science and the State of Exception

If, following Lorenzo Veracini and Patrick Wolfe, settler colonial societies are those founded on the elimination of Indigenous peoples and the disruption of their national patterns, then Canada is a settler colonial society *par excellence*.⁴¹⁰ For that reason, many scholars have found it useful to recruit Giorgio Agamben's concept of the 'state of exception' to the legal status of Indians and the deadly poverty that characterizes much of the reserve system in Canada.⁴¹¹ In this frame, the chronic lack of access to clean water, affordable food, safe shelter, and healthcare present in many First Nations and Inuit communities is a clear sign that Canada as a settler society has been produced through a genocidal logic of elimination that functions biopolitically to constitute reserve communities as 'camps', or as places occupied by beings that bear no rights and are routinely killed by structural or symbolic forms of state violence because they are seen as incommensurable with the larger body politic. This form of settler colonial violence is well-captured by Pam Palmater's concept of "death by poverty on First Nations."⁴¹² Writing within this theoretical frame of Canada as a settler colonial society proper, Scott Lauria Morgensen suggests that scholars ought to pay particular attention to the ways in which "settler colonialism directly informs past and present processes of European colonisation, global

⁴¹⁰ See Lorenzo Veracini, "Settler Collective, Founding Violence and Disavowal: The Settler Colonial Situation" in *The Journal of Intercultural Studies* Vol. 29, No. 4 [November 2008]: pp. 363- 379. Also, see Patrick Wolfe, "Settler Colonialism and the Elimination of the Native" in *The Journal of Genocide Research*, Vol. 9, No. 4 [2006]: pp. 387-409.

⁴¹¹ Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life* (Stanford: Stanford University Press, 1998).

⁴¹² Pamela Palmater, "Stretched Beyond Human Limits: Death by Poverty in First Nations", *Canadian Review of Social Policy*, Vol. 65, No. 66 [2011]: pp. 112-127. My definition of 'symbolic violence' is Bourdieu's (read: "the gentle, hidden form which violence takes when overt violence is impossible") and my definition of 'structural violence' comes from Galtung's standard definition. See Pierre Bourdieu, *Outline of a Theory of Practice* (Cambridge: Cambridge University Press, 1989) and Johan Galtung, *The True Worlds: A Transnational Perspective* (New York: Free Press, 1980).

capitalism, liberal modernity and international governance.”⁴¹³ Morgensen cautions further that “if settler colonialism is not theorised in accounts of these formations, then its power remains naturalised in the world that we engage and in the theoretical apparatuses with which we attempt to explain it.”⁴¹⁴

I believe that the history of the thrifty gene mythology is a striking example of the way in which settler colonialism has informed modern science, genetics, epidemiology, endocrinology, and evolutionary theory. I hazard to say further that this particular realm of settler colonial power operation – that is, scientific knowledge production – is currently underappreciated as a central apparatus of settler colonial governance with the broader literature critiquing the operation of biopolitics, states of exception, and logics of elimination in Canada. I am thinking here of Morgensen’s list of ‘European colonisation, global capitalism, liberal modernity and international governance’ as formations in which settler colonial power must be traced, lest it be naturalized. Science (or at least what I refer to as the ‘science of settler colonialism’) must be added to this list and considered a standard apparatus of settler colonial governance in the Canadian context as well as more globally.⁴¹⁵ I am not suggesting that science emerges after the fact as a justificatory discourse for settler colonial power relation; rather, the production of scientific data about Indigenous populations is a central characteristic or function of settler colonial power relations in Canada as well as in other settler locales (particularly Australia and New Zealand, though I may have gathered this impression merely from the strength of Warwick

⁴¹³ Scott Lauria Morgensen, “The Biopolitics of Settler Colonialism: Right Here, Right Now Scott Lauria Morgensen” in *Settler Colonial Studies*, Vol. 1, No. 1 [2011]: p. 52.

⁴¹⁴ Scott Lauria Morgensen, “The Biopolitics of Settler Colonialism: Right Here, Right Now Scott Lauria Morgensen” in *Settler Colonial Studies*, Vol. 1, No. 1 [2011]: p. 52.

⁴¹⁵ See Chapter One for relevant discussions of science and settler colonialism in non-Canadian locales.

Anderson's scholarship).⁴¹⁶

I argue further that this dissertation historicizes (settler) coloniality as foundational to the context and the content of key moments in the development of evolutionary theory, genomic science, and diabetes studies. In the broad sense, and in particular reference to the stories and life-writings of Charles Darwin and James V. Neel, colonial interactions with 'Indians' were formative and powerful experiences that profoundly shaped the research of each keynote figure. More specifically, however, it is clear from the stories of Percy Moore and Robert Hegele that modern Canadian sciences of nutrition, genetics, epidemiology, and endocrinology were very demonstrably brought into their current forms of existence by and through the study of First Nations and Inuit populations who were located on-reserve and suffering forms of structural and symbolic violence that created high rates of chronic illness. Especially disturbing in this history is the extent to which the professionalization of medical students and the generation of public health data continued to take precedence over the actual administration of meaningful forms of healthcare intervention across the provincial north of Ontario throughout the latter decades of the 20th century. Indigenous peoples were not offered the same kind of healthcare other residents of Ontario received: they were used as guinea pigs who provided practicing medical students the chance to sharpen their skills so as to provide non-Indigenous patients with higher quality healthcare.

⁴¹⁶ Warwick Anderson, *The Cultivation of Whiteness: Science, Health, and Racial Destiny in Australia* (New York: Basic Books Publishing, 2003), p. 113; the emphasis is mine. Also, see Warwick Anderson, *The Collector of Lost Souls: Turning Kuru Scientists Into White Men* (Baltimore, Maryland: John Hopkins University Press, 2008).

Comparing TB and Diabetes or, 1870 vs. 1970

On the basis of the histories discussed in the previous chapters (but particularly Chapter 5), I believe it is fair to historicize ‘Aboriginal Diabetes’ as a particularly fraught concept that reproduces the worst excesses of Canadian colonial violence (both physical and epistemological). The obvious reference point in this context is, at least for me, tuberculosis:

In the early 1870s, the disease was relatively rare among the indigenous population of the plains. Within a few years, the situation changed dramatically. By the early 1880s, TB was widely recognized to be the primary cause of morbidity and mortality among First Nations populations. Rather than direct infection from the burgeoning European population in the region, the explosion of the disease was caused by sudden ecological, economic, and political changes in the west that were primarily the result of the imposition of Canadian hegemony.⁴¹⁷

As we can see in the passage above, the rise of TB epidemics in Plains people has been linked to the imposition of Canadian hegemony and statehood as the disease corresponded so closely to the disruption of Indigenous national patterns and the imposition of the Canadian national pattern in the 1870s. And yet, dominant discourses of the day theorized racial susceptibility as the leading explanation for such high rates of Indigenous deaths from TB.⁴¹⁸ I believe that it is entirely appropriate to transplant this analysis to the context of diabetes in northern Ontario one century later. Recall that in the early 1970s, health surveys conducted across the provincial north rarely if ever mentioned diabetes, whereas by the mid to late 1980s, communities in the Sioux Lookout Region had been identified as exhibiting a very high rate of diabetes morbidity. Though public health surveys certainly are not authoritative sources (indeed, they are illusions of

⁴¹⁷ James Daschuk, Paul Hackett, Scott MacNeil, “Treaties and Tuberculosis: First Nations People in the late 19th Century Western Canada, a Political and Economic Transformation” in *The Canadian Bulletin of Medical History*, Vol. 23, No. 2 [2006]: p. 307.

⁴¹⁸ Christian W. McMillen, “‘The Red Man and the White Plague’: Rethinking Race, Tuberculosis, and American Indians, ca. 1890–1950” in *The Bulletin of the History of Medicine*, Vol. 82, No. 3 [Fall 2008]: pp. 608-645.

knowledge collected in service of the settler state), it seems clear that the emergence of so-called ‘diabetes epidemics’ across First Nations and Inuit communities has been a rapid and relatively recent affair. As I and others have shown elsewhere, this time period also corresponds to the creation and consolidation of grocery stores owned by the Hudson Bay Company and, after 1987, by the Northwest Company (whose business operations in the north netted in excess of \$188 million in the fiscal year of 2016, all the while being heavily subsidized by the Canadian government).⁴¹⁹ In addition to the rise of an exploitative grocery store monopoly, there is also an unsettling relationship that has developed between the Northwest Company (whose ‘Northern Store’ chain services most First Nations communities in northern Ontario and Nunavut) and the Canadian Diabetes Association (CDA). For example, in 2007, the CDA awarded the NWC the Outstanding National Corporate Award, which was presented at the Canadian Society of Endocrinology and Metabolism Professional Conference in Vancouver, British Columbia.⁴²⁰ In other words, the company most directly responsible for the high cost of food in the Canadian north is also a company celebrated by the CDA as an ‘outstanding corporation’, which is both scandalous and unsettling.

Often throughout this dissertation, I have been reminded of the following passage, penned by Canadian settler scientists in 1942:

It is not unlikely that many characteristics, such as shiftlessness, indolence, improvidence and inertia, so long regarded as inherent or hereditary traits in the Indian race may, at the root, be really the manifestations of malnutrition. Furthermore, it is highly probable

⁴¹⁹ The Northwest Company Inc., *Annual Report: 2016*; available online at: http://www.northwest.ca/content/annual_filings/2016_-_Annual_Report_-_APR27-17.pdf [accessed 10 January 2018]. Also, see Kelly Skinner, Kristin Burnett, Lori Chambers, and Travis Hay, “Retail Food Environments, Shopping Experiences, First Nations, and the Provincial Norths” in *Health Promotion and Chronic Disease Prevention in Canada*, Vol. 37, No. 10 [October 2017].

⁴²⁰ Canadian Diabetes Association, “Media Release: Canadian Diabetes Association Celebrates Outstanding National Corporate Award Recipient”, 23 November, 2007; available online at: http://www.northwest.ca/content/news_releases/16.pdf [accessed 10 January 2018].

that their great susceptibility to many diseases, paramount amongst which is tuberculosis, may be directly attributable to their high degree of malnutrition arising from lack of proper foods.⁴²¹

I expect that the same will soon be written of ‘Aboriginal Diabetes’ and turn now to a brief breakdown of my chapters in a way that I hope further substantiates this perspective.

Chapter Review

In my first chapter, I sought to bring together historians of science with Indigenous and feminist critics of biology to produce a framework for studying what I called the science of settler colonialism. In Chapter Two, I located the origins of this form of settler colonial science with Charles Darwin. I historicized Darwin, his social location, and his voyage aboard the *Beagle* in a way that underscored the co-production of imperial power and scientific knowledge: in this frame, the doers of colonial violence arrived on the same ship as the producer of evolutionary theory. Focusing on Darwin’s writings on and grappling with ‘Indians’, I underscored the extent to which Darwin erroneously depicted the genocide of Indigenous nations as a potentially natural event that followed from the fact that the ‘Indian’ had evolved to thrive in an environment that colonialism had destroyed, thereby destining the Indigenous biohistorical subject to disappear on a long enough timeline. And while I did not criticize Darwin for his ignorance of genetics as the mechanism of evolution by means of natural selection, I did suggest that Darwin’s failure to name British colonial violence as that ‘mysterious agency which causes the Indian to disappear wherever the European trods’ caused genetics – in both the classical and molecular iterations – to be positioned as the agents expected to do the disappearing work

⁴²¹ F. F. Tisdall and H. D. Kruse, “Summary of Findings From a Nutritional Survey of Approximately Three Hundred Indians”; LAC, RG 29, Vol. 936, File 386-6-10, March 15th, 1942.

divined by Darwin in *The Descent of Man*. In other words, Darwin's metaphor of natural selection evolved into Dr. Neel's thrifty gene hypothesis, as Indigenous antipathies transited from registers of natural theology, through to Darwin's writings on evolution, and into the emergence of genetics as a professional field of study in the early 20th century.

In Chapter Three, I reviewed the way in which British Indian Policy in the 1830s – that is, the same decade Darwin sailed aboard the *Beagle* – took a sharp turn towards assimilation and experimentation, and instituted at the foundations of Canadian federal Indian policy a governmentality that saw the civilization of the Indian as a massive experiment in human adaptation and relocation. Thereafter, I reviewed the first massive health surveys to which Indigenous peoples were subjected in Canada in relation to TB 'epidemics' and the careers of Peter Henderson Bryce and E.L. Stone, who served as Chief Medical Officers for the Department of Indian Affairs; however, the majority of this chapter was dedicated to Bryce and Stone's successor, Dr. Percy Moore. Moore's career, which lasted from before the Second World War to 1965, was incredibly influential in the formulation of federal Indian policies related to health as well as in the secularization and scientization of Indigenous public health. Moore robustly quantified 'Indian health' according to a series of biomarkers and openly sought to strip church-run institutions of their control over public health. In so doing, he set the groundwork for the way in which the settler state chose to respond to high rates of type-II diabetes in northern Ontario in the decades following his retirement in the 1960s.

Chapter Four switched focus once more from the settler colonial and national context back to the imperial and global story of evolutionary theory and genetic science. This chapter focused very singularly on the career of Dr. James V. Neel – the inventor of the thrifty gene hypothesis. Once again focusing on the material conditions of access that settler scientists have

had to Indigenous bodies, this chapter traced the trajectory of Neel's career and argued that his objects of scientific study were consistently racialized populations reeling from western imperial violence. For example, after studying the effects of nuclear fallout following the atomic bombing of Japan, Neel travelled through colonial Africa where he used British, French, and Belgian facilities to conduct what he called 'jungle science' on sickle-cell anemia. In 1962, Neel invented the thrifty gene hypothesis *before* ever collecting blood from Indigenous peoples in South and Central America; for the rest of the decade, however, Neel planned numerous research trips where he embroiled himself in the biggest controversy in American anthropological history (read: the Napoleon Chagnon affair and scandalous accusations that Neel had intentionally spread diseases for the purposes of scientific study). Though I found these accusations of intentional infection to be somewhat exaggerated, Neel's autobiography nonetheless revealed an extremely problematic and masculinist subject position wherein science and field work was understood as a test of both academic prowess and masculine virility. Indeed, Neel wrote that he felt a 'special connection' to Darwin in that precise respect, and even brought his son with him on a research trip as a masculine rite of passage. As a way to link the career of Neel to Canadian histories of science and settler colonialism, I bookended Chapter Four with the story of Neel's keynote address in 1978 Vancouver to the American Society of Human Genetics. At this talk, which came at a key time in the debates between the social and hard science, Neel gave an altogether aggressive talk lamenting western civilization for softening its male subjects and structuring itself so as to give manly men less reproductive advantages. Seeing this softening effect of civilization as promising severe consequences down the line, Neel advocated for the advancement of studies on Indigenous bodies and isolated, uncontacted communities in the hopes that a study of 'primitive population structures' might hold the solution to this crisis of

‘manliness and civilization.’ In this way, Neel not only fashioned the thrifty gene hypothesis but contributed to the extractive and predatory culture of genetic science in the post-war period.

In Chapter Five, I reviewed the reinvention of the thrifty gene hypothesis by a team of Canadian scientists in 1999 and situated their travels to Sandy Lake First Nation within a larger history of colonial health surveys. Specifically, I mined archival resources to put together a narrative of the Sioux Lookout Project – a collaboration between the University of Toronto and the medical authorities of the Sioux Lookout Zone in the late 1960s. Though Chapter Three discussed the way in which Percy Moore and other medical officers in the department had instituted a colonial health archive from Bryce’s report in 1907 to Moore’s retirement in 1965, the Sioux Lookout Project – which was struck in 1969 – marked a significant development in the opening up of northern Ontario as a scientific frontier for the extraction of data but also the training of doctors and nurses from the south of the province. Archival evidence revealed that the Sioux Lookout Project had these training initiatives as a stated primary objective over and against the provision of the best possible healthcare to communities. The Program, which failed to produce a viable model for Indigenous healthcare in northern Ontario within three years of operation as originally intended, nonetheless succeeded in securing funding, training, and opportunities for southern medical students to travel to reserves in the Sioux Lookout Zone to assist in them in becoming proper medical professionals and good Canadian doctors. The Health-Care hunger-strike undertaken by members of Sandy Lake First Nation at the Sioux Lookout Indian Hospital in 1988 was a clear indication that the program was a failure and that relationships had to be reformulated between the community and healthcare professionals. Though Sandy Lake First Nation was thereafter able to exert more agency and influence in the healthcare provision system following the hunger strike, the decision of the Medical Director of

the Sioux Lookout region to reach out to Dr. Robert Hegele has to be understood in the historical light of the Sioux Lookout Project as a tragic and ironic development. In the six years following, the Sandy Lake genetic study was undertaken and the ill-fated thrifty gene discovery was gleefully reported in news media and medical journals the world over as a landmark scientific accomplishment. Though Hegele has plainly and very publicly rejected the findings of this study, it continues to be cited in clinical guidelines and in state literature in 2018. At the time of writing, the thrifty gene hypothesis persists as a viable and state-sponsored explanation for high rates of type-II diabetes not just in First Nations communities in northwestern Ontario, but in all ‘Aboriginal’ bodies in Canada.

Conclusion

Quite simply, it is a serious and shameful indictment of the Canadian medical establishment that references to the 1999 Sandy Lake thrifty gene study *continue* to inform clinical guidelines, state literature, and everyday conversations across Canada. That the ‘Aboriginal Diabetes Initiative’ and the publication of Hegele et al.’s keynote paper both took place in 1999 is an unfortunate proximity of events that very likely exacerbated the extent to which the thrifty gene mythology has taken hold across Canada. It was, of course, not just Hegele that bears responsibility here, as the University of Toronto as an institutional and historical actor seems to be especially implicated in the creation of what McCallum calls ‘the colonial health archive’ through its administration of the Sioux Lookout Project and arrangement of the Sandy Lake study. My first conclusion, then, is that settlers simply have to stop reproducing the thrifty gene mythology, and that those involved in its creation bear a particular responsibility in dispelling the rumours related to ‘Aboriginal diabetes.’

In a broader sense, the story of the thrifty gene mythology suggests that what Evelyn Fox Keller called the masculinist ‘discourse of gene action’ – that which privileged the gene (encoded as masculine) in understandings of biological processes over and against cytoplasmic substrates (encoded as feminine) – can be expanded upon into a broader reading of the colonialist discourse of gene action. Though the thrifty gene hypothesis and the science of settler colonialism are clearly about race, colonialism, and ‘Indians’, the mythology was produced by the travel and circulation of men and their ideas all across the globe from the 18th to the 20th century. Thus, it seems evident that Indigenous antipathies, in addition to ideologies of gender, were operative in the making of the mythology and in the shaping of molecular genetics at a key moment in its emergence as a professional discipline. In plain language, Neel’s thrifty gene hypothesis was a masculinist fantasy dreamt up by a white scientist who saw in the ‘Indian’ the virile, masculine subjectivity that (in his mind) western civilization was slowly destroying. I believe that this obsession with Neel over the decline of the European man is also a particularly powerful example of the fraught relationship between ‘manliness and civilization’ discussed by Gail Bederman in her keynote study of the subject.⁴²²

As my final thought, I think that Canadians have to take seriously the way in which science and settler colonialism in this country exist as complementary sides of a deep-set power/knowledge formation wherein the frontiers of European empire became the frontiers of modern science. Thereafter, the hinterlands of the Canadian north became the frontiers of Canadian genetics, endocrinology, epidemiology, nutritional science, and public health interventions as specimens were sent not to London, but to Toronto. And while the science of settler colonialism remains a global formation in the historical sense, there is an urgent and

⁴²² Gail Bederman, *Manliness and Civilization: A Cultural History of Gender and Race in the United States, 1880-1917* (Chicago: University of Chicago Press, 1995).

present problem in Canada with the way settlers think about, study, research, and talk about Indigenous peoples, and the scale of this problem is deeper and more daunting than any disease.

Bibliography

NEWSPAPERS AND NEWS MEDIA

- Abraham, Carolyn. "Genetic Link Found to Natives' Diabetes if Mutation at Sandy Lake can be overcome, it could lead to new treatment, scientist says", *The Globe and Mail*, March 11th 1999, p. A11.
- "The Life and Death of a Seductive Theory," *The Globe and Mail*, Feb 26, 2011.
- "Genetic Trait for Diabetes Uncovered: Researchers to Reveal Link Today Between Disease and High Incidence for Northern Ontario Reserve," *The Globe and Mail*, March 9th 1999, p. A10.
- Brady, Margaret. "Researchers are making major strides in being able to identify genes linked to specific diseases and Canadian scientists are in the vanguard", *The Financial Post*, September 12th, 1998.
- "Canadian Researchers Uncover Genetic Link for Diabetes", Xinhua News Agency, March 9th, 1999.
- "Dealing With Racism Against Aboriginal People in Thunder Bay", *TorStar News Service*, Dec. 8th, 2015; available online at: <http://www.metronews.ca/news/canada/2015/12/08/dealing-with-racism-against-aboriginal-people-in-thunder-bay.html> [accessed Dec. 29th, 2016].
- Glanz, J. "James V. Neel is dead at 84; leading genetics researcher" in *The New York Times*, Feb. 3, 2003.
- Livingstone, Andrew. "Son defends scientist behind aboriginal nutrition experiments." *The Star* 24 July 2013; available online at: http://www.thestar.com/news/canada/2013/07/24/son_defends_scientist_behind_aboriginal_nutrition_experiments.html [accessed 21 July 2017].
- Page, Julie. "TB Death in Quebec's Far North spurs public health awareness campaign", *CBC News*, 21 February 2018; available online at: <http://www.cbc.ca/news/canada/montreal/tuberculosis-death-quebec-nunavik-1.4543922> [accessed 10 March 2018].
- Rivers, Wayne. "Racism a Common Theme at Thunder Bay Inquest Looking into Deaths of 7 Students", *APTN National News*, Nov. 23rd, 2015; available online at: <http://aptn.ca/news/2015/11/23/racism-a-common-theme-at-thunder-bay-inquest-looking-into-deaths-of-7-students/> [accessed Dec. 29th, 2016].

Rutherford, Adam. "He may have unravelled DNA, but James Watson deserves to be shunned", *The Guardian*, December 1st, 2014; available online at <https://amp.theguardian.com/commentisfree/2014/dec/01/dna-james-watson-scientist-selling-nobel-prize-medal> [accessed 10 August 2017].

"Scientist was Pioneer in Human Genetics", *The Globe and Mail*, 3 February 2000.

Stassen, Joanne. "High Infant Mortality Rate May Be Related to Fat-Burning Gene Variation", *CBC News*, Nov. 12, 2016; available online at: <http://www.cbc.ca/news/canada/north/inuit-infant-mortality-alaska-gene-research-1.3844052> [accessed 22 July 2017].

"Thunder Bay Health Unit says Tuberculosis confirmed in city", *CBC News*, 9 March 2018; available online at: <http://www.cbc.ca/beta/news/canada/thunder-bay/tuberculosis-thunder-bay-1.4569439> [accessed 10 March 2018].

GOVERNMENT REPORTS AND OTHER DOCUMENTS

Canadian Diabetes Association, *Just the Basics*, February 2011.

Canadian Institute of Health Research, Nation Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, *Tri Council Policy Statement: Ethical Conduct for Research Involving Humans*, December 2012.

EatRight Ontario, *Aboriginal People Can Reduce Their Risk for Developing Type 2 Diabetes*, 2014. This document is available online, see:
<http://www.eatrightontario.ca/en/Articles/Aboriginal-Health/Aboriginal-people-can-reduce-their-risk-for-develo.aspx#.U7rdjI1dVAs> [accessed July 7th, 2014].

Health Canada, *Diabetes Among Aboriginal (First Nations, Inuit, and Métis) Peoples in Canada: The Evidence*, March 10th, 2000.

- *Diabetes in Canada: Facts and Figures from a Public Health Perspective*, December, 2011; this document is widely available online, see: <http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/chap6-eng.php> [accessed 7 June 2017].

Indian and Northern Affairs Canada Devolution and Territorial Relations Branch, *Food Mail Review: Interim Report*, March, 2009.

Sioux Lookout First Nations Health Authority, *History*, 2014; available online at:
<http://www.slnha.com/about/history/> [accessed 7 Aug. 2017].

The Northwest Company Inc., *Annual Report: 2016*; available online at:
http://www.northwest.ca/content/annual_filings/2016_-_Annual_Report_-_APR27-17.pdf
[accessed 10 January 2018].

Canadian Diabetes Association, “Media Release: Canadian Diabetes Association Celebrates Outstanding National Corporate Award Recipient”, 23 November, 2007; available online at:
http://www.northwest.ca/content/news_releases/16.pdf [accessed 10 January 2018].

ARCHIVAL RECORDS

Library and Archives Canada (LAC), Record Group 85: Department of Northern Affairs,
Volume 1384.

LAC, Indian Nutrition Files, Record Group 29: Department of National Health and Welfare,
Volume 2989.

University of Toronto Archives and Record Management Services (UTARMS),
A-2014-0500, Box 002.

UTARMS, A97-0012, Box 002.

SECONDARY SOURCES

- Abraham, Carolyn. "Genetic Trait for Diabetes Uncovered: Researchers to Reveal Link Today Between Disease and High Incidence for Northern Ontario Reserve," *The Globe and Mail*, March 9th 1999, p. A10.
- Acoose, Janice Pelletier. *Iskwewak Kah' Ki Yaw Ni Wahkomakanak: Neither Indian Princess Nor Easy Squaws*. Toronto: Women's Press, 1995.
- Agamben, Giorgio. *Homo Sacer: Sovereign Power and Bare Life*. Stanford: Stanford University Press, 1998.
- Anderson, Warwick. "Immunities of Empire: Race, Disease, and the New Tropical Medicine, 1900–1920," *Bulletin of Medical History*, Vol. 70 [1996]: pp. 94–118.
- . *The Collector of Lost Souls: Turning Kuru Scientists Into White Men*. Baltimore, Maryland: John Hopkins University Press, 2008.
- . *The Cultivation of Whiteness: Science, Health, and Racial Destiny in Australia*. New York: Basic Books Publishing, 2003.
- Baber, Zaheer. *The Science of Empire: Scientific Knowledge, Civilization, and Colonial Rule in India*, Albany, N.Y.: State University of New York Press, 1996.
- Bain, H.W. and Gary Goldthorpe, "The University of Toronto 'Sioux Lookout Project' – a model of healthcare delivery" in *The Canadian Medical Association Journal* Vol. 107 [September 1972]: p. 523.
- Barta, Tony. "Mr. Darwin's Shooters: On Natural Selection and the Naturalizing of Genocide" in *Colonialism and Genocide*. Edited by A. Dirk Moses and Dan Stone. New York: Routledge Publishing, 2007: pp. 20-41.
- Basky, Greg. "Gene defect driving diabetes epidemic on Ontario reserve" in *The Canadian Medical Association Journal*, Vol. 160, No. 12 [June 1999]: p. 1692.
- Bederman, Gail. *Manliness and Civilization: A Cultural History of Gender and Race in the United States, 1880-1917*. Chicago: University of Chicago Press, 1995.
- Bellfy, Philip C.. *Three Fires Unity: The Anishinaabeg of the Lake Huron Borderlands*. Lincoln: University of Nebraska Press, 2011: pp. 108-109.
- Bennion L. and Li, T.K.. "Alcohol Metabolism in American Indians and Whites" in *The New England Journal of Medicine*, Vol. 294 [1976]: pp. 9–13.

- Benyshek, D.B. and Watson, J.T., “Exploring the Thrifty Genotype’s Food-Shortage Assumptions: A Cross-Cultural Comparison of Ethnographic Accounts of Food Security Among Foraging and Agricultural Societies” in *The American Journal of Physical Anthropology*, Vol. 131 [2006]: pp. 120-126.
- Blaut, J.M.. *The Colonizer’s Model of the World: Geographical Diffusionism and Eurocentric History*. New York: Guildford Publishing, 1993.
- Bourdieu, Pierre. *Outline of a Theory of Practice*. Cambridge: Cambridge University Press, 1989.
- Bowlby, John. *Charles Darwin: A New Life*. New York: W.W. Norton and Company, 1991.
- Brantlinger, Patrick. *Dark Vanishing: Discourse on the Extinction of Primitive Races, 1880-1930*. London: Cornell University Press, 2003.
- Burnett, Kristin, Lori Chambers, and Travis Hay, “‘A Tragedy to Be Sure’: Heteropatriarchy, Historical Amnesia, and Housing Crises in Northern Ontario” in *Understanding Atrocities: Remembering, Representing, and Teaching Genocide: Special Anthology on Genocide*, ed. Scott Murray. Calgary: University of Calgary Press, 2017: pp: 145-167.
- “Settling the Table: Northern Food Subsidy Programs and the (Re)Colonisation of Indigenous Bodies” in *Special Issue of Critical Race and Whiteness Studies: The White Man’s Burden After Race*, Vol. 11, No. 1 [2015]: pp. 1-18.
 - “Settler Colonialism, Indigenous Peoples, and Food: Federal Indian Policies and Nutrition Programs in the Canadian North since 1945” in *The Journal of Colonialism and Colonial History*, Vol. 17, No. 2 [Summer 2016].
- Burnett, Kristen, Kelly Skinner, Joseph LeBlanc, ‘From Foodmail to Nutrition North Canada: Reconsidering Federal Food Subsidy Programs for Northern Ontario’ in *The Canadian Journal of Food Studies* Vol. 2, No. 15 [2015]: pp. 141-156;
- Bryce, P.H.. *Report on the Indian Schools of Manitoba and the North-West Territories*)Ottawa: Government Printing Bureau, 1907.
- *The Story of a National Crime: Being a Record of the Health Conditions of the Indians of Canada from 1904 to 1921*. Ottawa: James Hope and Sons, 1922.
- Byrd, Jodi. *Transit of Empire: Indigenous Critiques of Colonialism*. Minneapolis: University of Minnesota Press, 2011.
- Canadian Diabetes Association, *Clinical Practical Guidelines*, 2013; available online, see <http://guidelines.diabetes.ca/browse/chapter38#sec1> [accessed 24 June 2017].

Canadian Pediatric Society, “Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada”, 2005 (reaffirmed 1 March 2014); available online, see <http://www.cps.ca/documents/position/risk-reduction-type-two-diabetes-aboriginal-children> [accessed 24 June 2017].

Canadian Paediatric Society, *Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada*, January 1st, 2005; reaffirmed February 28th, 2018; available online: <https://www.cps.ca/en/documents/position/risk-reduction-type-two-diabetes-aboriginal-children> [accessed 10 May 2018].

Carter, Sarah. *Capturing Women: The Manipulation of Cultural Imagery in Canada's Prairie West*. London: McGill University Press, 1997.

- . *Lost Harvests: Prairie Indian Reserve Farmers and Government Policy*. Montreal: McGill-Queens University Press, 1990.

- . *The Importance of Being Monogamous: Marriage and Nation Building in Western Canada to 1915*. Edmonton: University of Alberta Press, 2008.

Chambers, Lori and s and Kristin Burnett. “Jordan’s Principle: The Struggle to Access On-Reserve Healthcare for High Needs Indigenous Children in Canada” in *The American Indian Quarterly*, Vol. 41, No. 2 [Spring 2017]: pp. 101-124.

Cook, Ramsay. *The Regenerators: Social Criticism in Late Victorian English Canada*. Toronto: University of Toronto Press, 2016.

Crowshoe, L., D. Dannenbaum, M. Green, R. Henderson, M.N. Hayward, and E. Toth, “Clinical Practical Guidelines: Type 2 Diabetes and Indigenous Peoples” in *The Canadian Journal of Diabetes*, Vol. 42 [2018]: S296-S306.

Daschuk, James. *Clearing the Plains: Disease, politics of starvation, and the loss of Aboriginal life*. Regina: University of Regina Press, 2013.

Darwin, Charles. *A Naturalists' Voyage around the World: The Voyage of the Beagle* (New York: Skyhorse Publishing, 2014).

- . *The Autobiography of Charles Darwin*. London, Bibliolis Books Ltd., 2010.

- . *The Descent of Man and Selection in Relation to Sex*. Princeton: Princeton University Press, 1981.

- . *The Voyage of the Beagle*. Ebook: Project Gutenberg, 2010.

Daschuk, James, Paul Hackett, Scott MacNeil, “Treaties and Tuberculosis: First Nations People in the late 19th Century Western Canada, a Political and Economic Transformation” in *The Canadian Bulletin of Medical History*, Vol. 23, No. 2 [2006]: p. 307 -330.

- de Certeau, Michel. *The Writing of History*. New York: Columbia University Press, 1988.
- De Paolo, Charles. *The Ethnography of Charles Darwin: A Study of His Writings on Aboriginal People*. London: McFarland and Company, Inc., Publishers, 2008.
- Deloria, Ella Cara. *Dakota Grammar*. American Ethnological Society, 1942.
- . *Dakota Texts*. Lincoln: University of Nebraska Press, 1932.
- . *Speaking of Indians*. Lincoln: University of Nebraska Press, 1944.
- Deloria, Philip J.. *Playing Indian*. New Haven: Yale University Press, 1998.
- . *Indians in Unexpected Places*. Lawrence: University Press of Kansas, 2004.
- Deloria Jr., Vine. *Custer Died for Your Sins*. London: MacMillan Company Publishing, 1969.
- . *Red Earth, White Lies*. Golden, Colorado: Fulcrum Publishing, 1997.
- Desmond, Adrian and James Moore, *Darwin's Sacred Cause: How a Hatred of Slavery Shaped Darwin's Views on Human Evolution*. New York: Houghton Mifflin Harcourt, 2009.
- Drees, Laurie Meijer. *Healing Histories: Stories from Canada's Indian Hospitals*. Alberta: University of Alberta Press, 2013.
- Duster, Troy. *Backdoor to Eugenics*. New York: Routledge Publishing, 2003.
- Dubow, Saul. *Commonwealth of Knowledge: Science, Sensibility, and White South Africa 1820-2000*. Oxford: Oxford University Press, 2006.
- Fabian, Johannes. *Time and the Other: How Anthropology Makes Its Object*. New York: Columbia University Press, 1983.
- Ferguson, R.G.. *Tuberculosis among the Indians of the Great Canadian Plains: Preliminary Report of an investigation Being Carried Out by the National Research Council of Canada; reprinted from the Transactions of the Fourteenth Annual Conference of the British National Association for the Prevention of Tuberculosis*. London: Adlard and Son, 1929.
- Ferreira, M.L. and Gretchen Chelsey Lang. "Introduction: Deconstructing Diabetes" in *Diabetes and Indigenous People*. Edited by P. Stewart and A. Strathern (Durham: Carolina Academic Press, 2006): pp. i-xx.
- Flynn, Janet. "Walls and Bridges: Cultural Mediation and the Legacy of Ella Deloria" in *Frontiers: A Journal of Women Studies*, Vol. 21, No. 3 [2000]: pp. 161.

- Foucault, Michel. *Discipline and Punish: The Birth of the Prison*. Translated by Francesco Muttier. Chicago: Penguin Publishing, 1999.
- "Space, Power, Knowledge: interview with Paul Rabinow" in *The Foucault Reader*. Translated by Christian Hubert. New York: Pantheon Publishing, 1984: pp. 239-257.
- Fox Keller, Evelyn. "Beyond the Century of the Gene" in *The Journal of Biosciences*, Vol. 30, No. 1 [March 2005]: pp. 3-10.
- *Refiguring Life: Metaphors of Twentieth-Century Biology*. New York: Columbia University Press, 1995.
- *Reflections on Gender and Science*. New Haven: Yale University Press, 1985.
- *The Century of the Gene*. Cambridge: Harvard University Press, 2000.
- Galtung, Johan. *The True Worlds: A Transnational Perspective*. New York: Free Press, 1980.
- Garcia-Andrade, C., T.L. Wall, and C.L. Ehlers, "The Firewater Myth and Response to Alcohol in Mission Indians" in *The American Journal of Psychiatry*, Vol. 154, No. 7 [July 1997]: pp. 983-988.
- Gardner, Susan. "Speaking of Ella Deloria: Conversations with Joyzelle Gingway Godfrey, 1998-2000, Lower Brule Community College, South Dakota" *The American Indian Quarterly*, Vol.24, No. 3 [Summer 2000]: pp. 456-481.
- Geliga-Grazales, Susana Dalena. "Ella Deloria: A Dakota Woman's Journey Between and Old and New World", Master's Thesis. University of Nebraska-Lincoln: History Department, 2014; available online, see: <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1069&context=historydiss> [accessed 18 July 2017].
- Gouda, Frances. "Mimicry and Projection in the Colonial Encounter: The Dutch East Indies/Indonesia as Experimental Laboratory, 1900-1942" in *The Journal of Colonialism and Colonial History*, Vol. 1, No. 2 [2000].
- Gould, Stephen J. and Richard Lewontin. "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptionist Programme" in *The Proceedings of the Royal Society of London*, Series B, Vol. 205, No. 1161 [1979]: pp. 581-598.
- Gray, Charlotte. "Profile: Percy Moore" in *The Canadian Medical Association Journal*, Vol. 126 [February, 1982], p. 416.
- Gruber, Howard E. "Going the Limit: Toward the Construction of Darwin's Theory (1832-1839)" in *The Darwinian Heritage*. Edited by David Kohn. Princeton: Princeton University Press, 1985.

- Hall, Stuart. "Cultural Studies and its Theoretical Legacies" in *Cultural Studies*. Edited by L. Grossberg. London: Routledge, 1992: pp. 277-294.
- Halligan, Jessi et. al., "Pre-Clovis Occupation 14,550 years ago at the Page-Ladson site, Florida, and the peopling of the Americas" in *Science Advances* Vol. 2, No. 5 [May 2016]: pp. 1-8.
- Hanley, Anthony J.G., Stewart B Harris, Annette Barnie, Joel Gittelsohn, Thomas MS Wolever, Alexander Logan and Bernard Zinman, "The Sandy Lake Health and Diabetes Project: Design, Methods and Lessons Learned" in *Chronic Diseases in Canada*, Vol. 16, No. 4 [1995]: n.d.. available online, see: http://www.collectionscanada.gc.ca/webarchives/20071127090635/http://www.phac-aspc.gc.ca/publicat/cdic-mcc/16-4/d_e.html [accessed 14 Sept. 2015].
- Harding, Sandra. *Is Science Multicultural?: Postcolonialisms, Feminisms, and Epistemologies*. Bloomington: Indiana University Press, 1998.
- . *Primate Visions: Gender, Race, and Nature in the World of Modern Science*. London: Routledge Press, 1989.
- . *Sciences from Below: Feminisms, Postcolonialities, and Modernities*. Durham, Duke University Press, 2008.
- Harris, Cole. *Making Native Space: Colonialism, Resistance, and Reserves in British Columbia*. Vancouver: UBC Press, 2002.
- Hay, Travis. "How Thunder Bay Was Made: The 1905 Forced Relocation of Fort William First Nation," *Active History*; available online at: <http://activehistory.ca/2017/01/how-thunder-bay-was-made/> [accessed 9 May 2018].
- Hegele, R. "Genetic Predictions of Atherosclerosis: Lessons from Studies in Native Canadian Populations" in *Clinica Chimica Acta*, Vol. 286 [1999]: pp. 47-61.
- . "Lessons from Genetic Studies in Native Canadian Populations" in *Nutrition Review* Vol. 57 [1999]: S.
- et al. "The Hepatic Nuclear Factor-1a G319S Variant Is Associated with Early-Onset Type 2 Diabetes in Canadian Oji-Cree" in *The Journal of Clinical Endocrinology and Metabolism*, Vol. 84, No. 3 [1999]: pp. 1077-1082.
- Howard, Johnathan. *Darwin: A Very Short Introduction*. London: Oxford Paperbacks, 2003.
- Indian and Northern Affairs, *The British Indian Department and the Frontier in North America, 1755-1830*. Ottawa: Parks Canada National Historic Parks and Sites Branch, 1975.

Jones, Megan Sproule. "Crusader for the Forgotten: Dr. Peter Bryce, Public Health, and Prairie Native Residential Schools" in *Canadian Bulletin of Medical History*, Vol. 13 [1996]: p. 218.

The Jesuit Relations and Allied Documents: Travels and Explorations of the Jesuit Missionaries in New France, 1610-179. Edited by Reuben G. Thwaites (Cleveland: The Burroughs Brothers, 1898-1901.

Kahana, M. and Leo M.. "TB among Aboriginal Canadians" in *The Canadian Medical Association Journal*, Vol. 162, No. 10 [May 2000]: pp. 1404-1405.

Kakekagumick, K.E. et. al., "Sandy Lake Health and Diabetes Project: A Community-Based Intervention Targeting Type-2 Diabetes and Its Risk Factors in a First Nations Community" in *Frontiers in Endocrinology*, Vol. 4 [Nov. 2013]: pp. 1-9.

Keeshig-Tobias, Lenore. "Stop Stealing Native Stories," *The Globe and Mail*, 26 January 1990, A19.

-. "Stop Stealing Native Stories" in *Borrowed Power: Essays on Cultural Appropriation*. Edited by Bruce Ziff and Pratima Rao. New Jersey: Rutgers' University Press, 1997: 77-81.

Kelm, Mary-Ellen. *Colonizing Bodies: Aboriginal health and healing in British Columbia 1900-50*. Vancouver: UBC Press, 2006.

-. "Diagnosing the Discursive Indian: Medicine, Gender, and the 'Dying Race'" in *Ethnohistory* Vol. 52 No. 3 [2005]: pp 371- 406.

Kulchyski, Peter and Frank Tester. *Kiumajut (Talking Back): Game management and Inuit rights, 1900-70*. Vancouver: UBC Press, 2007.

-. *Tammarniit (Mistakes): Inuit Relocation in the Eastern Arctic, 1939-1963*. Vancouver: UBC Press, 1994.

Lacombe, Linda et al.. "Functional Gene Polymorphism in Canadian Aboriginal Populations with High Rates of Tuberculosis" in *The Journal of Infectious Diseases*, Vol. 198, No. 8 [October 2008]: pp. 1175-1179.

LeMaster, J.R. and James D. Wilson, *The Routledge Encyclopedia of Mark Twain*. New York: Routledge Publishing, 1993.

Lewens, Tim. *The Routledge Philosophers: Darwin*. Florence, US: Routledge, 2006.

Leslie, John and Ron MacGuire. *The Historical Development of the Indian Act*. Ottawa: Indian and Northern Affairs, 1978.

Lindee, M. Susan. "Voices of the Dead: James Neel's Amerindian Studies" in *Lost Paradise and the Ethics of Research and Publication*. New York: Oxford University Press, 2004: pp. 3-36.

- Lux, Maureen. *Medicine that Walks: Disease, medicine, and Canadian Plains Native people, 1880–1940*. Toronto: University of Toronto Press, 2001.
- . “Perfect Subjects: Race, Tuberculosis, and the Qu’Appelle BCG Vaccine Trial” in *The Canadian Bulletin of Medical History*, Vol. 15, No. 8 [1998]: pp. 277-295.
- . *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s*. Vancouver: UBC Press, 2016.
- Marcus, Alan R.. *Relocation Eden: The Image and Politics of Inuit Exile in the Canadian Arctic*. Hanover: University Press of New England, 1995.
- Martin, Paul. *A Very Public Life, Volume II: So Many Worlds*. Toronto: Deneau Publishers, 1985.
- Marullo, Letiza, Julia S. El-Sayed Moustafa, and Inga Prokopenko, “Insights into the Genetic Susceptibility to Type 2 Diabetes from Genome-Wide Association Studies of Glycaemic Traits” in *Curr. Diab. Rep.*, Vol 14 [2014]: pp. 556.
- Malthus, Thomas. *An Essay on the Principal of Population and Other Writings*. Edited by Robert J. Mayhew. London: Penguin Publishing, 2015.
- McBain, Leslie. “‘Pulling Up Their Sleeves and Getting On With It’: Providing Healthcare in a Northern Remote Region” in *Canadian Bulletin of Medical History*, Vol. 29, No. 2 [2012]: pp. 309-328.
- McCallum, Mary Jane Logan. “Starvation, Experimentation, Segregation, and Trauma: Words for Reading Indigenous Health History” in *The Canadian Historical Review*, Vol. 98, No. 1 [March 2017]: pp. 96-113.
- “The Last Frontier: Isolation and Aboriginal Health” in *The Canadian Bulletin of Medical History*, Vol. 22, No. 1 [2005]: pp. 103-120.
- McClellan, James E.. *Colonialism and Science: Saint Domingue in the Old Regime*. Baltimore: John Hopkins University Press, 1992.
- McGrane, Bernard. *Beyond Anthropology: Society and the Other*. New York: Columbia University Press, 1989.
- McMillen, Christian W. “‘The Red Man and the White Plague’: Rethinking Race, Tuberculosis, and American Indians, ca. 1890–1950” in *The Bulletin of the History of Medicine*, Vol. 82, No. 3 [Fall 2008]: pp. 608-645.
- Memmi, A. 1991. *The Colonizer and the Colonized*, Boston: Beacon Press.

- Milloy, John S.. "The Early Indian Acts" in *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies*. Edited by A. L. Getty and Antoine S. Lussier. Vancouver: University of British Columbia Press, 1983: pp. 149-150.
- Moore, P.E., Kruse, H.D. and Tisdall, F.F., "Nutrition in the North: A Study of the State of Nutrition of the Canadian Bush Indian," *The Beavery* No. 273 [March, 1943]: pp. 21-23.
- Montoya, M. 2011. *Making the Mexican Diabetic: Race, Science, and the Genetics of Inequality*, Berkeley: University of California.
- Morgensen, Scott Lauria. "The Biopolitics of Settler Colonialism: Right Here, Right Now Scott Lauria Morgensen" in *Settler Colonial Studies*, Vol. 1, No. 1 [2011]: p. 52.
- Mosby, Ian. "Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942-1952" in *Histoire sociale/Social History*, Vol. 46 No. 91 [2014]: pp. 145-72.
- Neel, James V.. "Diabetes Mellitus: A 'Thrifty' Genotype Rendered Detrimental by 'Progress'?" in *The American Journal of Human Genetics*, Vol. 14, No. 4 [December 1962]: pp. 353-362.
- "Genetic Effects of the Atomic Bombs in Hiroshima and Nagasaki" in *Science* Vol. 106 [1947]: pp. 331-333.
 - "On Being Headman" in *Perspectives in Biology and Medicine*, Vol. 23, No. 2 [Winter 1980]: pp. 277-294.
 - *Physician to the Gene Pool: Genetic Lessons and Other Stories*. New York: Wiley and Sons Publishing, 1994.
 - "The Detection of the Genetic Carriers of Hereditary Diseases" in *The American Journal of Human Genetics* Vol. 1, No.1 [Sept. 1949]: pp. 19-36.
 - "The Thrifty Genotype" in *Perspectives in Biology and Medicine* No. 42 (1998): 44-74.
 - "The 'Thrifty Genotype' in 1998" in *Nutrition Reviews* Vol. 57, No. 5 [1999]: S2-S9.
 - "Update to 'The Study of Natural Selection in Primitive and Civilized Human Populations'" in *Human Biology*, Vol. 61 [Dec. 1989]: pp. 811-823.
- Nichols, Peter. *Evolution's Captain: The Dark Fate of the Man Who Sailed Charles Darwin Around the World*. New York: Harper Collins, 2003.
- Olssen, Erik. "Mr. Wakefield and New Zealand as an Experiment in Post-Enlightenment Experimental Practice" in *The New Zealand Journal of History*, Vol. 31 [1997]: pp. 197-218.

- Orkin, Andrew. "Immersion in the High Arctic: An examination of the relocation of Canadian Inuit in 1953 from the perspective of the law on experimentation involving human subjects," unpublished paper submitted to the Canadian Arctic Resources Committee, 5 July 1993, 1086–1177.
- Ozanne, S.E Hales, C.N. "Thrifty yes, Genetic no" in *Diabetologia* Vol. 41 [1998]: pp. 595-601.
- Palmater, Pamela. "Stretched Beyond Human Limits: Death by Poverty in First Nations" in *Canadian Review of Social Policy*, Vol. 65, No. 66 [2011]: pp. 112-127.
- Poudrier, Jennifer. "Racial Categories and Health Risks: Epidemiological Surveillance among Canadian First Nations" in *Surveillance as Social Sorting: Privacy, Risk, and Digital Discrimination*. Edited by David Lyon. New York: Routledge Publishing, 2003.
- "The Geneticization of Aboriginal Diabetes and Obesity: Adding Another Scene to the Story of the Thrifty Gene" in *Obesity in Canada: Critical Perspectives*, edited by Jenny Ellison, Deborah McPhail, and Wendy Mitchinson. Toronto: University of Toronto Press, 2016.
- Priestman, Martin. *The Poetry of Erasmus Darwin: Enlightened Spaces, Romantic Times*. London, Routledge Publishing, 2013.
- Raeman, G.E.. *The Trail of the Iroquois Indians: How the Iroquois Nation Saved Canada for the British Empire*. London: Frederick Muller Publishing, 1967.
- Razack, Sherene H. *Dying from Improvement: Inquests and Inquiries into Indigenous Deaths in Custody*. Toronto: University of Toronto Press, 2015.
- "Reading Bootprints on the Chest: Inquests into the Deaths of Aboriginal People in Custody:", Lakehead University, 25 January, 2011; this talk is available online: <http://www.youtube.com/watch?v=Gv9RIIeqapM> [accessed June 12th, 2016].
- "The Space of Difference in Law: Inquests into Aboriginal Deaths in Custody" in *Somatechnics* Vol. 1, No. 1 (2011): p. 87-123.
- Richards, Evelleen. *Darwin and the Making of Sexual Selection*. Chicago: University of Chicago Press, 2017.
- Robson, Robert. "Suffering an Excess Burden: Housing as a Health Determinant in the First Nations Community of Northern Ontario" in *Canadian Journal of Native Studies* Vol. 28, No. 1 [2008]: pp. 71-87.
- Salzano, Francisco. "James V. Neel and Latin America - or how scientific collaboration should be conducted" in *Genetics and Molecular Biology*, Vol. 23, No. 3 [2000]: pp. 557-551.
- Saylor, K. "Risk Reduction for Type-2 Diabetes in Aboriginal Children in Canada" in *Pediatric Child Health*, Vol. 10, No. 1 [2005]: pp. 49-52.

- Segerstråle, Ullica. *Defenders of the Truth: The Battle for Science in the Sociology Debate and Beyond*. Oxford: Oxford University Press, 2000.
- Shewell, Hugh. *Enough to Keep Them Alive: Indian Welfare in Canada, 1873-1965*. Toronto: University of Toronto Press, 2004.
- . “‘What Makes the Indian Tick?’ The influence of social sciences on Canada’s Indian policy, 1947–1964” in *Histoire sociale / Social History*, Vol. 34, no. 67 [May 2001]: p. 133-167.
- Skinner, Kelly , Kristin Burnett, Lori Chambers, and Travis Hay, “Retail Food Environments, Shopping Experiences, First Nations, and the Provincial Norths” in *Health Promotion and Chronic Disease Prevention in Canada*, Vol. 37, No. 10 [October 2017].
- Smith, Linda Tuhiwai. *Decolonizing Methodologies: Research and Indigenous Peoples*. Dunedin: University of Otago Press, 1999.
- Simpson, Audra. “On Ethnographic Refusal: Indigeneity, ‘Voice’ and Colonial Citizenship” in *Junctures* No. 9 [2007]: p. 67-79.
- . *Mohawk Interruptus: Political Life across the Borders of Settler States*. Durham, Duke University Press, 2014.
- Southam, L., N. Soranzo, S. B. Montgomery, T. M. Frayling, M. I. McCarthy, I. Barroso, and E. Zeggini, “Is the thrifty genotype hypothesis supported by evidence based on confirmed type 2 diabetes- and obesity-susceptibility variants?” in *Diabetologia*, Vol. 52 [2009]: pp. 1846–1851.
- Speakman, John R. “Thrifty genes for obesity and the metabolic syndrome – time to call off the search?” in *Diabetes and Vascular Disease Research*, Vol. 3, Issue 1 [May 2006]: pp. 7-11.
- Stanley, George F.G.. “The Indians in the War of 1812” in *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies*. Edited by A. L. Getty and Antoine S. Lussier. Vancouver: University of British Columbia Press, 1983: pp. 105-124.
- Stassen, Joanne. “High Infant Mortality Rate May Be Related to Fat-Burning Gene Variation”, *CBC News*, Nov. 12, 2016; available online at: <http://www.cbc.ca/news/canada/north/inuit-infant-mortality-alaska-gene-research-1.3844052> [accessed 22 July 2017].
- Sturgeon, David. “‘Thrifty Gene’ Identified in Manitoba Indians” in *The British Medical Journal*, Vol. 318 [March, 1999]: pp. 828.
- Surtees, Robert. *Canadian Indian Policy: A Critical Bibliography*. Bloomington: Indiana University Press, 1982.

- Tadiar, Neferti. *Fantasy Production: Sexual Economies and Other Phillippine Consequences for the New World Order*. Hong Kong: Hong Kong University Press, 2004.
- TallBear, Kim. "Narratives of Race and Indigeneity in the Genographic Project" in *The Journal of Law, Medicine & Ethics*, Vol. 35, No. 3 [Fall 2007]: pp. 412-424.
- . *Native American DNA: Tribal Belonging and the False Promise of Genetic Science*. Minneapolis: University of Minnesota Press, 2013.
- . "Standing With and Speaking as Faith: A Feminist-Indigenous Approach to Inquiry" in *Journal of Research Practice*, Volume 10, Issue 2, Article N17, 2014; available online at <http://jrp.icaap.org/index.php/jrp/article/view/405/371> [accessed 24 Nov., 2016].
- . "Who Owns the Ancient One?", BuzzFeed Newsreader, July 23rd, 2015; available online: https://www.buzzfeed.com/kimtallbear/how-the-man-stole-ancient-man-from-his-native-descendents?utm_term=.nhAp5PDy4#.xczYB9Rwv [accessed 24. Nov. 16].
- Thrush, Coll. *Indigenous London: Native Travelers at the Heart of Empire*. London: Yale University Press, 2016.
- Tilley, Helen. *Africa as Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950*. Chicago: University of Chicago Press, 2011.
- Tierney, Patrick. *Darkness in El Dorado: How Scientists and Journalists Devastated the Amazon*. New York: W.W. Norton and Company Publishing, 2000.
- Tisdall, F.F. and H. D. Kruse, "Summary of Findings From a Nutritional Survey of Approximately Three Hundred Indians"; LAC, RG 29, Vol. 936, File 386-6-10, March 15th, 1942.
- Titley, Brian. *A Narrow Vision: Duncan Campbell Scott and the Administration of Indian Affairs in Canada*. Victoria: UBC Press, 1992.
- Tobias, John L.. "Protection, Civilization, Assimilation: An Outline History of Canada's Indian Policy" in *As Long as the Sun Shines and Water Flows: A Reader in Canadian Native Studies*. Edited by A. L. Getty and Antoine S. Lussier. Vancouver: University of British Columbia Press, 1983: pp. 43-45.
- The Truth and Reconciliation Commission, *Canada's Residential Schools: The History – Part I: Origins to 1939*. Montreal: McGill-Queens University Press, 2016.
- Tuck, Eve and k and K. Wayne Yang, "Decolonization is not a Metaphor" in *Decolonization: Indigeneity, Education and Society*, Vol. 1, No. 1 [2012]: pp. 1-40.
- Upton, L.F.S. "The Origins of Canadian Indian Policy" in *The Journal of Canadian Studies*, Vol. 8, No. 4 [November 1974]: p. 51-61.

- Vaag, A., L. G. Grunnet, G. P. Arora, and C. Brøns, "The Thrifty Phenotype Hypothesis Revisited" in *Diabetologia* Vol. 55 [2012]: p. 2085-2088.
- Valverde, Mariana. *The Age of Soap and Light Water: Moral Reform in English Canada*. Toronto: McClelland and Stewart Publishing, 1999.
- Veracini, Lorenzo. "Settler Collective, Founding Violence and Disavowal: The Settler Colonial Situation" in *The Journal of Intercultural Studies* Vol. 29, No. 4 [November 2008]: pp. 363-379.
- . *Settler-Colonialism: A Theoretical Overview*. New York: Palgrave MacMillan Publishing, 2010.
- Waldram, James. *Revenge of the Windigo: The Construction of the Mind and Mental Health of North American Aboriginal Peoples*. Toronto: University of Toronto Press, 2004.
- Waldram, James B., D. Ann Herring, and T. Kue Young. *Aboriginal Health in Canada: Historical, Cultural, and Epidemiological Perspectives*. Toronto: University of Toronto Press, 2006.
- Walters, K.. "A National Priority': Nutrition Canada's Survey and the Disciplining of Aboriginal Bodies, 1964-1975" in *Edible Histories/Cultural Politics: Towards a Canadian Food History*. Edited by Franca Iacovetta, Valerie Korinek, and Marlene Epp. Toronto: University of Toronto Press, 2012.
- Wai, Zubairu. *Epistemologies of African Conflicts: Violence, Evolutionism, and the War in Sierra Leone*. New York: Palgrave-MacMillan Publishing, 2012.
- Ward, R.H. and K.M. Weiss, "James V. Neel, M.D., Ph.D. (March 22, 195-January 31, 2000): Founder Effect" in *The American Journal of Human Genetics*, Vol. 66, No. 4 [April 2000]: pp. 755-760.
- Weaver, Jace. *The Red Atlantic: American Indigenes and the Making of the Modern World, 1000-1927*. Chapel Hill: University of North Carolina Press, 2014.
- Weaver, Sally M.. "The Hawthorn Report: Its Use in the Making of Canadian Indian Policy" in *Anthropology, Public Policy, and Native Peoples in Canada*. Edited in Noel Dyck and James B. Waldram. Montreal and Kingston: McGill-Queens University Press, 1993: pp. 75-97.
- Wilson, E.O.. *Sociobiology: The New Synthesis*. Cambridge: Harvard University Press, 1975.
- Wolfe, Patrick. "Settler Colonialism and the Elimination of the Native" in *The Journal of Genocide Research*, Vol. 9, No. 4 [2006]: pp. 387-409.
- Wood, John George. *The Uncivilized Races of Men in All Countries of the World; Being a Comprehensive Account of their Manners and Customs, and of their Physical, Social, Mental,*

Moral, and Religious Characteristics. Hartford, Connecticut: J.B. Burr and Hyde Publishing, 1872.

Workman, Lance. *Charles Darwin: Shaper of Evolutionary Thinking*. New York: Palgrave Macmillan, 2014.

Young, Robert. "Darwin's Metaphor: Does Nature Select?" in *The Monist*, Vol. 55, No. 3 [July 1971]: pp. 442-503.

-. *Darwin's Metaphor: Nature's Place in Victorian Culture*. Cambridge: Cambridge University Press, 1985.

- *Colonial Desire: Hybridity in Theory, Culture, and Race*. London: Routledge Publishing, 1995.

-. *White Mythologies: Writing History and the West*. London: Routledge Publishing, 2004.

Young, T. Kue and Peter Bjerregaard (eds.), *Health Transitions in Arctic Populations*. Toronto: University of Toronto Press, 2008.