

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

NATIVE AMERICAN STORIES AS SCIENTIFIC INVESTIGATIONS OF
NATURE: INDIGENOUS SCIENCE AND METHODOLOGIES

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

MASTER OF ARTS IN HISTORY OF SCIENCE,

TECHNOLOGY AND MEDICINE

By

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Norman, Oklahoma

2016

NATIVE AMERICAN STORIES AS SCIENTIFIC INVESTIGATIONS OF NATURE:
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A THESIS APPROVED FOR THE
DEPARTMENT OF HISTORY OF SCIENCE

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Nminak ode ndenwenmagnek.

Acknowledgements

First and foremost I must thank my family and friends for all their support throughout my lengthy academic career. I must also thank my fellow tribal members for all their guidance, kind words, and gifts of knowledge. Lastly, sincere thanks to the members of my committee, as well as other faculty members in and outside my program who have helped me throughout the course of my time as a master's student. Without all of you this would not have been possible. Chi migwetch.

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Fig. 1 - *Ojibwe Giizhig Anung Masinaa'igan - Ojibwe Sky Star Map*, page 71.

Abstract

Scientific knowledge is a global pursuit, one that takes on many different guises across cultures. This thesis argues that indigenous peoples have and had their own, independently developed forms of scientific knowledge, that are interwoven into stories that have been passed down for generations. I will share stories from my own tribe, the Potawatomi. Recognizing that Native American stories are tapestries of different types of knowledge—spiritual, scientific, and cultural— and that these knowledges cannot be extricated from one another, Native American science is neither directly comparable nor commensurable with Western, colonial, atheistic science. Rather, it has its own complex epistemology that must be recognized and valued for its difference, but also legitimated as having the same spirit of empirical understanding, as Western science.

Keywords: Native American, Science, Indigenous, Potawatomi, Post-Colonial Studies, History of Science, Storytelling

Introduction

Science can appear in a multitude of forms. One story common across Indian Country is called The Three Sisters, which relates to an agricultural method practiced up and down the Americas. There are many variations of the teaching, but all describe the three plants central to the story—corn, beans, and squash—as sisters. Here is one version of that story:

Some stories tell of a long winter when the people were dropping from hunger. Three beautiful women came to their dwellings on a snowy night. One was a tall woman dressed in all yellow, with long flowing hair. The second wore green, and the third was robed in orange. The three came inside to shelter by the fire. Food was scarce but the visiting strangers were fed generously, sharing in the little that the people had left. In gratitude for their generosity, the three sisters revealed their true identities—corn, beans, and squash—and gave themselves to the people in a bundle of seeds so that they might never go hungry again.¹

The seeds of are planted together in the same mound, which allows them to symbiotically support one another throughout the growing process. The squash provides ground cover that suppresses weed growth, while the cornstalks give the beans something to climb, and the beans give nitrogen back to the soil.² This agricultural technique allows for a nutritionally balanced, well supported, plentiful crop, and is proof of intentional experimentation with planting in order to provide better yields. It is also an excellent example of Indigenous American scientific knowledge as it is shared in stories.

¹ Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* (Minneapolis: Milkweed Editions, 2013), 131.

² Justin Neely et al., *Citizen Potawatomi Nation Department of Language: Welcome to Bodéwadmimwen Beginner Class 2015* (Shawnee: Citizen Potawatomi Nation Language Dept., 2015) 41.

This thesis is quintessentially an argument that presents Indigenous American³ knowledge in the most culturally authentic way that I can. However, the premise of this paper must be understood within the context of colonialism. Science, and its rules of inclusion and exclusion, of what is “rational” and what is “irrational,” has the dubious honor of being one of the last acceptable forms of imperial oppression, but it is rarely acknowledged as such. Thus, it is important to discuss the meanings and implications of Western science. González defines science generally as:

...in its most essential form, [science] is a practical quest for truths about the world— a dynamic search for effective ‘knowledge, based on experience and fashioned by reason.’...A critical part of my formulation is the notion of science as *practice*, as a practical search for knowledge to understand certain aspects of the world in which actors, while constrained by certain structures... can do and transform them over time, through practice.⁴

As González goes on to prove, Indigenous and cosmopolitan (or Western) science are characteristically the same: an empirical, experimental encounter with the natural world for the purpose of achieving understanding and new uses. Nevertheless, with this working overview, it is then critical to flesh out some of the differences between Western and Indigenous science. First, Western science views itself as the least biased form of knowledge due to its foundations in the Ancient Greek philosophical traditions of “logic” and “reason,” as well as its Enlightenment separation from Christianity and subsequent Cartesian dualistic opposition to religion. Today, the Western sciences are

³ Throughout this paper, I will use Indigenous American or tribal peoples as opposed to Native American or American Indian as a collective noun for the Indigenous peoples of the Americas, except in direct quotes. There are complicated rhetorical reasons for why I have chosen this term; for a full explanation, see the terminology section of this work.

⁴ Roberto González, *Zapotec Science: Farming and Food in the Northern Sierra of Oaxaca*, Austin: University of Texas Press, 2001, 22-24.

divided into formalized subfields that are atomistic in construction, resulting in works that talk only to the peers within their subfield, as opposed to the sciences more broadly, let alone the public. Lastly, another key tenet of Western science is that it perceives itself to be universally true. A key corollary to that is that Western science criticizes tribal science as only locally true, and not universally applicable.

On the other hand, Indigenous Americans do not see our empirical knowledge about the world as separate from other types of knowledge. Relatedly, unlike Western science, Indigenous American knowledge is holistic, and considers all aspects of the natural world in relation to one another at all times. Additionally, the pursuit of knowledge for knowledge's sake is not an Indigenous American epistemology. Rather, the pursuit of knowledge is weighed against risk to the community and to the earth. These are only some of the differences between the two sciences; moreover, Indigenous American epistemologies will be discussed in more detail later on.

Meanwhile, this argument is very much for the benefit of Indigenous representation in the white world; not because we did not already know that our stories contained knowledge of how to care for and live with all our relations, plants, animals, and the earth included. The story told by this thesis is part of a battle against colonial stereotypes of ignorance and primitivism. In order to achieve this, I will draw from the history of science and technology, as well as from anthropology, philosophy, post-colonial studies, Native American/American Indian/First Nations studies, and Indigenous studies texts in order to construct an intersectional argument for the recognition of Indigenous American scientific knowledge.

Indeed, by drawing from all of these sources, my intention is to make the reader consider an argument that is an obvious fact to Indigenous scholars, but is virtually unacknowledged in the history of science: that Indigenous peoples had and have their own independently developed forms of scientific knowledge that are interwoven into stories that have been passed down for generations. I will support this argument using the knowledge and history of my own tribe, the Potawatomi (*Bodéwadmi* in our language). Relatedly, the fact that this an argument *specifically about Potawatomi science* that can be theoretically expanded to Native science more generally is important to remember, because tribal knowledge and praxis varies from tribe to tribe to such an extent that Native science is difficult to generalize. Thus, recognizing that Indigenous American stories are tapestries of all sorts of knowledge and that these knowledges cannot be extricated from one another, this form of Indigenous science should be seen as distinct from yet commensurate with Western science.

However, it is important to situate these scientific observations in relation to criticisms of Indigenous science, and Indigenous knowledge in general. One of the questions I have been asked in some form or another allows us a glimpse of the forms of modern scientific imperialism and Western hegemony: “Well why should we recognize Native American knowledge as equal to Western science? Especially when it is contained in stories?” These questions articulate the failures of postcolonial studies specific to recognition of non-white, non-Western bodies as being fully capable of self-representation and intelligence independent of the metropole:

One day the white master recognized *without a struggle* the black slave. But the former slave wants to *have himself recognized*. There is at the basis of the Hegelian dialectic an absolute reciprocity that must be highlighted. It is when I go beyond immediate existential being that I apprehend the being of the other as a natural reality, and more than that. If I...make the two-way movement unachievable, I keep the other within himself. In an extreme degree, I deprive him even of this being-for-self.... "Action from one side only would be useless, because what is to happen can only be brought about by means of both....*They recognize themselves as mutually recognizing each other.*"⁵

It is not that I am arguing that our two sciences are the same. They are fundamentally different for a number of reasons which will be discussed later. Indigenous American Science is not only distinct from Western science, but it also varies from tribe to tribe. Rather, my argument is that until Indigenous science, indeed all non-Western science, is recognized by the academy as science, then the dialectic of the post-colonial academy has broken down, and it can only offer lip service to inclusivity. We cannot have an academy that aspires to be post-colonial if it continues to perpetuate the epistemological and ontological fallacies that marked Empire. As long as there is an entrenched, yet often unrecognized, sense of superiority and effectiveness that marks Western science, there will always be problems recognizing and representing the Rest.

When discussing the scientific practices of non-Western peoples, there is always that qualifier, that "but." There is a diminution of the understanding present in Indigenous science, and in all non-Western science, in comparison to the knowledge contained within Western science. This qualification also extends to research done by

⁵ Frantz Fanon, *Black Skin, White Masks*, trans. by Richard Philcox (New York: Grove Press, 1952, 2008), 191-192; quote within the block quote, as cited by Fanon: GWF Hegel, *The Phenomenology of the Mind*, trans. by JB Baillie, 2nd rev. ed. (London: Allen and Unwin, 1949), 230-231, my emphasis.

and about non-Western science today. For instance, when I have discussed my own work with my peers, I have been asked on more than one occasion how I can retain objectivity when I am writing about my own people. When we want to represent and research our own communities, our work is always interrogated for the slightest hint of bias. However, I have yet to hear this same interrogation leveled at my white colleagues who work on the scientific histories of their own nations.

We cannot have a post-colonial academy until there is no longer an absence of recognition of the Rest by the West. We cannot truly be rid of colonial racism and the dominion of empire until we honestly, truly, regard non-Western science as science-with-no-qualifier. Not “premodern,” not “primitive,” not “pseudoscience,” not “traditional,” not “complementary”; these qualifiers are indicative of this fundamental truth of both science and its history:

[Orthodox science] accepts non-western traditions to the degree to which they help to bolster the existing and approved orthodox doctrines. The vast majority of the time, the non-Western interpretations of Earth history and the history of human beings are rejected as Stone Age remnants of human societies that could not invent or accept the mechanistic and later industrial interpretation of the natural world.⁶

Indigenous knowledge, and all other non-Western knowledges, is only acceptable insofar as it can be used by white/Western academics, in fields such as “ethnobotany” (which possesses the telling prefix “ethno-”), ecology, climate science, and pharmacology, among others.⁷ This is despite the fact that “science and empiricism

⁶ Vine Deloria Jr., *Red Earth, White Lies: Native Americans and the Myth of Scientific Fact* (Golden, CO: Fulcrum Publishing, 1997), 32-33.

⁷ Some such works include: Fikret Berkes, *Sacred Ecology*, 2nd ed. (New York: Taylor & Francis, 2008); Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom,*

offer no more an ‘objective’ explanation of the world and reality than, for example, ancient myths.”⁸ The fundamental issue is “that all knowledge is socially constructed and political,” and non-Western bodies and their knowledges are still often only allowed agency as the researched, not the researcher.⁹

Nevertheless, even in the Western scientific fields where Indigenous science is allowed greater participation, it is frequently to the detriment of those communities. One such frequent consequence of such participation is biopiracy and bioprospecting. The former are the illegal (and nominally more legal) practices of “mining” non-Western communities for biological, geological, and medicinal knowledge, while either not compensating or minimally compensating the source communities.¹⁰ Even when non-Western communities are valued for their scientific expertise, they are not necessarily included in the conversation, or the rewards.

One case study that elucidates both the diminution of Indigenous scientific knowledge and biopiracy is the use of cinchona bark to treat fevers and malaria. The use

Scientific Knowledge, and the Teachings of Plants (Minneapolis: Milkweed Editions, 2013); Wendy Geniusz, *Our Knowledge Is Not Primitive: Decolonizing Botanical Anishinaabe Teachings* (New York: Syracuse University Press, 2009); and Wendy Geniusz (ed.), *Plants Have So Much to Give Us, All We Have to Do Is Ask: Anishinaabe Botanical Teachings* (Minneapolis: University of Minnesota Press, 2015).

⁸ Adrienne Chambon, Allan Irving, and Laura Epstein, *Reading Foucault for Social Work* (New York: Columbia University Press, 1999): 34.

⁹ Karen Potts and Leslie Brown, “Becoming an Anti-Oppressive Researcher,” in *Research as Resistance: Critical, Indigenous, and Anti-Oppressive Approaches*, eds. Leslie Brown and Susan Strega (Toronto: Canadian Scholars’ Press/Women’s Press, 2005): 261-262.

¹⁰ For more information on bioprospecting and biopiracy, see Bryan Liang, “Global Governance: Promoting Biodiversity and Protecting Indigenous Communities against Biopiracy,” *Journal of Commercial Biotechnology* 17(3): 248-253; and Thomas Efferth et al., “Biopiracy of Natural Products and Good Bioprospecting Practice,” *Phytomedicine* 23 (2): 166-173.

of cinchona bark by the Indigenous South American tribes such as the Quechua to treat fevers is often touted as an example of useful science from Indigenous peoples. However, when scholars neglect to then correlate that with the fact that this means that those tribes knew and understood that the bark was an effective treatment for malaria, this comment implies that the Quechua did not fully understand this medicine before European contact. This dismissal is amplified by the fact that there is still much more scholarship on the Europeans who were first to “discover” quinine, as opposed to uses of the bark by the Indigenous peoples.¹¹ By not crediting the tribal people who originally discovered the usefulness of cinchona, colonial rulers could continue to treat the Quechua and other tribes as “savages” who deserved no compensation. This insidious dismissal of Indigenous knowledge persists today in ongoing intellectual property rights cases on bioprospecting and biopiracy, resulting in legal recommendations from the United Nations Environment Program, among other laws and recommendations passed at an international, national, and local level.¹²

¹¹ While it is one of the common token examples in the history of science and medicine, actual sources on Indigenous use of cinchona are hard to pinpoint. One reference is: Steve Russell, “Patent Pending: Indigenous Plant Could Help Where ‘Miracle Drug’ Can’t,” *IndianCountryTodayMediaNetwork.com*. Another is Saul Jarcho, *Quinine’s Predecessor: Francesco Torti and the Early History of Cinchona* (Baltimore: Johns Hopkins University Press, 1993). For examples of the purported colonial ‘discovery’ of cinchona, see: Achan, Jane et al. “Quinine, an Old Anti-Malarial Drug in a Modern World: Role in the Treatment of Malaria.” *Malaria Journal* 10 (2011): 144. *PMC*. Web. 27 Mar. 2016; and “Products of the Empire: Cinchona: A Short History.” *Cambridge University Library*. <http://www.lib.cam.ac.uk/deptserv/r/cs/cinchona.html?> Accessed 26 March 2016. Web.

¹² Lydia Slobodian, Rémy Kinna, Alphonse Kambu, and Lara Ognibene, “Bioprospecting in the Global Commons: Legal Issues Brief.” *United Nations Environment Programme – Division of Environmental Law and Conventions, Environmental Law and Governance Branch*. Web. <http://www.unep.org/delc/Portals/119/Biosprecting-Issuepaper.pdf>

Fundamentally, one of the most serious problems with Western knowledge creation is:

...the inherent racism in academia and in scientific circles. Some of the racism is doctrinaire and unforgiving—for instance, the belief that, for a person and/or community possessing any knowledge that is not white/Western in origin, the data is unreliable. A corollary of this belief is that non-Western peoples tend to be excitable, are subjective and not objective, and consequently are unreliable observers.¹³

Academia, and particularly the sciences, has not yet cleansed itself of the colonial poisons that gave force and life to the evils of racial taxonomy, eugenics, anti-miscegenation laws, forced sterilization programs, and so many other projects of empire.¹⁴ These constructions of non-Western science as inferior, grounded in

¹³ Deloria Jr., *Red Earth, White Lies*, 34.

¹⁴ The literature on these topics is extensive: For some primary sources on racial taxonomy, see: Johann Friedrich Blumenbach, “On the Natural Variety of Mankind,” in *The Idea of Race*, eds. Robert Bernasconi and Tommy Lott (Indianapolis: Hackett Publishing, 2000): 27-37; Georges Buffon, *Buffon’s Natural History Containing A Theory of the Earth, A General History of Man, of the Brute Creation, and of Vegetables, Minerals, &c. &c.*, Vol. IV (London: Symonds, Paternoster-Row, 1807); Immanuel Kant, “Of the Different Human Races,” in *The Idea of Race*: 8-22; Josiah Nott, “Two Lectures on the Natural History of the Caucasian and Negro Races” (Mobile: Dade and Thompson, 1844); and Francois-Marie Voltaire, “‘Of the Different Races of Men’ from *the Philosophy of History*,” from *The Idea of Race*: 5-7.

For some solid secondary literature on eugenics, see: Stefan Kuhl, *Nazi Connection: Eugenics, American Racism and German National Socialism* (New York: Oxford University Press, 2002); and Paul Lombardo, ed., *A Century of Eugenics in America: From the Indiana Experiment to the Human Genome Era* (Bloomington, IN: Indiana University Press, 2011).

For an excellent primary source overview of US anti-miscegenation laws, see: James Browning, “Anti Miscegenation Laws in the United States,” *Duke Bar Journal* 1, no.1 (1951): 26-41. Lastly, here is a sample of articles on American forced sterilization projects: Allison Carey, “Gender and Compulsory Sterilization Programs in America: 1907-1950,” *Journal of Historical Sociology* 11, no.1 (1998): 74-105; Jane Lawrence, “The Indian

superstition or religion, and frozen in pre-modernity are directly connected to the work of colonial anthropologists of the 19th and 20th centuries, the racial taxonomists who thrived before and alongside them, and the colonial powers that supported their fieldwork and conclusions.¹⁵ As an institution, an epistemology, and a methodology, science will never be able to outgrow its past until it is willing to join the Rest in mutual recognition. Until then, “he who is reluctant to recognize me is against me.”¹⁶

Health Service and the Sterilization of Native American Women,” *American Indian Quarterly* 24, no. 3 (2000): 400-419; and Alexandra Minna Stern, “Sterilized in the Name of Public Health: Race, Immigration, and Reproductive Control in Modern California,” *American Journal of Public Health* 95, no.7 (2005): 1128-1138.

¹⁵ For more information on these topics, see: Alice Conklin, *In the Museum of Man: Race, Anthropology, and Empire in France, 1850-1950* (Ithaca: Cornell University Press, 2013); Anténor Firmin, *The Equality of Human Races*, trans. by Asselin Charles (Chicago: University of Illinois Press, 2002; Originally published in French, 1885); Benedict Anderson, *Under Three Flags: Anarchism and the Anti-Colonial Imagination* (New York: Verso Press, 2007); Talal Asad, ed., *Anthropology and the Colonial Encounter* (New York: Humanity Books, 1973, 1995).

¹⁶ Frantz Fanon, *Black Skin, White Masks*, 193.

Centering a Potawatomi Perspective: A Self-Reflexive Essay

"To sew is to pray. Men don't understand this.... They don't see the speech of the Creator in the work of the needle. We mend. We women turn things inside out and set things right. We salvage what we can of human garments and piece the rest into blankets. Sometimes our stitches stutter and slow. Only a woman's eyes can tell. Other times, the tension in the stitches might be too tight because of tears, but only we know what emotion went into the making. Only women can hear the prayer."

– Louise Erdrich, *Four Souls*

“The difference between non-Western and Western knowledge is that the knowledge is personal for non-Western peoples and impersonal for the Western scientist. Americans believe that anyone can use knowledge; for American Indians, only those people given the knowledge by other entities can use it properly.”

– Vine Deloria Jr., *Red Earth, White Lies*

Bozho. Calandra ndezhnekas. Neshnabe kwe ndow. Hello. My name is Calandra, and I am a Potawatomi woman.

I am an enrolled member of the Citizen Potawatomi Nation (commonly abbreviated as CPN). If you go to Shawnee and ask around, my tribe knows me, but I did not grow up in the community. I was raised in Indian Country, but not on a reservation. I am a member of the CPN women's hand drum group, *De'wegen Kwek*, but I have not yet been named.¹⁷ I know the basics of my language, but I can't carry a conversation in Potawatomi. I attend ceremonies regularly, but I still make mistakes. I

¹⁷ Names are usually given at birth or a young age. However, if one did not grow up in their community, there are various other ways to earn or ask for a traditional name. It is also not uncommon for people to have more than one name throughout the course of their life. Nevertheless, these are teachings I know from my tribe, and thus are applicable only to some Potawatomi people. There is no universal Indigenous American opinion on naming, or any other traditional practice; different tribes will have different thoughts on traditional practices.

know how to dance, but I am not high enough blood quantum to dance at some powwows. I have Grandma Jessie's face, but I don't have her skin tone.

My great-great grandfather was Joseph Slavin, one of the original Dawes Roll members of the Citizen Band (also known as the Mission Band), who left the Kansas reservation in order to take allotment land in Indian Territory. He was enrolled on the Dawes rolls as half, despite the fact that we have records showing he was already born before *Ma-Nis* married Thomas Slavin, and was referred to as strictly Indian in his adoption records. His daughter, Jessie, married the son of a Dutch immigrant born in a dugout, and raised my grandfather Eugene and his siblings outside the culture, most likely in order to pass them off as white children. She was successful, or at least enough so to keep them out of residential schools. Her son Eugene, my grandfather, then went on to connect train cars and mine uranium in Grant, New Mexico to pay his tuition for dental school. His daughter, my mother, told me this story.

By the time I was born, my family had been without our traditions for three generations. I came home to my tribe as an adult, seeking out my *Bodewadmi* heritage after years of longing. Acculturation is a complicated process for many reasons, and I was not sure how welcoming my own would be of a white passing mixed blood outlander from a lost family line. Thankfully, I was received warmly by people, some of whom are now my dearest friends. That is not to say I did not have to pass the typical set of identification questions: "what tribe(s) are you?" and "what family are you from?" While this sort of self-representative narrative is generally enough proof to avoid further scrutiny from other Indigenous people, my self-identification to non-Native people is not necessarily taken as well. Given the fact I am not "phenotypically

Native,” a common response I get when I self-identify is “but you don’t look Native American.” I am very aware that I do not fit a stereotypical idea of what an Indigenous American looks like. This is why I claim an Indigenous identity but I do not claim to be a woman of color because I do not have the same experiences since I am white passing. And, while it is easy to fixate on physical or “racial” appearance, that is only one factor in the construction of Indigenous American identities, and it does not solely define us. However, my appearance keeps some scholars, Indigenous or otherwise, from accepting my claims without further proof of community participation, of enrolled tribal membership, even of blood quantum. My own blood quantum is subject to numerical fluctuation depending on whether you value BIA records or tribal archival research more. *Wegwendek*.¹⁸

For tribal people, factors such as community involvement, cultural knowledge, and tribal language fluency are often evaluated to prove whether or not a person is an authentic member of their community. These three factors are inextricable from one another. Our languages are an integral part of our tribal epistemologies, and without a basic understanding of the language, one cannot wholly understand the cultural and ceremonial ways. By living in a Native community, only then can one truly understand the nuances of Native humor, expressions, and lifeways. Lastly, without tribal ways, there is no community and no language. The need for such evidence comes from both traditional understandings of our own communities, but also the real and substantial problem of non-Indigenous American people claiming Indigenous heritage for personal gain including but not limited to employment, the ability to be perceived as an authority

¹⁸ See glossary.

on a tribe or several tribes, and business profit. This is a particularly pervasive problem in academia, with people who have no traceable heritage make false claims of tribal identity in order to gain authority and employment. Some notable examples include Rachel Dolezal (who in addition to pretending to be African American also claimed “Native American heritage” and to be “born in a tipi” and to “hunt with bows and arrows”), Andrea Smith, and Ward Churchill.¹⁹ Nevertheless, this has had repercussions for mixed Indigenous Americans such as myself, who now must struggle even harder to prove ourselves. However, the blame rests with the imposters, and with the artificial colonial taxonomy of blood quantum.

Authentic Indigenous American identity is uniquely complicated and difficult to prove to both Indigenous and non-Indigenous individuals. First of all, as Garrouette discusses in her article, “American Indians differ from other twenty-first-century racial groups in the extent to which their racial formation is governed by *law*,” with separate standards of evidence required for legal enrollment varying from tribe to tribe, in

¹⁹ For the original interview where Dolezal made those claims see: Shawntelle Monty, “A Life to be Heard,” *The Easterneronline.com*: 5 February 2015. <http://easterneronline.com/35006/eagle-life/a-life-to-be-heard>. On Andrea Smith, see: David Cornsilk, “An Open Letter to Defenders of Andrea Smith: Clearing Up Misconceptions about Cherokee Identification,” *IndianCountryTodayMediaNetwork.com*: 10 July 2015. <http://indiancountrytodaymedianetwork.com/2015/07/10/open-letter-defenders-andrea-smith-clearing-misconceptions-about-chokeee-identification> ; ICTMN Staff, “Andrea Smith Releases Statement on Current Media Controversy,” *IndianCountryTodayMediaNetwork.com*: 9 July 2015. <http://indiancountrytodaymedianetwork.com/2015/07/09/andrea-smith-releases-statement-current-media-controversy-161028> ; Pamela Jumper Thurman, Ellen Guttillo Whitehouse, Pamela Kingfisher, Carol Patton Cornsilk, Patti Jo King, “Cherokee Women Scholars’ and Activists’ Statement on Andrea Smith,” *IndianCountryTodayMediaNetwork.com*: 15 July 2015. <http://indiancountrytodaymedianetwork.com/2015/07/17/chokeee-women-scholars-and-activists-statement-andrea-smith>.

addition to different legal standards for who is deemed an “American Indian or Alaskan Native” in the context of federal United States law.²⁰ Many tribes have a blood quantum requirement for enrollment; others, such as my tribe, base enrollment eligibility on direct traceable descendancy from enrolled tribal members listed on a delineated set of census rolls, such as the Dawes rolls. While blood quantum is a common, perhaps even popular, means of determining whether or not one is “Indian enough” for tribal enrollment as well as self-representation, it is important to remember the ties that blood quantum has to the racial taxonomy and eugenics movements of the nineteenth and twentieth centuries, and laws such as the “one drop rule.”²¹ As is made explicit in American federal Indian law:

The original stated intention of blood quantum distinctions was to determine the point at which the various responsibilities of that dominant society to Indian peoples ended. The **ultimate and explicit federal intention** was to use the blood quantum standard as a means to liquidate tribal lands and to eliminate government trust responsibility to tribes along with entitlement programs, treaty rights, and reservations.²²

Blood quantum a colonial construction, and is more accurately a form of *regulation, limitation, oppression, and ultimately, elimination*. It is a form of recognition but it is the recognition of the colonized by the colonizer – an asymmetrical violence. As

Coulthard argues, “recognition is not posited as a source of freedom and dignity for the

²⁰ Eva Marie Garrouette, “The Racial Formation of American Indians: Negotiating Legitimate Identities within Tribal and Federal Law,” *American Indian Quarterly* 25, no. 2 (Spring 2001): 224-239, my emphasis. There are a vast array of scholarly and/or Native American sources that tackle the question, I personally recommend perusing the archive of *Indian Country Today Media Network's* articles for additional sources on blood quantum.

²¹ *Ibid*, 225-229.

²² *Ibid*, 225, my emphasis.

colonized, but rather as the field of power through which colonial relations are produced and maintained.”²³

While navigating personal identity as a mixed person in various communities is a complex and not always pleasant experience, the multivalent perspective also gives me complicated and sometimes contradictory views on the ethics of Indigenous research. As a researcher, I want to help share Indigenous American knowledge with the academy. However, as an Indigenous person, I have concerns about how to ethically gather and share such knowledge without causing harm to the communities to whom the knowledge rightfully belongs. As Kovach notes, “there is a fundamental epistemological difference between Western and Indigenous thought, and this difference causes philosophical, ideological, and methodological conflicts for Indigenous researcher.”²⁴ There are additional concerns about transgressing the boundaries of our tribal communities when we are teaching and researching. For example, Gunn Allen wrestles with the very same problem in some of her work:

Ethically, a professor is responsible to provide students with the most complete, coherent information available, and, in teaching Native American literature, providing the best information includes drawing from ritual and mythic sources that have a bearing on the text under consideration.... But to use the oral tradition directly is to run afoul of native ethics, which is itself a considerable part of the tradition. Using the tradition while contravening it is to do violence to it. The ethical issue is both political and metaphysical, and to violate the traditional ethos is to run risks that no university professor signed up for, in any case.²⁵

²³ Glen Sean Coulthard, *Red Skin, White Masks: Rejecting the Colonial Politics of Recognition* (Minneapolis: University of Minnesota Press, 2014), 25.

²⁴ Margaret Kovach, *Indigenous Methodologies: Characteristics, Conversations, and Contexts* (Toronto: University of Toronto Press, 2009), 29.

²⁵ Paula Gunn Allen, “Special Problems in Teaching Leslie Marmon Silko’s *Ceremony*,” in *Natives and Academics: Researching and Writing about American Indians*, ed. Devon Mihesuah (Lincoln: University of Nebraska Press, 1998): 55-56.

This dilemma continues as she discusses the research experiences of Ray Young Bear when he tries to gather stories from his own tribe and others, particularly when delving too deeply into knowledge he did not have the right to personally from his own community:

Young Bear raises a couple of issues [one of which being] ‘if it’s ours, it’s not for sale.’ He also discovers that what was told to a white ethnographer is not to be retold by a Mesquakie, *lest tragic consequences ensue*. Preserving tradition with the sacrifice of its living bearers seems at best reasonless, at worst blasphemous. If people die as a result of preserving tradition in the White way of preservation, for whom shall the tradition be preserved?²⁶

Indeed, “the white world has a different set of values, one which requires learning all and telling all in the interests of knowledge, objectivity, and freedom. This ethos and its obverse—a nearly neurotic distress in the presence of secrets and mystery—underlie much of modern American culture.”²⁷ Indigenous American scholars must juggle constantly to balance our academic pursuits with the ethics and rules of our own communities (as well as those of other Indigenous communities we study). From these examples, it is clear that having an ethical research methodology is fundamental and essential to researching non-Western communities, either as an “insider” or an “outsider” of that community.

In this same vein, how does my own identification as Potawatomi affect my perception and analysis? And how does the fact that I am still learning my own ways affect my research? My insider position as a tribal member means my research will be

²⁶ Ibid, 57, italics in original.

²⁷ Ibid, 59.

guided by an awareness of all of the negative impacts that Western research can have on Indigenous communities. However, I must also be aware of how my understanding as a relative newcomer and someone who did not grow up learning the traditional ways may not always be complete. Even though I am endeavoring to have a tribal perspective, mistakes and miscommunications are unavoidable, because I am learning the ways of my people while I also work as a scholar. This is just a reality I must accept; to remedy this, I reached out to other tribal people, from my tribe as well as my committee, to make sure there are as few transgressions as possible.

As I resituate myself as a researcher, I must be aware of how my identity impacts my methods, perspectives, and analysis of Indigenous sources. As historians, we all have some sort of vested interest in our research questions, in part largely unacknowledged, and my work is no different. However, it must be recognized that, as a historian laying claim to an Indigenous subjectivity, the burden is on me to prove that my research is unbiased and well-supported. It is this same colonial burden that requires me to dissect my subjectivities in this self-reflexive preface. My use of a Potawatomi research paradigm also calls for reflexivity in research, because of its awareness of tribal ontologies, and “because of the value placed upon this type of knowing” by tribal paradigms.²⁸

My methodology recognizes a diverse, local, and infinite number of sciences. I respect and privilege the epistemologies and modalities of my own tribe above those of the academic research community. Some of the boundaries to my work are as follows:

²⁸ Kovach, *Indigenous Methodologies*, 49.

first, I do not and will not ask about medicinal practices, as those are sacred. As Allen discussed earlier in relation to Silko, sacred boundaries, even if already transgressed by anthropologists in the past, are never to be crossed by tribal members.²⁹ Whether the transgressions are those of ignorance or nonfeasance, anthropologists can still claim to have misunderstood these boundaries, while an insider cannot. It is out of respect for this boundary that I have chosen to not look at the history of medicine in either my secondary or primary research. It is outside our tribal methodology.

Secondly, the transcripts of my fieldwork will not be available with unrestricted access via the university; rather, I will be archiving my fieldwork with the Citizen Potawatomi Nation archive, where my tribe will control access to the records. By interviewing members of my community who have been approached ethically, according to Internal Review Board as well as our own tribal standards, I hope to avoid repeating the abuses perpetuated by the imperial constructions of the colonial archive. This allows me to be confident in the knowledge that I am not sharing a story that tribal members would consider inappropriate to share, and that these stories have been gathered without coercion and in good faith. As will be discussed in greater detail later on, there is a well-earned mistrust in Indigenous communities of researchers, particularly anthropologists, or the “most prominent members of the scholarly community that infests the lands of the free, and in the summertime, the homes of the braves”³⁰:

²⁹ Ibid, 57-59.

³⁰ Vine Deloria Jr., *Custer Died for Your Sins: An Indian Manifesto* (Norman: University of Oklahoma Press, 1988), 78.

You may be curious as to why the anthropologist never carries a writing instrument. He never makes a mark because he ALREADY KNOWS what he is going to find. He need not record anything except his daily expenses... for the anthro found his answer in the books he read the winter before. No, the anthropologist is only out on the reservations to VERIFY what he has suspected all along—Indians are a very quaint people who bear watching...There are, however, [other kinds of anthropologists...that] depend on their field observations and write long adventurous narratives in which their personal observations are used to verify their suspicions.³¹

These same methodological assumptions about Indigenous Americans can also be found in the field of history. The implicit problem noted by Deloria is that the archive is privileged over the actual, living knowledge of the people being “watched.”³² In doing this, we as historians perpetuate colonial constructions of Indigenous Americans. One such glaring example is White’s award-winning book *The Middle Ground*, in which he “is not recovering a segment of [these tribes’] past but toying with a story safely severed from their present. He simply ignores the people whose history he is examining....White’s is a retelling of his own people’s account of their long-ago dealings with the tribal nations.”³³ One notable example from that work is the salacious introduction, which claims to recount the alleged cannibalism of one particular tribe, despite the fact that White’s only evidence is one anthropological work from the 1820’s that was republished in 1938 because it “offered so much information on a now extinct

³¹Ibid, 80-81, original emphasis.

³² Ibid.

³³ Susan Miller, “Licensed Trafficking and Ethnogenetic Engineering,” in *Natives and Academics: Researching and Writing about American Indians*, ed. Devon Mihesuah (Lincoln: University of Nebraska Press, 1998), 101.

tribe³⁴ that it was decided to publish this material.”³⁵ This example will be discussed fully in the methodologies section on archives, until then, it is sufficient to note that this is most certainly questionable historical methodology. By relying on colonial archives, which in the case of Indigenous Americans would be any archive not created by an Indigenous tribe or tribal institution because the United States is a settler colony, we cannot expect to produce true or accurate Indigenous American histories.

Lastly, one serious concern regarding Western historical methodology, particularly as is common amongst Americanists, is a fundamental lack of understanding about the importance of community in Indigenous American tribes. As a Potawatomi woman who is aware of some of her cultural teachings, I am most concerned about how my community will receive my research, and I have spent much time discussing it with fellow tribal members, because above all else, I do not want to harm my community through my scholarship. When non-Native historians write about Indigenous American people without considering how their work will affect or be perceived by the tribe(s) about whom they are writing, they are failing to engage with those communities ethically.

Consequently, this is the most fundamental question for any Indigenous American scholar who wishes to work with our own cultural knowledge: ethically speaking, should we even be doing this work at all? Or have we gone off the red road onto the white one, and are we now willing to sacrifice traditional ways in order to

³⁴ The Miami, about whom this text primarily focuses, are not extinct. Post-Removal, the Miami Tribe of Oklahoma resides in Northeastern Oklahoma.

³⁵ CC Trowbridge, *Meearmeeear Traditions*, ed. Vernon Kinietz (Ann Arbor: University of Michigan Press, 1938), v.

preserve our knowledge in the white way? There is no simple answer here, and the question is disconcerting enough to give me pause in continuing on my own research path. The ethics of Indigenous research is a complex and rich conversation, one that will be addressed more thoroughly in the methodology section. In the meantime, I have chosen to finish what I began, in the most respectful and ethical way that I can. I have asked members of my tribe to entrust me with some appropriate stories in my role as a researcher, and I have learned them as a tribal person in the process of decolonizing myself. I have decided what they mean as a *Bodewadmi kwe* finding our ways by rebuilding myself and my subjectivity gradually as I learn our ceremonial ways. I must rebuild myself as a member of my community as well as a member of the academy. If my family had been raised in our culture, I wouldn't have had to ask for this knowledge. *Iwk she ezhewebek*. That's just the way it is.

Terminology

Before continuing, there are some terminological clarifications that this thesis must make. While “Native American” is considered by some to be the “politically correct” term for the tribal peoples of the Americas, it has also been appropriated by right-wing conservatives with no Native heritage to represent the children of immigrants who are born in the US.³⁶ Most importantly, instead of using the terms “Native American” or “American Indian” to refer back to the Indigenous people of Turtle Island (North America), I have chosen to use Indigenous Americans, Indigenous, Indigenous Nations, or Natives as nonspecific group nouns, in keeping with the research and terminological choices of Mihesuah and Yellow Bird.³⁷ Instead, “Indigenous Americans” or “Indigenous Nations” are more representative and accurate group terms, when it is necessary to make more general statements.³⁸ And, as Yellow Bird notes in his work, Indigenous people preferred above all else to use their tribal designation to describe themselves when surveyed.³⁹

Thus, whenever possible, I will use the specific tribe names of the peoples being discussed, such as Potawatomi, interchangeably with the word in their language for their tribe, such as *Diné* for the Navajo people. The only exception being in regards to the group noun for the Three Fires tribes: when referring to shared cultural knowledge

³⁶ Michael Yellow Bird, “What We Want to Be Called: Indigenous Peoples’ Perspectives on Racial and Ethnic Identity Labels,” *American Indian Quarterly* 23, no. 2 (1999), 12, 16.

³⁷ Devon Abbott Mihesuah, *So You Want to Write about American Indians? : A Guide for Writers, Students, and Scholars* (Lincoln: University of Nebraska Press, 2005), xi-xii; Yellow Bird, “What We Want to Be Called,” 12-21.

³⁸ *Ibid*, 6, 14.

³⁹ *Ibid*, 14-17.

between the Potawatomi, the Ojibwe, and the Odawa, I may also use the term *Nishnabe* or *Neshnabe*. This is the Potawatomi word for Indigenous People, as well as ourselves. The Ojibwe variation, *Anishinaabe* and the plural forms of these nouns, *Neshnabek/Anishinaabeg*, will also be used.⁴⁰ There is also a glossary at the end of the thesis which will provide the tribal origin and definition of all Indigenous words used here.

Additionally, words that are in Potawatomi or another Native language will be italicized. There are also many spelling variations in Native languages, particularly when translated into English. When you see a variant spelling of an Indigenous word or tribal name, particularly in quotations, this is not in error. For example, Potawatomi is also commonly spelled Pottawatomie, among many other variations.

⁴⁰ There is also a glossary at the end of the thesis which will provide the tribal origin and definition of all Indigenous words used here.

Potawatomi History

The Potawatomi (*Bodéwadmí*), “the people of the place of the fire,” “the fire people,” or “the keepers of the fire,” depending on who you talk to, are one of three *Neshnabek* peoples, along with the Ojibwe/Chippewa and the Odawa. Our tribal history tells us that the three tribes were all one unified tribe originally, but when this split occurred chronologically is not known. Because of this shared history, many Potawatomi stories, beliefs, and teachings are similar to those of the Ojibwe and Odawa, and vice versa.

Our bands were originally from the Great Lakes area, primarily around Lake Michigan, in present day Michigan, Wisconsin, Indiana, and Illinois. This means that we are geographically situated in what is considered the Eastern Woodlands region of Indigenous American tribes. Relatedly, *Bodéwadmimwen* is an Algonquin language. Traditionally, we were longhouse people, who lived in permanent to semi-permanent villages, and were both an agrarian and hunter-gatherer society. Like the other Eastern Woodlands/Great Lakes tribes, the beadwork of our people primarily features floral designs. Ours, however, is often outlined in white beads.

We first came into contact with Europeans by way of early seventeenth century French traders. With the founding of the United States, the *Neshnabe*⁴¹ began to move westward as settlers encroached deeper into their ancestral lands but prior to the

⁴¹ Our collective noun for ourselves.

Removal period.⁴² Then, beginning in the 1830's and into the 1840's, most groups of Potawatomi were removed to different locations west and south of their homeland in what is collectively known in our history as the Trail of Death. Some bands were force-marched to Council Bluffs, Iowa, others were taken to the Osage River reservation in southern Kansas.⁴³ In 1846, the Council Bluffs and Osage River Potawatomi agreed to remove to the Kansas River reservation in northern Kansas.⁴⁴

Then, fifteen years later, the Treaty of 1861 presented to Potawatomi with two options: stay in Kansas, or take allotments (and citizenship) in Oklahoma.⁴⁵ Those who decided to try their luck with the land in Indian Territory became known as the Mission or Citizen Band Potawatomi; those who chose to stay in Kansas became known as the Prairie Band. While there was no guarantee of safeguard from further removal, nevertheless, after several removals all within living memory, for many the possibility of permanence must have been tempting. Unfortunately, the 1861 treaty would be broken, and by 1867, the majority of the Citizen Potawatomi had been dispossessed of their allotments in Kansas.⁴⁶ In the 1870's, more Potawatomi would decide to try again in Indian Territory. Once again our lands were taken in the land runs as the boomers,

⁴² In American Indian Studies and Federal Indian Law, the Removal Period refers to the time after the passage of the Indian Removal Act by Andrew Jackson in 1830 until the beginning of the Allotment period in U.S. Federal Indian policy.

⁴³ Kelli Mosteller, "Potawatomi Allotment in Kansas," in *Indigenous Communities and Settler Colonialism: Land Holding, Loss and Survival in an Interconnected World*, eds. Zoe Laidlaw and Alan Lester (London: Palgrave Macmillan, 2015), 218-219.

⁴⁴ *Ibid.*

⁴⁵ The Citizen Band Potawatomi Tribe and the National Endowment for the Humanities, "*Grandfather, Tell Me A Story*": An Oral History Project Conducted by the Citizen Band Potawatomi Tribe of Oklahoma, and Funded by the National Endowment for the Humanities (Unknown: Citizen Potawatomi Tribe and NEH, 1984), ix.

⁴⁶ Mosteller, "Potawatomi Allotment in Kansas," 218-220.

sooners, and the rest of the white settlers descended upon Indian Territory, and carved it up into the state of Oklahoma.

Today, our lands in Oklahoma are located in Potawatomie and Cleveland County, with tribal resources and administration located in Tecumseh and Shawnee. Some families have held on to their allotment lands to this day. Others, like mine, quickly sold their allotment land and moved back to Kansas, or to locations unknown, in pursuit of survival and kinship. The Prairie Band still has a reservation near Mayetta, Kansas. There are seven other bands of Potawatomi that fled into Canada or elsewhere during removal, and have since returned to our ancestral homelands: the Forest County Indian Community in Wisconsin; the Hannahville Indian Community in the northern peninsula of Michigan; the Match-E-Be-Nash-She-Wish (Gun Lake) Band in Allegan County, Michigan; the Nottawaseppi Huron Band in Calhoun County, Michigan; and the Pokagon Band in southwestern Michigan and northeastern Indiana. In Canada, there are several First Nations communities with Potawatomi members, however two recognized bands of First Nations Potawatomi are Walpole Island First Nation and Wasauksing First Nation.

This is a very spare account of how a Woodlands tribe from Lake Michigan came to be so far from our homeland. This account also provides insight as to what sorts of traumatic events shape our culture and epistemology today, just as such histories do for each and every tribe. *Iw.* That's all.

Historiography

As shown by the citations in the above historical overview, the Potawatomi have been the subject of some academic study. Much of this work dates from the late nineteenth and early to mid-twentieth centuries. The following works do not include much, if any, natural or scientific knowledge, but it is still useful to briefly recount some of the more easily found histories and ethnographies of our bands. One of the earliest such studies was read before the Chicago Historical Society in 1870.⁴⁷ Caton primarily documents the political history of the Potawatomi, including the Three Fires.⁴⁸ However, this text is also most certainly a Victorian Romantic treatise on the glory of the wilderness, and the majesty of ‘the noble savage’:

That a mightier race had come, so far their superior that they must fade away before it. It is emphatically true of all our American Indians, that they cannot exist, multiply, and prosper in the light of civilization.... They are plainly the sick man of America; with careful nursing and the kindest care, we may prolong his stay among us for a few years, but he is sick of a disease which can never be cured except by isolating him from civilization, and remanding him to nature’s wildness, which in truth has more charms in many cases for even the white man, than the refinements and the restraints of the white man’s mode of life.⁴⁹

Caton does make one observation that helps support this thesis:

⁴⁷ John Dean Caton, *The Last of the Illinois, and a Sketch of the Pottawatomies. Read before the Chicago Historical Society, December 13, 1870* (Chicago: Fergus Printing Co., 1876). Another obscure work is: Cornelia Steketee Hulst, *Indian Sketches: Père Marquette and the Last of the Pottawatomie Chiefs* (New York: Longmans, Green and Co., 1918). <http://tinyurl.galegroup.com/tinyurl/37cvL7>

⁴⁸ *Ibid*, 10-12.

⁴⁹ *Ibid*, 22.

More than thirty-seven years ago, when I first became a citizen of Chicago, I found this whole country occupied as the hunting grounds of the Pottawatomie Indians. I soon formed the acquaintance of many of their chiefs, and this acquaintance ripened into a cordial friendship. I found them really intelligent and possessed of much information resulting from their careful observation of natural objects.⁵⁰

Nevertheless, Caton's work is most certainly in keeping with typical colonial anthropology, and should be read as such.

One of the more commonly cited works on the Potawatomi people was done by the ethnologist Skinner, which focused on the Prairie Band (whom he incorrectly identified as the Mascoutens).⁵¹ Skinner's work focused on the customs and culture of the Prairie Band Potawatomi. One of the distinguishing features of his work, as well as its most controversial aspect, was his extensive documentation of the tribe's sacred bundles. This work is now viewed as transgressive by Potawatomi people, and Skinner is viewed negatively in our communities.

Around the same time, Winger wrote a more general history of the Potawatomi.⁵² In his work, Winger discussed the political history of the Potawatomi with the United States, before, during and after removal. He also included some basic cultural information on Potawatomi people as a whole, as well as the Pokagon and Prairie bands. Moving forward chronologically, two other Western scholars went on to specifically study the Prairie Potawatomi: Landes, a mid-century anthropologist,

⁵⁰ Ibid, 6.

⁵¹ Alanson Skinner, "The Mascoutens or Prairie Potawatomi Indians," *Bulletin of the Public Museum of the City of Milwaukee* 1924-1927 (3 Volumes).

<http://hdl.handle.net/2027/uc1.32106006252248>

⁵² Otho Winger, *The Potawatomi Indians* (Elgin, IL: Elgin Press, 1939).

concentrated her work on Prairie Potawatomi medicinal practices, which will not be discussed here for ethical reasons.⁵³ The second, Clifton, is the best known of the lot. His monograph, and the work that brought him fame as an anthropologist, begins with pre-removal Potawatomi general and political history, but then focuses on the Prairie Band later on in the book.⁵⁴ In addition to primarily being a work of general history, Clifton also intersperses chapters on what he calls Potawatomi “Ideology,” “Religion,” “Social Organization,” and “Leadership and Governance,” which are where he does most of his anthropological labor. Unfortunately these sections maintain the same paternalistic racism of the earlier anthropological works, as indicated by his analysis of a Wiské story first published by Skinner, but also recounted to him:

The hero figures in Potawatomi myths and tales are just that...they are generally made to be poverty stricken and relatively helpless. This is the nature of a [Potawatomi man]⁵⁵; he is dependent on external aid and support. In this story Tisha is just a little worse off than most.... [He] gets relief...from mysterious contacts with strange, generally supernatural figures.... The postulate is clear: [the Potawatomi man] is relatively helpless to correct his impoverished condition without the intervention of powerful benefactors and skilled allies. [This story of Tisha, the poor brother who eventually earns wealth and respect] is a Potawatomi-style success story.⁵⁶

There are several problems with Clifton’s analysis, but first and foremost, the greatest error is the inclusion of this story at all. Most stories that feature Wiské, who is a major

⁵³ Ruth Landes, “Potawatomi Medicine,” *Transactions of the Kansas Academy of Science* 66, vol. 4 (Winter 1963): 553-599. *JSTOR*.

⁵⁴ James Clifton, *The Prairie People: Continuity and Change in Potawatomi Indian Culture, 1665-1965: An Expanded Edition* (Iowa City: University of Iowa Press, 1998 [original ed. published 1977]).

⁵⁵ Clifton consistently misuses our word for our people, neshnabe, as a word for man. Thus, instead of confusing the reader, I have included his definition in place of his incorrect use. The Potawatomi word for man is *nene* (pl. *nenwik*).

⁵⁶ Clifton, *The Prairie People*, 48-49.

trickster figure in Potawatomi storytelling, are winter stories; winter stories are stories that are only meant to be told during wintertime, or when snow is still on the ground. It is inappropriate to tell these stories outside of their season, and by publishing this story, Clifton is violating Potawatomi custom. Because this is most likely a winter story, I will not discuss or repeat this story here. It is still clear even without a full discussion of the story that Clifton clearly thinks the Potawatomi are not able to take care of themselves. This is a common racist stereotype of Indigenous and non-Western people the world over, and there are innumerable examples. After this brief discussion of Clifton, it is to no great surprise that his work is not well-regarded in our communities.

Looking to the north, there are fewer sources readily available that specifically focus on the northern bands, however, most of the longer anthropological works on the Prairie Potawatomi actually focus primarily on general Potawatomi history, which is de facto northern band history.⁵⁷ One of the most recent books on general (and particularly northern) Potawatomi history is Edmunds' *The Potawatomis: Keepers of the Fire*.⁵⁸ However, unlike most of the other authors discussed, Edmunds' volume only goes up to the point of removal. Otherwise, it gives much of the same general and political history as Clifton, Skinner, and Winger.

⁵⁷ Two such studies include: Kenneth Tiedke, "A Study of the Hannahville Indian Community (Menominee County, Michigan)," Michigan State College Agricultural Experiment Station: April 1951. <http://hdl.handle.net/2027/mdp.39015071815075>; and Cecilia Bain Buechner, "The Pokagons," *Indiana Historical Society* 10, no.5 (1933). <http://hdl.handle.net/2027/uiuo.ark:/13960/t50g4sj82>

⁵⁸ R. David Edmunds, *The Potawatomis: Keepers of the Fire* (Norman: University of Oklahoma Press, 1978); He also published an annotated bibliography of Potawatomi history: R. David Edmunds, *Kinsmen Through Time: An Annotated Bibliography of Potawatomi History* (Metuchen NJ: Scarecrow Press, 1987).

There have been several publications specifically about the Citizen Band, all of which have been published by or recognized by the tribe. Chronologically, the first of these is Father Murphy's legal and political history of the band, which was successfully defended as a PhD dissertation at the University of Oklahoma before being published as a book.⁵⁹ The next work is a brief overview of general Potawatomi history that, unlike the others discussed previously, then discusses the creation of the Citizen Band, and its history up to present day.⁶⁰

Moving into the twenty-first century, two works have already been published on Potawatomi people, and specifically on the Citizen Band. The first, published by the current director of the Citizen Potawatomi Nation Cultural Heritage Center, is a historical article on the Kansas and Oklahoma phases of removal for the Prairie Band, and the creation of the Citizen Band.⁶¹ The other is a sociological investigation of cultural revitalization across the nine bands of Potawatomi across North America.⁶² Additionally, Wetzel is interested in nation-building and national identity amongst the Potawatomi as an anti-colonial organization movement.

It is notable that the majority of these texts were written over 25 years ago, and potentially without the consent of the people being studied. It is also worth noting that many of these texts, particularly the more readily available works by Clifton and

⁵⁹ The Rev. Joseph Murphy, O.S.B., *Potawatomi of the West: Origins of the Citizen Band* (Shawnee, OK: Citizen Band Potawatomi Tribe, 1988).

⁶⁰ Joseph Cash, *The Potawatomi People (Citizen Band)* (Phoenix: Indian Tribal Series, 1976), front matter.

⁶¹ Kelli Mosteller, "Potawatomi Allotment in Kansas."

⁶² Christopher Wetzel, *Gathering the Potawatomi Nation: Revitalization and Identity* (Norman: University of Oklahoma Press, 2016).

Edmunds, are viewed negatively by many Potawatomi people I know. Of the texts listed here, I relied entirely on ones that I know are viewed positively by my people, and primarily by those published or otherwise endorsed by the Citizen Potawatomi at some point or another. There are two reasons for this: it is the most current, and it is written by a tribal member. This is in keeping with the intention of this thesis to avoid perpetuating the myths and fantasies of the colonial archive. The vast majority of these texts fall within the category of either bad “Native American” history or the old form of predatory anthropology, which will be discussed in more detail in the methodologies section, but are both regarded by Native American scholars to be reductive, biased, extractive, and, at worst, racist.⁶³

Before continuing on to the history of science and technology historiography, it is of note that, unlike the texts previously discussed, there are a few sources on Potawatomi and Ojibwe botany. While there are several anthropological sources, and even a botanical published by the Great Lakes Indian Fish and Wildlife Commission, I instead wish to focus on the works of Robin Wall Kimmerer, a Citizen Band Potawatomi plant ecologist.⁶⁴ Her work integrates Anishinabe botanical knowledge into

⁶³ See Vine Deloria, *Custer Died for Your Sins*, chapter 4: “Anthropologists and Other Friends”; as well as Waziyatawin/Angela Cavender Wilson, “American Indian History or Non-Indian Perceptions of American Indian History?” in *Natives and Academics: Researching and Writing about American Indians*, ed. Devon Abbot Mihesuah (Lincoln: University of Nebraska, 1998): 23-26.

⁶⁴ For some other Anishinabe botanical sources, see: Mary Siisip Geniusz, *Plants Have So Much to Give Us, All We Have To Do Is Listen: Anishinaabe Botanical Teachings* (Minneapolis: University of Minnesota Press, 2015); Wendy Makoons Geniusz, *Our Knowledge Is Not Primitive: Decolonizing Botanical Anishinaabe Teachings* (Syracuse: Syracuse University Press, 2009); James Meeker, Joan Elias, and John Heim, *Plants Used by the Great Lakes Ojibwa* (Odanah, WI: Great Lakes Indian Fish and Wildlife Commission, 1993); and Huron Smith, “Ethnobotany of the Forest Potawatomi

Western scientific paradigms, creating beautifully written works that seamlessly share Potawatomi culture and science simultaneously.

Kimmerer's first book, *Gathering Moss*, looks at both Potawatomi and Western scientific understandings of moss ecology. Her use of personal narrative and relational understanding methods makes her work, which is also a biological and ecological history of mosses, is a brilliant example of how one can write an integrated Neshnabe/Western scientific case study. Still, it is *Braiding Sweetgrass* that is the best example of how one can share Indigenous knowledge infused with Western scientific knowledge. In *Gathering Moss*, Kimmerer is primarily focused on discussing moss from two different epistemologies. In *Braiding Sweetgrass*, she is entirely interested in sharing Potawatomi ecological, botanical, biological, and climatological knowledge, almost entirely from an Indigenous perspective.

Shifting the focus from Anishinabe political, cultural, and botanical historiography to the history of science and technology historiography, let us begin again at the broadest aspects of science and technology studies theory before looking at specific works within (or adjacent to) the history of science that are in keeping with the approaches to Indigenous American scientific knowledge. Studies like the ones to be discussed below are few and far between, but they make important contributions to the recovery of Indigenous science and to decentering the artificial binary of the West and the Rest within the history of science and technology. First we will examine and critique one of noted science and technology studies scholar Sandra Harding's more

Indians," *Bulletin of the Public Museum of the City of Milwaukee* 7, no. 1 (May 7 1933): 1-230.

recent works on post-colonial science studies, before narrowing our focus to a case study of Indigenous technological knowledge in Zimbabwe. From there, we will return to the Americas with two more works from the history of technology that focus on Indigenous Americans and different types of large scale technologies. Then, to end where we began, our discussion will focus on Indigenous American agricultural and ecological knowledge.

Not all of these texts are directly from the history of science and history of technology fields, and there are two reasons why this is important. First, interdisciplinarity is necessary in order to see the true breadth and depth of Indigenous knowledge, since Indigenous knowledge is holistic and indivisible.⁶⁵ Second, there is simply very little work done in the history of science and technology about Indigenous knowledge, therefore it is essential to expand historiographical scope to include other humanities fields when searching for case studies.

For Harding in her elementary work *Sciences From Below*, feminism and postcolonial studies are intrinsically connected because women and non-Western (or Southern, as opposed to Northern, or Western, to use Harding's language) people both experience othering and exclusion in the face of Western scientific imperialism. Non-Western women are *especially* susceptible to knowledge erasure, as both the non-dominant member of gender culture and Western culture. However, Harding notes that

⁶⁵ Waziyatawin/Angela Cavender Wilson, "Reclaiming Our Humanity: Decolonization and the Recovery of Indigenous Knowledge," in *Indigenizing the Academy: Transforming Scholarship and Empowering Communities*, eds. Devon Abbott Mihesuah and Waziyatawin/Angela Cavender Wilson (Lincoln: University of Nebraska Press, 2004): 73.

non-white, non-Western women are not necessarily benefactors of Western, white feminism, and instead remain marginalized within a framework that is built to improve the lives of white, Western, wealthy women.⁶⁶

Nevertheless, while it is true that Western feminism frequently fails to help the “Third World Woman,” postcolonial science and technology studies (or PCSTS, as she handily abbreviates) does not necessarily recognize its own eurocentrism nor its androcentrism, which causes PCSTS to fall short of addressing women’s knowledge generally, but especially for non-Western woman. This is one of the most important reasons why Harding argues that a combined approach, which she calls the feminist postcolonial standpoint, is necessary in order to engage intersectionally with scientific and technological knowledge practitioners that fall outside the mold of the white Western elite male scientist. In applying this combined methodology, Harding hopes that the effects of imperialism and eurocentrism on women will get more coverage in STS accounts.⁶⁷ Such an approach will allow scholars to “reevaluate Indigenous knowledge and traditional environmental knowledge not from the perspective of conventional Northern exceptionalist and triumphalist standards, but rather as projects which responded well, or not, to concerns of non-European societies and their peoples.”⁶⁸

While Harding makes valid points, Grande, Tuhiwai-Smith, and all of Vine Deloria Jr.’s books, just to name a few, have all emphatically and substantively argued

⁶⁶Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities, and Modernities*, Durham, NC: Duke University Press, 2008, 14-15.

⁶⁷ Ibid, 130-133, 155-158, 164-167.

⁶⁸ Ibid, 134.

the same thing. Given the fact several Indigenous authors have already argued for this methodology, I am not interested in spending time on Harding's reiteration. Arguing we should "add women" to our historical narratives, be they STS, post-colonial, or any other kind of narrative, is neither new nor exciting.⁶⁹

Additionally, while Harding succeeds in repeating the arguments of Indigenous scholars, she does so from within the confines of Western epistemology. Her problematic use of terms such as "third world," as well as her references to "traditional environmental knowledge" and "Indigenous knowledge" which she then compares to "Northern sciences" fails to bridge the epistemological divide between the West and the Rest by implicitly allowing the dichotomous terminology to persist in perpetuating difference between non-Western and Western science.⁷⁰ Lastly, while Harding advocates for "taking seriously in our own thinking the standpoint of the peoples of other cultures," Harding herself remains firmly engrossed in Western epistemology. This is evident from the fact that her entire argument is trapped within Western philosophical dichotomies such as modernity versus tradition, and North versus South, instead of attempting to consider non-Western science in its own milieu, as the Indigenous scholars mentioned above do in their works, and as this thesis strives to do.⁷¹ *Sciences From Below* is a latecomer to a conversation that has been going on

⁶⁹ Ibid, 212-213.

⁷⁰ Ibid, 138-146.

⁷¹ Ibid, 144, 215-216.

amongst post-colonialists, medical anthropologists, and Indigenous scholars for decades.⁷²

One of the only books from within the history of science and the history of technology disciplines that comes close to demanding equal treatment of Indigenous science is Mavhunga's *Transient Workspaces*. Mavhunga writes a true "insider" history of his people by masterfully using vaShona language to support his argument, and prove to "outsider" readers that the language of mobility and creative innovation comes naturally to his people, and that their knowledge, their "spiritually guided mobilities," is a technological and scientific means by which to know and shape the world.⁷³

Aside from being a balanced history from an Indigenous perspective, another noteworthy aspect of this book is that Mavhunga does not shy away from the spiritual aspect of the vaShona lifeways when he is guiding us through the vaShona tribe's traditional hunting practices, which he calls "the professoriate of the hunt." Nor does he gloss over them when he argues that in order to assert the comparable legitimacy of vaShona (and by extension, African) technologies, "the same concepts we use to

⁷² This conversation has been going on since the post-structuralist challenge to objectivity as problematized by the Subaltern Studies group, Michel Foucault, and others; in regards to the crisis of anthropology in the 1980's, see: Vincent Crapanzano, "Hermes' dilemma: The masking of subversion in ethnographic description," in *Writing culture: The poetics and politics of ethnography* (1986): 51-76; and David Chioni Moore, "Anthropology is Dead, Long Live Anthro(a)pology: Poststructuralism, Literary Studies, and Anthropology's 'Nervous Present,'" *Journal of Anthropological Research* 50 (4): 345-365.

⁷³ Clapperton Chakanetsa Mavhunga, *Transient Workspaces: Technologies of Everyday Innovation in Zimbabwe*, Cambridge, MA: MIT Press, 2014, 25-28.

analyze northern-made technology and science must be the same ones we extend to an analysis of African thought and practices.”⁷⁴

For Mavhunga, Indigenous African science, medicine and technology has its origins within the spiritual and “traditional” practices of “ordinary people”: people who are constantly engaged in creative innovation in order to survive in a forbidding economic and political climate. In the case of this work, “ordinary people” are the villagers of Zimbabwe who live in rural communities, “those of us who grew up in rural Africa [who] see the home, the village, the mountains, the valleys, and the rivers as educational and technological spaces where...innovation occurred on a daily basis.”⁷⁵ Indeed, one of the first distinctions that Mavhunga creates in his work is that while many others before him have looked at what Africans did with Northern technology once it was given to them as users, his argument gives Africans agency both as users and designers of technology. His first step towards creating agency begins when he discusses the spiritual and cultural daily practices of the vaShona and other nearby tribes in relation to Indigenous African technologies.⁷⁶

Relatedly, Mavhunga uses the idea of “the professoriate of the hunt” to also illustrate his eponymous idea of “transient workspaces,” places where technology is seen as “a means (if that is what we mean by technology) of performing specific projects of their own,” and places of contingency that are subject to physical, temporal, and cultural location and change.⁷⁷ He goes on to teach us several vaShona words that

⁷⁴ Ibid, 16.

⁷⁵ Ibid, 8-12.

⁷⁶ Ibid.

⁷⁷ Ibid, 16-20.

illustrate a traditional interconnection between ideas of work, mobility, communal cooperation, and creativity, such as “*kupambara* [which] defines clearly the idea and practice of mobility as creative work.”⁷⁸ And, while traditional workspaces such as that day’s community cattle herder and the hunting team in the forest still live on to some extent, Mavhunga also identifies new transient workspaces, typically illicit under stringent “informal” working regulations, such as roadside vending, private taxi services, and ivory smuggling.⁷⁹

Overall, Mavhunga makes a great case not only for vaShona science, but also for Indigenous science in general. The chapters directly referring to vaShona spirituality in relation to their mobilities and practices are further evidence that Indigenous spirituality should be recognized as a vital part of all Indigenous knowledge, including that which falls within the comparable realms of Western science, medicine, and technology. Additionally, Mavhunga unveils a powerful implicit imperial binary about who produces and owns science, and who uses and contaminates it:

In this particular case, the same concepts we use to analyze northern-made technology and science must be the same ones we extend to an analysis of African thought and practices. Unless we do so, we are likely to assume that the North is the domain of designers and the South of users, that ‘things northern’ are technology and ‘things African’ are primitive stuff that always give way to or contaminate ‘technology.’⁸⁰

Mavhunga’s assertion that while African (specifically vaShona, or more regionally, Zimbabwean) science and technology are different, we as historians of science and

⁷⁸ Ibid.

⁷⁹ Ibid.

⁸⁰ Ibid, 16.

technology must recognize Indigenous knowledge as comparable within the Western/Northern paradigm, or else it is all too easy for dissenting Western/Northern opinions to perpetuate stereotypes about the primitive nature of Indigenous peoples, and their inauthentic creation and use of science.

Back in the United States, Ruuska presents an excellent case study on the use of trains by Plains tribes to help spread the Ghost Dance during the late nineteenth century, and the thick layers of interaction between whites and Indigenous Americans that trains brought. Focusing on the American West, Ruuska discussed the experiences of the Western Shoshone, Lakota, Dakota, and Northern Paiute tribes. The Ghost Dance moved across the West more expeditiously because the leaders of the Ghost Dance were using trains for travel; however, this infrastructure only came about because of catastrophic and violent seizure of land by the United States government.⁸¹ Ruuska stands apart in the history of technology, as well as history of science, as one of the only case studies published *specifically in these fields* that looks at Indigenous American engagement with, and, in this case, appropriation of industrial technology for cultural uses.

The case study of uranium mining on the Navajo reservation during the mid to late 20th century is the most well-known case study in the history of science and technology that looks at the intersection between Indigenous American lives and “modern” western science. This topic produced a number of documentaries, several books, many chapters, and countless articles, all published primarily within the last 25

⁸¹ Alex Ruuska, “Ghost Dancing and the Iron Horse: Surviving through Tradition and Technology,” *Technology and Culture* 52 (3):575-576.

years.⁸² Gabrielle Hecht even touches on American uranium mining and its effects on the Navajo people in her work on uranium mining in Francophone Africa, although primarily for anecdotal comparison.⁸³ One of the books that not only does a superb job succinctly discussing the history of and ongoing problems with uranium mining in Navajo country, but also comes from an inclusive methodology and Indigenous perspective, is *The Navajo People and Uranium Mining*.⁸⁴

This book gives the reader not only a concise understanding of both the history and impact of American uranium mining in Navajo country, but also a deeply personal insight into how the *Diné* community is still impacted today through transcribed interviews with surviving miners, as well as miner's widows and extended family, as well as reports on various repercussions of the uranium industry's presence in their community; this explores topics such as psychological effects of the mining and its aftermath on Navajo people, as well as the Radiation Exposure Compensation Act and whether or not it allows for fair and feasible access to compensation.

⁸² For other titles that will not be discussed here, see Peter Eichstaedt, *If You Poison Us: Uranium and Native Americans* (Santa Fe: Red Crane Books, 1994), Barbara Johnston, *Half-Lives and Half-Truths: Confronting the Radioactive Legacies of the Cold War* (Santa Fe: School for Advanced Research, 2007), Judy Pasternak, *Yellow Dirt: An American Story of a Poisoned Land and a People Betrayed* (New York: Free Press, 2010), Sherry Smith, *Indians & Energy: Exploitation and Opportunity in the American Southwest* (Santa Fe: School for Advanced Research Press, 2010), and Traci Brynne Voyle, *Wastelanding: Legacies of Uranium Mining in Navajo Country* (Minneapolis: University of Minnesota Press, 2015).

⁸³ Her full length work, *Being Nuclear* (Cambridge: MIT Press, 2012), as well as her articles "Nuclear Ontologies" (*Constellations* 2006) and "A Cosmogram for Nuclear Things" (*Isis* 2007) include her brief discussion of the *Diné* and uranium mining. It is worth noting that the anecdotes are reasonably similar in all three publications.

⁸⁴ Doug Brugge, Thomas Benally, and Esther Yazzie-Lewis, eds., *The Navajo People and Uranium Mining*, Albuquerque: University of New Mexico Press, 2006.

The first chapter is the most important for the purposes of this project. In it, Yazzie-Lewis and Zion give us a traditional *Diné* understanding and opinion of *leetso*, or uranium, and the mining industry, and respond to questions such as what the *Diné* think about uranium? The age of atomic energy? And the vast political and military machines behind these technologies?⁸⁵ To which, they reply simply,

[The *Diné*] see uranium and materials for atomic power as a monster... [a] *nayee*... 'that which gets in the way of a successful life'...[uranium] is *leetso*, which means 'yellow brown' or 'yellow dirt.' Aside from its literal translation, the word carries a powerful connotation. Sometimes when we translate a Navajo word into English, we say it 'sounds like' something. We think *leetso* sounds like a reptile, like a monster. It is a monster, as we will explain.

Yazzie-Lewis and Zion then tell the story of how *leetso* came to be, and what it has done to the Navajo people. Using storytelling, the authors share both a historical and cultural understanding of the havoc *leetso* wrought on their communities, as well as how to be rid of *leetso*.

Navajo thought is directly relevant to any discussion of the nuclear culture....There is a Navajo saying that one should 'always beware of powerful beings.' A 'powerful being' includes any force that we do not understand well. If we do not know it...then it may be dangerous....Knowledge of [uranium] is the key to knowing how to weaken or destroy it.⁸⁶

For the authors, one of the systemic issues that allowed this to happen is the disrespect of the land and the abuse of power, which are the larger issues that must be dealt with in order to be rid of *leetso*.⁸⁷ As is clear from the preceding excerpts, the *Diné* most certainly understand uranium mining, and their own epistemologies have ethical and

⁸⁵ Ibid, 1-2.

⁸⁶ Ibid, 7.

⁸⁷ Ibid, 7-10.

empirical answers for how to handle such problems. At the root of understanding this problem, as the authors noted, is *Diné* cultural knowledge of the scientific issue at hand. One empirical pursuit that, while not always considered science, Indigenous peoples are often given credit for understanding, is agriculture. González's work is an ethnographic study of a farming community called Talea de Castro, a mostly Indigenous Mexican community nestled in the northern mountains of the state of Oaxaca. By spending a considerable amount of time with the local *campesinos* (farmers), González is able to learn firsthand how the *campesinos* use a combination of Indigenous and "cosmopolitan" science to farm the major crops of the village: maize, sugarcane, and coffee. González tells us about the cultural practices that are involved in "farming and foodways in Talea," which include "*mantenimiento* (maintenance), reciprocity, the personification of non-human...beings, the normality and inevitability of physical work, food quality," and a construction of hot and cold quality dichotomy that seems to be a pre-conquest, local, Indigenous form of humoral theory.⁸⁸

Building from this "traditional" scientific knowledge, González then compares how this Indigenous science compares to what the author calls "cosmopolitan" science, which is his comparable term for Western science. Before deconstructing the hypocrisy and discontinuities latent in Western science, González gives us a helpful, inclusive definition for the term "science" for which he draws support from Malinowski: "my position is that science, in its most essential form, is a practical quest for truths about the world—a dynamic search for effective 'knowledge, based on experience and

⁸⁸ Ibid, 13-15, 20-21.

fashioned by reason.”⁸⁹ Shortly thereafter, González builds upon this definition by noting that “a critical part of my formulation is the notion of science as *practice*, as a practical search for knowledge to understand certain aspects of the world in which actors, while constrained by certain structures... can do and transform them over time, through practice.”⁹⁰ This argument is essential to supporting his argument that Zapotec knowledge relating to agriculture (and by extension all other relevant kinds of Indigenous knowledge) fall within the purview of “science,” and should be treated as just another kind of science, one that is distinct from yet compatible with Western science.⁹¹

Indeed, González argues that the Talean *campesinos* utilize a combination of “cosmopolitan” and “traditional” science in their farming today. González even goes as far as to argue that, especially since the history of colonialization in this area is over 600 years old, it is not possible to entirely separate the two after all this time, as he argues that “local agricultural sciences have become ‘cosmopolitan’ even as ‘cosmopolitan’ sciences have become ‘localized’ because of the multidirectional movement of crops and technologies.”⁹² The co-construction of the local and global is intentionally illustrated in the author’s choice of crops to discuss: maize, a crop that was initially domesticated in North America many thousands of years before conquest; sugarcane, a crop introduced early on during colonization from Southeast Asia; and lastly, coffee, a crop brought in from Ethiopia via Europe and the Middle East, and introduced fairly

⁸⁹ Ibid, 22.

⁹⁰ Ibid, 23.

⁹¹ Ibid, 22-24, 260-262.

⁹² Ibid, 24.

recently. By discussing the cultivation of these crops, in addition to the tenants and tools of *campesino* agricultural knowledge, González creates a convincing case study to support arguments for the recognition of relevant sorts of Indigenous knowledge as legitimate science in the Western pantheon. While this methodology gives a feasible means by which to compare Indigenous agriculture to Western agriculture, and González does a little work reconciling non-Western and Western medicine, this method would have to be expanded upon to apply more broadly to technology or medical studies, or to non-agricultural forms of science. However, these are obstacles one would not expect González to account for, and his case study provides solid, case study-based evidence to support and defend the applicability of the knowledge of the Rest against Western detractors.⁹³

In particular, González's work with maize is the most relevant of the three case studies. He begins by noting that the area had been home to "highly specialized maize farming techniques that local farmers had been evolving for over 5,000 years."⁹⁴ Not only that, but he also retells local stories about the heart and soul of the maize, linking it in yet another way to the Zapotec culture.⁹⁵ His work is in many ways the most comparable to the fieldwork that I have done, and sets an excellent precedent for further research into agricultural practices and Indigenous science.

One of the fundamental texts on Indigenous ecological practices is *Sacred Ecology*. Related to González's work is one of the largest subfields of Indigenous

⁹³ Ibid, 24, 261-262

⁹⁴ Ibid, 24.

⁹⁵ Ibid, 102-105.

science: “ethnoecology” or “traditional ecological knowledge,” which Berkes defines as “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes, and handed down through generations by cultural transmission, about their environment.... [it] is a way of knowing; it is dynamic, building on experience and adapting to changes.”⁹⁶ While his terminology is problematic, Berkes provides much of the critically-needed methodological and epistemological discussion that compares and contrasts Indigenous and Western science, from the perspective of a respected outsider engaged in reciprocal, respectful research with Indigenous communities. In part a product of Berkes’ decades of research amongst the James Bay Cree, this work constructs Indigenous American ecology and situates it within the history of ecology. He then uses several case studies to illustrate how Indigenous knowledge-as-practice and knowledge-as-information works in application, with particular focus on his work with the James Bay Cree.⁹⁷ Berkes’ provides several critically important definitions as well as sound case studies that provide foundational support for Indigenous science as both an ecological methodology, as well as a scientific methodology in general.

Importantly, Berke also defines it as inextricable from “the social and the spiritual,” a key epistemological difference between Native and Western epistemologies.⁹⁸ Moreover, he delineates a set of characteristics that define and contrast Western scientific knowledge systems and Indigenous knowledge systems:

⁹⁶ Fikret Berkes, *Sacred Ecology*, 2nd ed. (New York: Taylor & Francis, 2008), 7.

⁹⁷ *Ibid*, 4-7.

⁹⁸ *Ibid*, 6, 11.

...Indigenous knowledge systems are characterized by embeddedness of knowledge in the local cultural milieu; boundedness of local knowledge in space and time; the importance of community; lack of separation between nature and culture, and between subject and object; commitment or attachment to the local environment as a unique and irreplaceable place; and a non-instrumental approach to nature.⁹⁹

On the other hand:

These features contrast, respectively, with Western scientific knowledge systems, which are characterized by disembeddedness; universalism; individualism; nature:culture and subject:object dichotomy; mobility; and an instrumental attitude (nature as commodity) toward nature.¹⁰⁰

While these definitions provide contrast between the two worldviews, they are useful because they help provide an explanation of why the preservation and acceptance of tribal knowledge is so vital. First Nations science provides perspectives that are obscured by or completely outside the limits of the rhetoric of the Western knowledge system.

Nevertheless, the most important distinction made by Berkes is that Indigenous storytelling traditions are an integral form of ecological knowledge preservation and instruction.¹⁰¹ While Berkes focuses strictly on ecology, his work further bolsters my argument for the validity of Indigenous scientific methodologies. Indeed, Berkes notes that, according to Lévi-Strauss in *The Savage Mind*, non-Western experimentation is motivated by “a curiosity-driven scientific attitude and a desire for knowledge for its own sake,” much the same as the Western scientific tradition.¹⁰² Just like Western

⁹⁹ Ibid, 11.

¹⁰⁰ Ibid.

¹⁰¹ Ibid, 6-9, 37.

¹⁰² Ibid, 10.

scientific knowledge, Indigenous scientific knowledge exists both in the form of a process and a type of information, and the validity of those knowledge claims are subject to peer critique within their own milieu.¹⁰³

In summary, these examples from both historians of science and technology, as well as anthropologists, Indigenous scientists, ecologists, and public health scholars work together to create a sense of what ethical and useful humanities research about Indigenous peoples can look like. Though only some of these studies are by Indigenous researchers for a broader audience, the other scholars in this historiography have done an exemplary job working ethically, and in most cases meaningfully, with their researched communities. While they may not make the same arguments that I do in relation to Indigenous knowledge and science, their work is foundational in supporting my own efforts as a researcher. This is particularly true of the works by Berkes, González, and Mavhunga, as their work relies on orally transmitted scientific knowledge, either in story form or otherwise.

While historiographical content may be sparse, there is considerably more written on Indigenous American and post-colonial methodologies. First, the archive and Western history will be problematized as artifacts of colonialism. Then, the tenets of Native methodologies will be discussed, before my version of a Potawatomi methodology is constructed.

¹⁰³ Ibid, 8-9, 15.

What do you do with the Enemy's Archive? : On Methodologies

As fledgling historians, many of us are taught to consider the perspective of the archives we encounter. Each archive will have its own biases, but there are also common blind spots that are particularly present in colonial archives, such as the erasure of colonized voices, of female voices, and of disabled voices. It would seem commonsensical to keep such biases in mind, in particular when examining the archives of two or more opposing nations. However, these analytical insights are frequently forgotten when Indigenous Americans are being studied. Instead of implementing post-colonial analyses of the archive as a text unto itself, many historians who purport to do “Native American History” instead only perpetuate colonial American “account[s] of their long ago dealings with the tribal nations.”¹⁰⁴ In this section, the colonial archive will be interrogated as its own text, replete with its own political, social, and racial “anxieties.”¹⁰⁵ The bias of non-tribal archives in the United States should always be considered, especially since the United States is still a settler colony. For instance, consider the archives of the Bureau of Indian Affairs (BIA). Given the fact that until the establishment of the Department of the Interior in 1849, the BIA was under the auspices of the Department of War, it is necessary to interrogate the nature of such an archive. How fair can people be about anyone they see as their enemies?

Foremost, it is important to discuss what kinds of primary and secondary resources about Indigenous American tribes are typically available in non-tribal

¹⁰⁴ Miller, “Licensed Trafficking and Ethnogenetic Engineering,” 101.

¹⁰⁵ Anne Laura Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense* (Princeton: Princeton University Press, 2009), 20.

archives. When writing about Indigenous Americans, many non-Native scholars rely heavily on BIA documents, past anthropological fieldwork and other resources not created by Native peoples for their primary sources. But when crates of reports from Indian agents and memoirs from settlers expanding west are examined as a whole, as a series of narratives, it becomes clear that these archives were constructed to document and justify the battle against Indigenous Americans. Even if historians are trained to question archival documents, to probe them for their veracity and for their prejudices, the documents themselves are fundamentally flawed way to write Indigenous American history, particularly when used without consulting the tribes themselves for their own historical knowledge. Inevitably, using only colonial sources brings about the same result: “the reconstitution, on the basis of what the documents say, and sometimes merely hint at, of the past from which they emanate and which has now disappeared far behind them...”¹⁰⁶ If these documents are not read as colonial documents and if they are not interrogated as non-Native perspectives on Indigenous Americans, the work that comes from their analysis will only perpetuate the existing racial stereotypes. This is why much of the historical work on Indigenous Americans is widely problematized across Indian Country.¹⁰⁷

¹⁰⁶ Michel Foucault, *The Archaeology of Knowledge and The Discourse on Language*, trans. by A.M. Sheridan Smith (New York: Vintage Books, 2010; Originally published in French, 1971), 6.

¹⁰⁷ There are innumerable discussions, articles, and books on the misrepresentation of American Indians. Some that have been read during the course of my research include: Vine Deloria, *Custer Died for your Sins*; Roxanne Dunbar-Ortiz, *An Indigenous Peoples' History of the United States* (New York: Beacon Press, 2015); Sandy Grande, *Red Pedagogy: Native Americans and Political Thought* (New York: Rowman & Littlefield Publishers, 2004); Devon Abbott Mihesuah, *So You Want to Write about American Indians?: A Guide for Writers, Students, and Scholars* (Lincoln: University of Nebraska Press, 2005); Devon Abbott Mihesuah, ed., *Natives and Academics:*

An excellent example of so-called “Native American History” that both fails to interrogate the archive and is heavily criticized across Indian Country is White’s *The Middle Ground* and its use of uncorroborated government ethnography to make claims of cannibalism when the Seneca were at war with the Miami, the supposedly extinct Woodlands tribe that is the focus of Trowbridge’s study. To begin, the Miami are in fact *not* an extinct tribe, and today reside in Northeastern Oklahoma, as they very much did in 1938 as well. And what about the veracity of the tale from which White solely derives his information? His sole source is what is referred to by Trowbridge as a war story from the Miami, who were the wronged tribe in the story, as recounted by a single informant, Le Gros.¹⁰⁸ However, Trowbridge’s report does not provide any evidence as to what conflict this story originated from; despite this, White goes on to claim that the story dated from the Iroquois Wars.¹⁰⁹ There is no evidence directly from the actual two hundred year old anthropological questionnaires that were distributed to “all traders and Indian agents” by longtime governor of Michigan Territory Lewis Cass upon which Trowbridge’s work was based in the early 1820’s that this cannibalism actually occurred, aside from the fact that one financially compensated informant claims it did.¹¹⁰ If this story of alleged cannibalism is read against the grain, as Stoler recommends, researchers must consider the fact that this source is fundamentally biased for a number of reasons.

Researching and Writing about American Indians (Lincoln: University of Nebraska Press, 1998); Devon Abbott Mihesuah and Waziyatawin/Angela Cavender Wilson, eds., *Indigenizing the Academy: Transforming Scholarship and Empowering Communities* (Lincoln: University of Nebraska Press, 2004).

¹⁰⁸ Trowbridge, *Meearmear Traditions*, 1, 74-77.

¹⁰⁹ Richard White, *The Middle Ground*, 3.

¹¹⁰ Trowbridge, *Meearmear Traditions*, v-vi, 1-5.

First, chronologically, this is preceding removal, but during a time when Indigenous American tribes are feeling considerable pressure from the United States government. Though Le Gros was financially compensated, as noted by Trowbridge in his letter to Governor Cass, there is also the distinct likelihood that the informants Trowbridge interviewed had personal motives such as self-preservation in mind when asked if they would cooperate with the interview process. Additionally, this source must be read as a part of the American colonial archive. When this anthropological research was pursued, Trowbridge was employed by Governor Cass as a clerk and assistant topographer. So despite the fact Trowbridge is best known as a businessman, he did this fieldwork as a government agent.¹¹¹ Due to the pugilistic nature of Indigenous American-United States relations at this time, this means that Trowbridge and his informants were on two disparate sides of a latent conflict. This is complicated further by inter-tribal conflicts, of which this narrative is reflective. Thus, within its colonial and political context, there is reason to suspect that the informants Trowbridge encountered may have had alternative motivations in recounting this story as it was, and his work should be corroborated with the very much alive Miami tribe in order to determine its accuracy.

Lastly, White's motive for including such a story, regardless of whether or not it is true, must be questioned. Why does such a salacious story appear in his work at all? One possible answer is indicated by the story's placement in his book. It is quite

¹¹¹ James V Campbell, "Biographical Sketch of Charles Christopher Trowbridge," in *Collections of the Pioneer Society of the State of Michigan, Together with the Reports of County Societies, vol. VI* (Lansing: Wynkoop Hallenbeck Crawford Co., 1907): 481-482.

possible that White included this story of warring cannibals strictly for entertainment value, especially given the fact that it appears in the first five pages of *The Middle Ground*. When this is also weighed against the fact that the story adds nothing to the thesis of the text, it seems even more likely that White included the story, regardless of its negative ramifications for present day Indigenous American stereotypic representation, just to draw in readers.

Returning to Stoler, her work is very useful in support of critiquing the colonial archive. By looking at “archiving-as-process,” Stoler is able to investigate “what insights into the social imaginaries of colonial rule might be gained from attending not only to colonialism’s archival content, but to the principles and practices of governance lodged in particular archival forms.”¹¹² Much like in the Dutch Indonesian archives with which Stoler works, the United States government records on Indigenous Americans should always be considered and analyzed as a colonial archive. As Stoler points out, the colonial Dutch archives are inextricably shaped by race and empire: “...what could, should, and need not be done or said colludes and collides on the ragged ridges of racial categories, and in the constricted political space of a never-stable, Dutch-inflected ‘colonial situation.’”¹¹³ The colonial policies enforced on Indigenous Americans since First Contact through today have created the social, racial, and cultural categories that Natives must struggle with in contemporary society. Some of those remaining trappings of empire include blood quantum disenrollment, tribal jurisdictional limitations, and the continued misrepresentation of Natives in mainstream American culture.

¹¹² Stoler, *Along the Archival Grain*, 20.

¹¹³ *Ibid*, 19.

Since the popular image of Indigenous Americans has been constructed from non-tribal sources, one way to counter this is to demand that academics consult and engage with the Indigenous communities who are their subjects. The absence of historical scholarly engagement with the living Indigenous communities is a serious flaw that has substantive consequences. Indigenous American tribes have their own living histories, and by ignoring them as a resource, scholars cannot hope to have a nuanced and multivalent understanding of any tribe. Innumerable Indigenous scholars around the globe have effectively argued that this must be one of the fundamental aims of ethical research within all Indigenous communities, regardless of whether or not the researcher is an “insider” or an “outsider.”¹¹⁴ Despite this body of work, this ethical responsibility to living subjects has not been universally acknowledged undertaken by many historians.

In order to best respond to the need for more ethical research, let us again return to Stoler. In the course of her examination of the colonial archive, she also asks us to consider the colonial archive as a textual artifact of its individual empire with its own properties; representative of all the thick things that being of-its-particular-empire entails.¹¹⁵ This approach is very useful in critiquing the archives of the United States government, because it reframes the American archive as a colonial one, despite the popular fiction that the US ceased to be a set of colonies in 1776. Instead, Stoler’s

¹¹⁴ See: Cheryl Crazy Bull, “A Native Conversation about Research and Scholarship,” *Tribal College* 1 (Jul 1997):17-26; Donald Fixico, “Ethics and Responsibilities in Writing American Indian History,” in *Natives and Academics: Researching and Writing about American Indians*, ed. Devon Mihesuah (Lincoln: University of Nebraska Press, 1998): 84-99; Margaret Kovach, *Indigenous Methodologies: Characteristics, Conversations, and Contexts* (Toronto: University of Toronto Press, 2009).

¹¹⁵ Stoler, *Along the Archival Grain*, 40-50.

approach requires researchers to center America's status as a settler colony. This is an approach that is a "commitment to the notion of reading colonial archives 'against their grain' of imperial history, empire builders, and the priorities and perceptions of those who wrote them."¹¹⁶ By reading non-Native sources on Indigenous Americans "against the grain," these primary sources can be effectively utilized alongside tribal archives, ethical fieldwork, and collaborations with tribal members in order to create a more balanced and rich Indigenous American history, while simultaneously respecting the tribes as the living descendants of historical subjects.

¹¹⁶ Ibid, 46-47.

Indigenous American Research Frameworks

“To me an Indigenous methodology means talking about relational accountability. As a researcher, you are answering to *all your relations* when you are doing research. You are not answering questions of validity or reliability or making judgements of better or worse. Instead you should be fulfilling your relationships with the world around you.”
– Shawn Wilson, “What is an Indigenous Research Methodology?”¹¹⁷

Now that we have interrogated the archive and the academy, and urged for the inclusion of Indigenous perspectives, it is time to determine what exactly an Indigenous American research perspective is, and how it differs from Western perspectives.

Kovach asserts, and I agree, that:

...[Indigenous methodologies] like any methodology [are] both a knowledge belief system (encompassing ontology and epistemology) and the actual methods...Finally, and most significantly, tribal epistemologies are the centre of Indigenous methodologies, and it is this epistemological framework that makes them distinct from Western qualitative approaches.”¹¹⁸

These assertions are critical because means that by extension, every tribe will have, to varying degrees, a different methodology informing their knowledge systems.

Understanding that there are a multiplicity of tribal understandings and methodologies is fundamental to fully understanding Indigenous American methodologies.

Nonetheless, despite the fact that no two tribes will have an identical understanding, there are some characteristics that are common across the epistemologies and methodologies of Indigenous Americans. First and foremost, as

¹¹⁷ Shawn Wilson, “What is an Indigenous Research Methodology?” *Canadian Journal of Native Education* 25, no. 2 (2001): 177.

¹¹⁸ Kovach, *Indigenous Methodologies*, 25.

Deloria Jr., and many others note, there is "...a fundamental principle of interpretation/observation that pervades everything that Indians think or experience."¹¹⁹ Central to our principles of interpretation and observation are these fundamental truths of many tribal ontologies: "we are all relatives."¹²⁰ When applied methodologically, this means that "everything in the natural world has relationships with every other thing and the total set of relationships makes up the natural world as we experience it."¹²¹ Although appearing in slightly different forms in both cases, Fixico calls this philosophical understanding American Indian circular philosophy, and Kovach refers to it as the relational aspect of Indigenous American knowledge.¹²² Wilson phrases it the best in this excerpt from his work:

One major difference between the dominant paradigms [such as positivism/post-positivism, constructivism, etc.] and an Indigenous paradigm is that the dominant [Western] paradigms build on the fundamental belief that knowledge is an individual entity: the researcher is an individual in search of knowledge, knowledge is something that is gained, and therefore knowledge may be owned by an individual. An Indigenous paradigm comes from the fundamental belief that knowledge is relational. Knowledge is shared with all of creation....It is with the cosmos, it is with the animals, with the plants, with the earth that we share this knowledge.¹²³

This description also untangles another key feature of tribal epistemology: knowledge is not owned by individuals. Rather, it is something that is given, often earned, and

¹¹⁹ Vine Deloria Jr., "Relativity, Relatedness, and Reality," in *Spirit and Reason: The Vine Deloria, Jr. Reader* (Golden, CO: Fulcrum Publishing, 1999): 33.

¹²⁰ *Ibid.*, 34.

¹²¹ *Ibid.*

¹²² See Chapter 3 of Fixico, *The American Indian Mind in a Linear World*; and chapter 2 and 3 of Kovach, *Indigenous Methodologies*.

¹²³ Sean Wilson, "What is an Indigenous Research Methodology?" *Canadian Journal of Native Education* 25, no. 2 (2001): 176-177.

belongs to no one, and also everyone. Knowledge is meant to be shared so that all can benefit.

Some other aspects of Native epistemologies that transcend tribal differences are the holistic nature of Indigenous knowledge, a focus “on the metaphysical and pragmatic,” and the importance of language and place in tribal epistemologies.¹²⁴ The holism of Indigenous knowledge is one of its greatest epistemological differences with modern Western science, which typically considers itself to be free of anything metaphysical. For tribal people, knowledge does not need to be separated into categories; instead, it is meant to be observed and interpreted by the individual, reflecting the pragmatism mentioned earlier. Indigenous knowledge is also focused on change: “Nothing is transfixed. Nothing is secure or stable or permanent, and Indian people have accepted this situation.”¹²⁵ This is fitting with the cyclical principles shared by many Indigenous Americans, because the nature of a cyclical system is intrinsically that of change. Finally, language and place are fundamental to tribal epistemologies because our languages preserve our ceremonial ways, and our homelands home to our medicines, our sacred places, and our ancestors. If we lose connection to either of those things, we risk losing the knowledge tied to them forever.

It is worth noting that there are a few aspects of Indigenous methodology that I will not discuss in any great detail. These facets are primarily in regard to Native scientific concepts that relate to the metaphysical, such as discussions of “metaphysics through creation myths...and an energy source that Indigenous people describe as the

¹²⁴ Ibid.

¹²⁵ Fixico, *The American Indian Mind in a Linear World*, 44.

sacred,” and some of the more spiritual aspects of temporality and space.¹²⁶ Despite the fact that our ceremonial beliefs play a fundamental role in our knowledge-making, these are not topics that are applicable directly to the science that I am discussing in my case study. Ontologically, speaking from my position as a young member of our ceremonial community, I do not feel that I have the experience necessary to claim any sort of expertise in the situation. My epistemology as a member of the Potawatomi community recognizes that I am both new and young, and as such I would want many years to think on our teachings before professing any mastery of our metaphysics.¹²⁷ Elders are typically consulted to learn such information, not young researchers. As such, I want to stay within the bounds of my roles in my ceremonial community.

Another fundamental aspect of Indigenous American methodologies, particularly in relation to science, is the use of stories and oral history as integral sources. As historian of technology Carolyn de la Peña notes when she calls for more work that intersects with race,

The sticking point seems to be the challenge of translating such calls into action. Part of the difficulty is the process of conducting the research upon which all historical scholarship must rest. We cannot rely on the archives or methods that have well served many others engaged in the history of technology to serve the study of race and technology.¹²⁸

¹²⁶ Kovach, *Indigenous Methodologies*, 57.

¹²⁷ For some further reading on Indigenous American metaphysics/philosophy/etc., see: Donald Fixico, *The American Indian Mind in a Linear World*; the numerous works of Vine Deloria, Jr.; and Ed McGaa, *Native Wisdom: Perceptions of the Natural Way* (Minneapolis: Four Directions Publishing, 1995).

¹²⁸ Carolyn de la Peña, “The History of Technology, the Resistance of Archives, and the Whiteness of Race,” *Technology and Culture* 51, no. 4 (October 2010): 921.

One way to solve this archival and methodological dilemma is to integrate oral history and ethnographic fieldwork into the historical research program. In my own research, the way I have chosen to subvert the colonial and institutional archives is by using Potawatomi stories that I have personally gathered as one of my primary scientific sources. This is because “in an Indigenous context, story is methodologically congruent with tribal knowledges.”¹²⁹ These stories, while similar to oral histories in that they are recounted orally, defer significantly in content, particularly in the context of the stories I will share in my case study. These are not just retellings of the astronomical and ecological observations themselves. Rather, they are also cultural teachings that emphasize characteristics valued by the Potawatomi, such as courage and wisdom. These stories were never meant to exist strictly as data, because, for Indigenous Americans, they are “active agents within a relational world, pivotal in gaining insight into a phenomenon.”¹³⁰ Further, “Oral stories are born of connections within the world, and are thus recounted relationally. They tie us with our past and provide a basis for continuity with further generations.”¹³¹ Our traditional stories are not only historical, but also cultural, moral, scientific, and instructive. They are spoken archives, lovingly tended to and shared by generations upon generations of Native people across the Americas. Indeed, “as a form it is no wonder that narrative is the primary means for passing knowledge within tribal traditions, for it suits the fluidity and interpretive nature of ancestral ways of knowing.”¹³² Our stories transmit ideas and practices that are

¹²⁹ Kovach, *Indigenous Methodologies*, 35.

¹³⁰ *Ibid.*, 94-95.

¹³¹ *Ibid.*

¹³² *Ibid.*

reified and preserved with each telling, yet must be understood within their socio-cultural milieu. This is not because stories cannot be comprehended by all, or that they are ineffective means of preserving and communicating knowledge. Instead, “what is contested...is that story is an apolitical, acultural method that can be applied without consideration of the knowledge system that sustains it.”¹³³ For example, the use of a different knowledge system from that of the tribe of origin to attempt to analyze a Potawatomi story, or a Seminole story, or a Cree story will most likely miss the point. Or, as decades of anthropology such as Clifton’s study of the Prairie Potawatomi proves, there is the potential to completely misrepresent the knowledge of a given tribe, and do them harm in the process.¹³⁴

Potawatomi science is fundamentally local, as is the science of any other tribe. Yet at the same time, our stories contain scientific “facts,” particularly about ecology, botany, and astronomy that “are portable to other sites.”¹³⁵ As Kovach affirms:

Stories are vessels for passing along teaching, medicine, and practices that can assist members of the collective.... The interrelationship between story and knowing cannot be traced back to any specific starting time within tribal societies, for they have been tightly bound since time immemorial as a legitimate form of understanding.¹³⁶

Within Indigenous knowledge systems, stories and storytelling are valid textual sources, and while these sorts of orally-transmitted texts are not traditionally considered canonical within many Western methodologies, this is a difference that reaffirms the

¹³³ Ibid, 97.

¹³⁴ Ibid.

¹³⁵ Ibid, 47.

¹³⁶ Ibid, 95.

need for Indigenous methodologies. Relatedly, it is not a difference that should be allowed invalidate Indigenous knowledge sources just because they are from a different social-cultural paradigm.

One critique of using stories as historical sources that I have encountered in particular is the Western assumption that our narrative traditions are static, unchanging over innumerable years. What Western scholars recognize here as static temporality is actually a non-linear conception of time, and an integral part of the Indigenous American worldview. Our stories are tied to places, and transcend linear time rather than replicate it.¹³⁷ Instead,

All three parts of linear time—past, present, and future—are a part of the American Indian circular understanding¹³⁸ of a time continuum. Told again and again, a story's power becomes known and acknowledged such as a person of known reputation, for example, as good or bad story, interesting or dull, short or long, and so forth.¹³⁹

Conclusively, stories are central to Native epistemologies and methodologies, particularly in relation to science.

These are only some aspects of an Indigenous American methodology. While not comprehensive, this overview is intended to educate the broader scholarly community about how Native epistemologies and methodologies vary from prominent Western methods such as triumphalism, constructivism, and even critical theory. It is

¹³⁷ Ibid, 96.

¹³⁸ Fixico explains Native circular philosophy to mean that “the native world is one of cycles, and observing the cycles provides an order to life and community.” (42) Additionally, as Kovach has discussed, relationships and interconnectedness are also central to this ontology.

¹³⁹ Fixico, *The American Indian Mind in A Linear World*, 27.

also meant to head off some common critiques of Indigenous research paradigms, particularly in regards to centering work around a specific tribal epistemology.¹⁴⁰

Kovach observes that:

Primarily, these questions have come from non-tribal people who are well versed in methodology...but are new to Indigenous knowledge. Furthermore, there is a political dimension to this problematizing that has its roots in colonial history, and often manifests itself in discourses of disbelief, and, within research circles, a desire for universal application.¹⁴¹

This assertion supports my argument that much of the academic resistance to accepting Indigenous knowledge centers on colonial constructions of racial inferiority, as well as Western positivism, particularly in relation to science.

Another reason that asserting individual tribal epistemologies is vital to the decolonization of academia is that this allows Natives to assert their own tribal identities, and escape from under homogenous stereotypes of Indigenous Americans. Subsuming all tribes under a single, artificially constructed idea of “the American Indian” perpetuates harmful stereotypes, and makes it that much easier to continue erasing Native culture and its heterogeneity. Finally, and more simply put, “Indigenous people contextualize to their tribal affiliation.”¹⁴² Methodologically speaking, we identify tribally because our knowledge is the knowledge of our tribe(s), including tribal history, language, place, and culture. Without this level of specificity, we can explain the data, but not the knowledge system.

¹⁴⁰ Kovach, *Indigenous Methodologies*, 37.

¹⁴¹ *Ibid.*

¹⁴² *Ibid.*

Perhaps the most important aspect of Indigenous research for all academia to understand is how to work with Indigenous communities ethically. Centuries of unethical research done by non-Native investigators has set a terrible precedent in Indigenous American communities. In order to rectify this, numerous Native scholars have written on how to do research ethically (as either a tribal or non-tribal person) within Indigenous communities. I will primarily focus on the works of Crazy Bull and Fixico, however this is only a sampling of possible authors to consult.¹⁴³

One of the most important tenets of ethical research in Indigenous American communities is what we, as researchers, should always make sure that our work gives back to the community with which we are working. So what do Indigenous Americans want to come of research for and about their communities? As Crazy Bull asserts at the beginning of her article:

We, as tribal people, want research and scholarship that preserves, maintains, and restores our traditions and cultural practices. We want to restore our Native languages; preserve and develop our homelands; revitalize our traditional religious practices; regain our health; and cultivate our economic, social, and governing systems. Our research can help us maintain our sovereignty and preserve our nationhood.¹⁴⁴

Relatedly, tribal communities want to hold researchers accountable for their work.

“Researchers who make brief visits and then leave are no longer welcome,” especially if their work does not benefit the community.¹⁴⁵ This is why some tribes have their own

¹⁴³ Other authors who have written on this topic include Vine Deloria Jr., Margaret Kovach, Linda Tuhiwai Smith, and Sean Wilson; There are many more besides.

¹⁴⁴ Cheryl Crazy Bull, “A Native Conversation about Research and Scholarship,” *Tribal College 1* (July 1997): 18.

¹⁴⁵ *Ibid.*

research oversight committees that take applications from outside researchers, and require extensive cooperation in order to gain research permissions.

Fixico focuses specifically on how to ethically write histories of Indigenous Americans. He specifically indicts historians for unfairly representing Native peoples, and for failing to actually write about the Native perspective on historical events.¹⁴⁶ In order to do so, it is imperative that historians contact the tribes about whom they are writing, in order to gain a better understanding of the tribe's own history of those events, as well as their culture. As discussed earlier on in the methods section, without an understanding of a tribe's epistemology and methodology, one cannot wholly understand their perspective.

Quintessentially, ethical qualitative research projects in Indian Country require the researcher to respect tribal communities, their members, and their opinions, wishes, and requests. While this is a simplification, it is the truth at the heart of what all Indigenous scholars discuss in their treatment of Indigenous ethics. This means that Indigenous communities should be fully and fairly compensated for their knowledge, in reference to bioprospecting and other sorts of knowledge mining, and should not be exploited, even if their own life ways do not dictate that they ask for compensation for their knowledge. This means that tribal people should be told how the knowledge you are asking for is going to be used, and allowed to decide if they wish to participate based on a full understanding of how widely disseminated their knowledge will

¹⁴⁶ Donald Fixico, "Ethics in Writing American Indian History," in *Natives and Academics: Researching and Writing about American Indians*, ed. Devon Abbott Mihesuah (Lincoln: University of Nebraska Press, 1998): 90-91.

become. This means so many other things, but fundamentally, this means researchers should treat Indigenous communities as research collaborators, not just as objects to be researched.

Toward A Potawatomi Research Paradigm

As has been previously mentioned, all Native epistemologies and methodologies are tribe-specific. Thus, the heart of my work is my own Potawatomi research method. The key epistemological and methodological qualities of this paradigm include: self-reflexivity; ethical fieldwork and archival practices; giving back to the community; and research input and oversight from respected tribal members and Elders. As seen earlier on in my thesis, self-reflexivity has an imperative role in my research, both in understanding my ontology and in shaping how I do my research. In this section, I will break down how the other three facets of my own methodology shaped not only my fieldwork, but also my thesis.

As Kovach emphasizes in her chapter on Indigenous research frameworks, my primary concern in doing primary research within my community is making sure that my research has been done in a good way, and in keeping with tribal ethics.¹⁴⁷ To this end, I have asked not only the person I have interviewed but also other members of our tribe, including Elders, to look over my work and provide feedback, so that I can make sure that my research is not in any way harmful to the community. Additionally, I purposefully included a clause in my research guide and on my IRB consent forms that states that I strongly discourage anyone from participating that does not wish to be identified by name in my work, in keeping with the sort of name identification Kovach notes is used as a form of accountability in oral cultures.¹⁴⁸

¹⁴⁷ Kovach, *Indigenous Methodologies*, 48-49.

¹⁴⁸ *Ibid*, 49.

In regards to the types of stories I gathered, I specifically asked about stories that pertained to astronomy, the weather, or planting, but I also invited my collaborator to share any additional stories they wished. Also, being aware of the cultural restrictions on telling winter stories out of season, I requested to only be told stories that could be shared all year round. I have likewise intentionally chosen to only provide a summation of the stories that I have gathered, as opposed to the full text of the transcriptions. This is to further ensure that my fieldwork cannot be accessed by other researchers without the express permission of tribal members.

I selected my possible interview subjects from a group of Citizen Band Potawatomi tribal members that are familiar with our cultural teachings, and are involved in our community. I intentionally sought out tribal members who knew traditional life ways stories, and that could speak Potawatomi. In the end, I interviewed Justin Neely, who is the director of the language department at the Citizen Potawatomi Nation Cultural Heritage Center, and is a highly proficient *Bodéwadmimwen* speaker. He allowed me to record our interviews, which I then transcribed. In total, three interviews were taken over the course of two months. The average length of the interviews is forty-five minutes, with some as long as an hour and fifteen minutes. As specified on my consent forms, all transcriptions and audio files will only be archived with myself and the Citizen Potawatomi Nation Cultural Heritage Center, thus leaving control over the research in tribal hands. A copy of my thesis will also be archived with the Cultural Heritage Center, as well as at the University of Oklahoma and on their online repository ShareOK. The University of Oklahoma will at no time have access to my transcriptions or audio recordings.

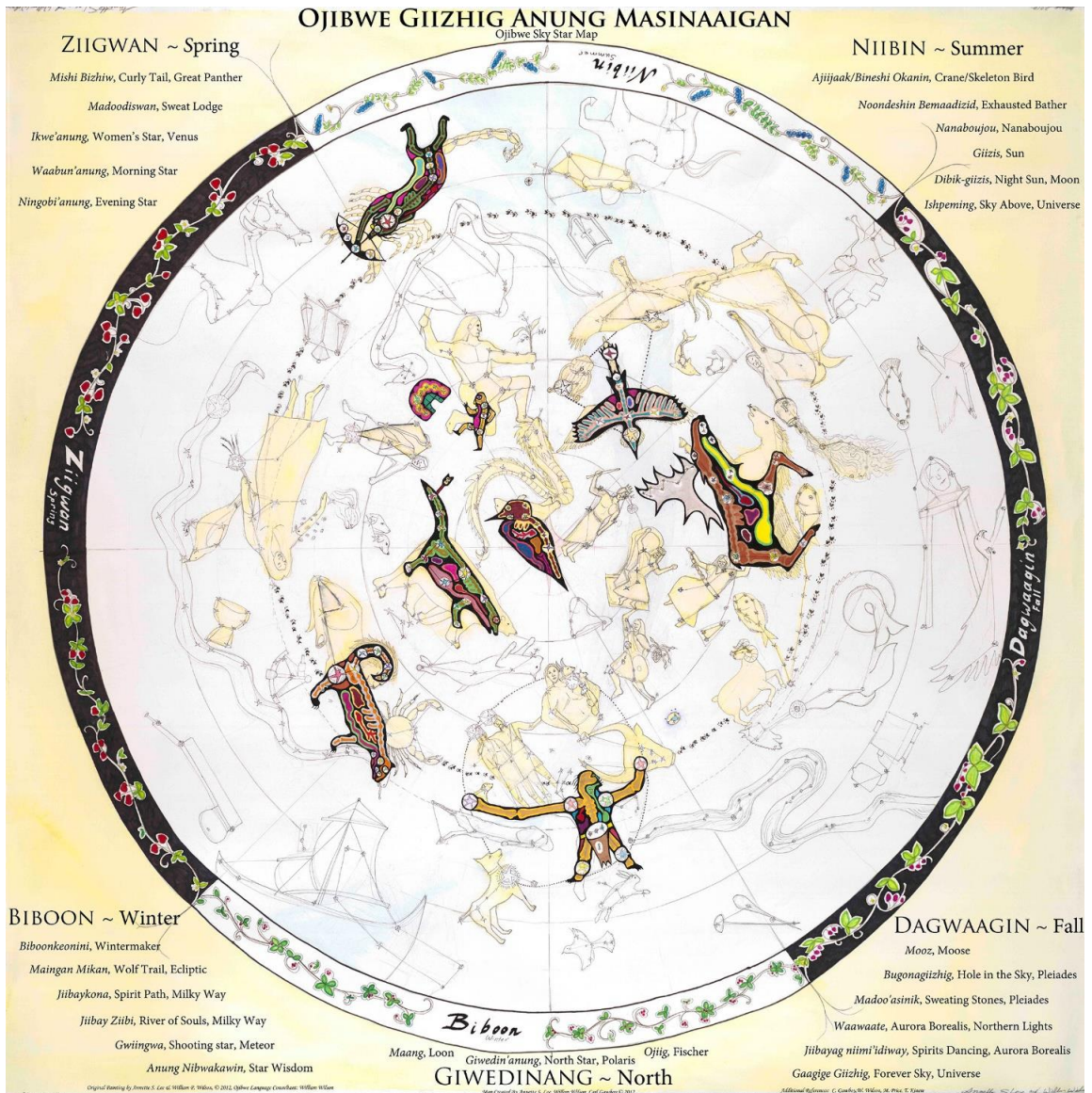
The other reason I wish for these transcriptions and recordings to be archived with the Citizen Potawatomi Nation is that I wanted to give tribal members an opportunity to learn more of our stories, as there is currently no published collection of Potawatomi stories, and there are only a few individual stories that are available otherwise. My hope is that tribal members from around country (and even internationally) will be able to read or listen to these stories if they so desire, even if they cannot make it to the Shawnee area. This is one way I hope to give back to my community by doing this research.

Hence, not only is it imperative to my Potawatomi research paradigm that my fieldwork is not at any time outside the control of our tribal community, where tribal members can make sure that any subsequent work created from that research can be overseen by the community, but, in keeping with tribal ethics, I am attempting to contribute something helpful and meaningful to my community through my fieldwork.¹⁴⁹ Fundamentally, these preparations, such as collaborating with Elders and respected tribal members, making conscientious archival decisions, and writing my research guide, have given me the means to do this research in the best way that I can. As Kovach affirms: “However we define it, [preparation] is about doing the work in a good way. If we are attuned to the ancestors, Indigenous researchers know what this means and that it matters deeply.”¹⁵⁰

¹⁴⁹ Ibid, 44-49.

¹⁵⁰ Ibid, 50.

*Neshnabe Negos Mbwakawen*¹⁵¹



Ojibwe Giizhig Anung Masinaaigan - Ojibwe Sky Star Map, a Native Skywatchers star map created by A. Lee, W. Wilson, C. Gawboy, ©2012. Used with permission.

¹⁵¹ Potawatomi for “Potawatomi/Indian Star Knowledge”

The *Bodewadmi* share a complex cosmology and astronomy with the Ojibwe and the Odawa. Unfortunately, due to culture loss as a result of forced assimilation and removal, tribal star knowledge is in danger of being lost. Thanks to the Native Skywatchers, a Native American astronomy initiative directed by Annette Lee at St. Cloud State University, some resources are available online and in print.¹⁵² The above star chart is one of these resources.

To begin our analysis, the Native Skywatcher's *Ojibwe Giizhig Anung Masinaa'igan* (Ojibwe sky star map) is oriented with the Northern stars at the bottom of the circle, in conjunction with the *Biboon* (winter) stars. Then, moving clockwise from the bottom are the *Ziigwan* (spring), *Niibin* (summer), and *Dagwaagin* (fall) constellations. Looking at the map, one will notice that there is an inner circle of tracks, which indicates the *Maingan Mikan*, the Wolf Trail, which is the Ojibwe name for the ecliptic. The fully colored Woodlands style x-ray figures indicate the constellations discussed in detail by Lee and her collaborators in *Ojibwe Giizhig Anung Masinaa'igan*. The rest of the constellations appear to be from a mixture of cosmologies.

In the Winter/Northern quadrant of the chart, we find *Ojiig* (the fisher) and *Maang* (the loon) constellations, which are known as the Big and Little Dipper respectively in the Arabic/Hellenistic tradition.¹⁵³ Additionally, *Biboonikeonini/Pondese*, Old Man Winter, can also be seen in the sky.¹⁵⁴ *Pondese*

¹⁵² Both the star map and the book used to supplement my fieldwork are from their program.

¹⁵³ Annette Lee, William Wilson, Jeffrey Tibbetts, and Carl Gawboy, *Ojibwe Giizhig Anung Masinaa'igan: Ojibwe Sky Star Map Constellation Guide: An Introduction to Ojibwe Star Knowledge* (Ingram Spark, CA: Lightning Source, 2014), 40.

¹⁵⁴ *Ibid.*

encompasses parts of Orion, Canis Minor, and Taurus.¹⁵⁵ Lastly, *Giiwedin Anang*, Polaris, is placed in this quadrant, although it is visible all year round.¹⁵⁶ Some additional celestial objects are also shown in this quadrant: the Milky Way, which is known as *Jiibaykona* in Ojibwe and *Jibé Meyew* in Potawatomi. Both of these names translate to “the spirit path.”

Moving to the Spring quadrant, the two constellations that reside here are:

Madoodiswan (The Sweat Lodge), also known as Corona; and *Gaadidnaway* or *Mishihizhii* (Curly Tail or the Great Panther), which contains parts of Leo and Hydra.¹⁵⁷

However, in the above star chart, Lee et al. have also placed Venus, who is known to *Neshnabek* people by several names. One of the names Venus has is *Ikwe Anang* (Ojibwe)/*Kwe Negos* (Potawatomi), the Women’s Star, in part because of the planet’s synodic period, split in half, of which the two halves are each the same length as average human gestation.¹⁵⁸ Indeed, complex *Anishinaabe* knowledge of Venus’ orbit is supported by the authors:

The first understanding is that native Ojibwe people carefully observed the motion of Venus each day/night and found patterns in the movement. The pattern of Venus’ movement as seen from as seen from an observer on Earth is that Venus will appear in the East before sunrise (the Morning Star) and then in the West just after sunset (the Evening Star). As a person watches Venus in the morning for about nine months, it disappears for a short time and then reappears in the opposite sky at sunset for about nine months....This is why Ojibwe and other Indigenous cultures have associated Venus with the feminine.¹⁵⁹

¹⁵⁵ Ibid.

¹⁵⁶ Ibid.

¹⁵⁷ Ibid.

¹⁵⁸ Ibid, 30-31.

¹⁵⁹ Ibid.

Looking again to the star map, we see that alongside *Ikwe Anang*, the other Ojibwe names for Venus are listed: *Waabun'anung*, the Morning Star; and *Ningobi'anung*, the Evening Star.¹⁶⁰

In the Summer quadrant, many more constellations appear. *Ajijiaak/Bineshi Okanin*, the crane or skeleton bird (represented by Cygnus in the Arabic/Hellenic tradition) appears early on during summer nights.¹⁶¹ *Noondeshin Bemaadizid*, the Exhausted Bather, and *Nanabozho* also appear during the summer. The Exhausted bather is an early summer constellation, represented as Hercules in Greek cosmology.¹⁶² *Nanabozho*, or Scorpio, is seen fighting against Curly Tail in the midsummer.¹⁶³ Although they are not pictured in the chart, *Giizis* (the Sun) and *Dibik-giizes* (the Moon, literally “the Night Sun”), and one of the names for the universe, *Ishpeming*, are also given. *Dibik-giizes* is one of the most temporally important celestial bodies for *Neshnabe* people because of the *Neshnabe* lunar calendar.¹⁶⁴ The names of the thirteen lunar months reflect traditionally important activities that occur during that month.

Given seasonal variations across the United States and Canada, the names of the moons in this calendar vary from community to community. For example, in Shawnee, Oklahoma where the Citizen Band resides, *Démin Dbekgises*, the strawberry moon, occurs in May, while in Hannahville, it occurs in June; the differences between the two calendars reflect differences in regional crop ripening times. Some of the moon names

¹⁶⁰ Ibid, 40.

¹⁶¹ Ibid, 16.

¹⁶² Ibid, 15.

¹⁶³ Ibid, 17.

¹⁶⁴ Ibid, 32-34.

differ entirely from band to band. Here in the south the climatological conditions are not conducive to tapping maple trees like they are in the north. Subsequently, neither Prairie Band nor Citizen Band have a *Zibaktoge Dbekgises*, or maple sugar moon, on their calendar, despite the fact that maple syrup making is a very important aspect of our culture. The seasonal and lunar observations required here indicate that the *Anishinabe* peoples maintain and have maintained ongoing sets of natural observations in order to both establish and adapt a lunar calendar over time.

To conclude our overview of the star chart, we come to the Autumnal quadrant of constellations. The Pleiades are known by two names in Ojibwe, *Bagone'giizhig* (the Hole in the Sky) and *Madoodoowasiniig* (The Sweating Stones).¹⁶⁵ These two names refer to two different ceremonial practices, however, the Seven Sisters as they are also known represent a means to connect with the spirit world for *Anishinabe* people.¹⁶⁶ The other autumnal constellation is *Mooz*, or Moose, a constellation taking shape from Pegasus and Lacerta.¹⁶⁷ *Mooz*, like *Maang* and *Ajijaak*, is a clan animal of the Ojibwe, which is why it is represented in a constellation.¹⁶⁸ Lastly, *Jibayag Niimi'idiwa* (Spirits Dancing) or Aurora Borealis is mentioned in this quadrant, although not pictured.

From this analysis of the *Ojibwe Giizhig Anung Masinaa'igan*, it becomes clear that the *Neshnabek* peoples of the Great Lakes region possess a complex astronomical understanding. Some of the astronomical details that stand out are the place-based thirteen month lunar calendar characteristic of both Potawatomi and Ojibwe tribes, as

¹⁶⁵ Ibid, 22-23, 40.

¹⁶⁶ Ibid.

¹⁶⁷ Ibid, 20.

¹⁶⁸ Ibid.

well as an understanding of detailed and consistent observations of celestial bodies such as Venus. So how does this knowledge persist in tribal communities? Generally, it is through intergenerational instruction of cultural teachings and the communal sharing of stories, some of which tell the origins and meanings behind the *Neshnabe* constellations. For this thesis, I will discuss two stories from my interviews that are about one of the Northern and one of the Winter constellations, respectively: *Ojik Negos* – *The Fisher Star*, and *Pondese* – *Old Man Winter/The Wintermaker*.

In the story of the *Ojik Negos* (the Fisher Star) Fisher, a large member of the weasel family related to the marten, decided he wants to bring warm weather to his animal friends, as well as the *Neshnabe* people, because at the time the earth was very cold. Fisher gathered his friends Lynx, Otter, and Wolverine and told them of his plan to break a hole in the barrier between the earth and Skyland, because Skyland was always beautiful and warm. After great effort, the animals were able to break a hole in the barrier between the two places. Working frantically, Fisher was able to make a hole big enough to allow the warm air and the birds escape down to the earth, but he was mortally wounded by the humans of Skyland in the process. However, *Mamogosnan*, the Creator, took pity on Fisher because Fisher only wanted to make a better life for everyone. So, *Mamogosnan* placed Fisher in the sky, so *Neshnabe* people would always be able to look up and remember him and his sacrifice for them.¹⁶⁹

¹⁶⁹ This a traditional *Bodéwadmi* story, presented here in summary, based on my own transcription of my fieldwork interviews. Justin Neely, “Interview by Author #1,” CPN Cultural Heritage Center, February 2 2016.

The Fisher constellation is the *Neshnabek* name for Ursa Major, or the Big Dipper.¹⁷⁰ One of the northern circumpolar constellations, Fisher is always visible for any *Neshnabek* living along or north of the 35th parallel (north) in North America. In the Ojibwe telling, Fisher saves spring and the birds from ogres, which is very similar to the Potawatomi story. The fisher is also an animal that is always travelling, making dens wherever it ends up instead of returning home; this is reflected by the Fisher constellation, which moves around the North Pole endlessly. Fisher is also neither diurnal nor nocturnal, instead preferring to rest as necessary.¹⁷¹ As the *Native Skywatchers* note, “the correlation between sky and earth, or above and below, is an important underlying theme in Ojibwe star knowledge and reflects a keen sense of observation.”¹⁷² The Potawatomi, as noted earlier in the Potawatomi history section, have a lot of cultural similarities with the Ojibwe, so it is reasonable to assume great similarity between the two tribe’s astronomy.

During the interviews, we also discussed what the constellation meant to the Potawatomi people. According to Justin Neely, this particular constellation is also indicative of the seasonal shifts, and is easiest to see in the springtime, and is harder to see in the wintertime.¹⁷³ This likely reflects the fact that we are at a lower latitude than our northern kin, where the northern stars are most certainly less obscured.

¹⁷⁰ Lee et al., *Ojibwe Giizhig Anung Masinaa`igan*, 1-2, 4-5.

¹⁷¹ *Ibid.*, 4.

¹⁷² *Ibid.*

¹⁷³ Justin Neely, “Interview by Author #1,” CPN Cultural Heritage Center, February 2 2016.

The next constellation, known as *Biboonikeonini* in Ojibwe (*Anishnaabemowin*) and *Pondese* in Potawatomi (*Neshnabemowin*) is one of the winter constellations in *Neshnabek* cosmology. The body of the Wintermaker constellation is similar to that of Orion, “but the left arm stretches into Canis Minor and the right arm [into] Taurus. Altogether, Wintermaker...is about four times the angular diameter of Orion.”¹⁷⁴ Indeed, “his outstretched arms rule the winter sky.”¹⁷⁵ Additionally, like *Ojik Negos*, *Pondese* is another constellation that marks the arrival of spring.

Pondese's (a winter *mnedo*) story begins with *Mnokme* (a spring *mnedo*) walking through the forest. She suddenly happens upon a *wigwam* (house), and she is invited in to visit by the *kewezi* (old man) who lives there. Unbeknownst to her, the old man is *Pondese*, and he challenges her to a spirited debate over whose powers are more impressive. Despite *Pondese*'s fearsome command of ice and snow, in the end, *Mnokme* wins the day, and defeats The Wintermaker. *Pondese* disappears, leaving only the first trailing arbutus of spring behind in his stead. This small pink or white flower is known to the *Bodewadmi* as one of the first flowers to bloom when spring first comes.¹⁷⁶

In the story of *Pondese*, when Old Man Winter melts after losing his debate to *Mnokme* his disappearance marks the beginning of the new season. This echoes the disappearance of his constellation in the night sky; when Wintermaker no longer appears, spring has begun. As is true for many cultures across the globe, the stars are used by the *Neshnabek* to keep track of the seasonal changes. Given the fact that the

¹⁷⁴ Annette Lee et al., *Ojibwe Giizhig Anung Masinaa'igan*, 27

¹⁷⁵ Ibid.

¹⁷⁶ See footnote 81.

Neshnabek people are originally from the northern part of the United States and the southern part of Canada, preparing for and surviving the winter was a central part of our lives, as it still is for those who reside in the north. Subsequently, several stories mention different ways to know that spring is on its way.

There are also cautionary stories about the dangers of winter, such as the *Windego* stories, which tell of the terrifying monsters that feast on people who are not properly prepared for winter, or who are greedy.¹⁷⁷ The reason the latter are also in danger is because greedy people hoard food and are willing to let other members of the community starve in order to keep what they consider theirs. Indeed, as the well-respected Anishinaabe scholar and author Basil Johnston notes about the *Windego* stories, “At root is selfishness, regarded by the *Anishinaubae* peoples as the worst human shortcoming.”¹⁷⁸

These constellation origin stories, in conjunction with the *Anishinaabe anang nibwakawin* (or *Neshnabe negos mbwakawen*, in Potawatomi) gathered by Lee and her team, support the argument that there is a long-standing scientific tradition rooted in observation and deduction amongst the Potawatomi and Ojibwe, and by extension, Indigenous American tribes in general. However, in their narrative form, the stories of *Ojik Negos* and *Pondese* not only relay scientific information to *Nishnabe* people, but also share important cultural teachings with future generations. For instance, in *Ojik*'s quest to help make Earth a warmer place to live for his friends, he had to put the needs

¹⁷⁷ Justin Neely, “Interview by Author #2,” CPN Cultural Heritage Center, March 1, 2016.

¹⁷⁸ Basil Johnston, *The Manitous: The Supernatural World of the Ojibway* (New York: HarperCollins, 1995), 223.

of the community ahead of his own, even if this proved fatal. Stories of this nature are common amongst Potawatomi people, and across Indian Country in general, since one common shared characteristic across Indigenous American peoples is that we are community oriented, as opposed to privileging the individual over the rest.

Consequently, even scientific *Bodéwadmí* stories do not have only one meaning, because our knowledge is holistic and interconnected. This is in keeping with Fixico's observations of Indigenous American circular philosophy:

...all things are related and involved in the broad scope of Indian life. As part of their life ways, the Indigenous peoples of the Americas have studied the Earth, observed the heavenly bodies and contemplated the stars of the universe....All such things are in a vast continuum that Albert Einstein referred to as circular in form.¹⁷⁹

As such, Indigenous American scientific epistemology is in this case fundamentally opposed to the isolation of the scientific enterprise as is pursued in the West. Because our science is firmly rooted in our cultural life ways, storytelling is the perfect methodology for Indigenous scientific instruction.

The versatility of Indigenous storytelling is demonstrated not only by these astronomical stories, but also by the authors from the historiography. Berkes, Brugge et al, González, and Mavhunga particularly drew from Indigenous storytelling for their analysis of Indigenous science. For Mavhunga, this is shown in his discussion of the professoriate of the hunt. For Berkes, this tradition is alive in his recording and utilization of James Bay Cree fish farming knowledge. For González, *campesino* stories about corn are shared alongside centuries of agricultural science. For Brugge, Benally,

¹⁷⁹ Fixico, *The American Indian Mind in a Linear World*, 42.

Yazzie-Lewis, and their collaborators, stories about *leetso* inform Diné nuclear policy. These are all brief examples of how these authors used Indigenous story knowledge to share Indigenous scientific knowledge with the Western academy, just as I hope to do with my own work.

Another factor that synthesizes both my research and the research of my historiography is that, regardless of tribe or country of origin, across all Indigenous knowledge, biological, ecological, and geological knowledge is fundamental to Indigenous epistemologies and philosophies. Relatedly, Indigenous knowledge is necessarily local, as it is tied to the homelands of the people. Nevertheless, this knowledge can still be transferred to new locations, with profound adaptability. One such example, as mentioned in my research section, are the Potawatomi lunar calendars. The location-specific changes made not only between the northern bands, but particularly between the northern and the southern bands, proves that Potawatomi astronomical knowledge is incremental as well as adaptable. Regardless of where Indigenous Americans are transplanted, our scientific knowledge can readily adapt to new wildlife, plants, weather, and geography, as long as we still have our stories.

Conclusion

To conclude, it is important to consider where this research can go in the future, and who it benefits. To answer the latter, I must return to self-reflexivity. There is a set of questions that I did not address in my reflexivity essay, but is critical to my ontology as a Native scholar: after 500 years of genocide and the denial of our personhood, why should I try to persuade this colonial institution that our cultural capital matters now? Why should I try to communicate with the colonizer, when the very nature of our relationship means that this opportunity mutual recognition is uneven?¹⁸⁰ What could we possibly gain from their acceptance?

I have two reasons. First, as a master's candidate, I was able to claim, assert, and defend my own cultural space within my department where such communication could happen; a space where Native knowledge was respected, and allowed to persevere. This was only possible because of substantial support from several faculty members within the department. As a result, I have been able to, at least temporarily, help bring Indigenous knowledge into our department, and help faculty members learn about Native knowledge and culture.

The second, more important reason, is that representation is critical. The more Indigenous Americans there are getting advanced degrees, the more space is created for our youth to follow behind us, and excel far beyond us. By fighting for an authentic Potawatomi research project, I hope to show other Native students, current and future, that our knowledge has a place in the sciences. And, by extension, our youth do as well.

¹⁸⁰ Fanon, *Black Skin, White Masks*, 191-192.

This work is important not only because it offers a multitude of possibilities for the histories of science and technology, but also because using an Indigenous paradigm helps broaden Native accessibility in both the humanities and in STEM fields. Seeing Indigenous and Western scientific knowledge working together provides a positive model for Indigenous youth who may be interested in joining a STEM field, but are worried about how disparate this work will be from their culture.

Thus, the main goals of this thesis were to problematize the typical scientific narrative, to introduce Indigenous methodologies to the history of science and technology, and to provide a case study to exemplify what such a study would look like in our field. Doing my own fieldwork has allowed me greater control over the ethics of my research. By conducting my own interviews in order to learn the astronomical stories discussed here, I can be sure that I am not accidentally sharing sacred information, or that I am breaking any storytelling rules. I am also able to ensure that my transcriptions are not misused by other researchers by archiving them with the Citizen Potawatomi Nation as opposed to the university, where they can be preserved by other tribal members. Yet, there are limitations to the fieldwork presented here. Due to insufficient funds and time, I was not able to travel to any other Potawatomi bands in order to interview members of those communities. I have also met additional members of my own band that I wish I had known sooner, so that I could have asked them to also participate.

Using a Potawatomi methodology is a political choice, as mentioned in the methodologies section. Indigenous representation matters, and it defies centuries of colonial oppression. It also problematizes the academy, and promotes ethical and

sensitive research *with* Indigenous peoples, not *on* them. By choosing to write from a Potawatomi perspective, I am choosing to defy centuries of negative stereotypes, racial taxonomy, and colonial anthropology. This research also provides an introduction into a much different worldview, with a more holistic, reciprocal, and ecologically-minded perspective than is provided by traditional Western science. Indigenous American stories can tell us so much, all we have to do is listen to their truths.

In the future, I would like to continue this research, although I will be doing so in a different field. If I continue to pursue this work in the academy, I will do so in the field of Native American studies, as opposed to history of science, because I wish to further investigate the story as a lexicon of cultural capital, and limiting myself to only “science” stories would be detrimental. Additionally, I would like to design a working model for affordable oral knowledge preservation that Indigenous people can use within their communities and implement with ease; I also want to interview more people from more bands of Potawatomi than I was able to reach this time. However, I may instead continue this work strictly as a Potawatomi who wants to protect and preserve her tribe’s knowledge, within a more purely Indigenous paradigm. *Aho odopi. Iw.*¹⁸¹

¹⁸¹ Potawatomi, translates to “That’s all for now. The end.”

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Appendix: Glossary of Indigenous American Words and Phrases

Navajo¹⁸²

Diné – Their word for themselves.

Leetso – ‘yellow brown’ or ‘yellow dirt.’ Also, Uranium.

Nayee – ‘that which gets in the way of a successful life,’ or ‘a monster’

Ojibwe¹⁸³

Ajijaak/Bineshi Okanin – Crane/Skeleton Bird Constellation

Anung/Anang – Star

Anang Nibwakawin – Star knowledge

Biboon - Winter

Biboonikeonini – Old Man Winter, The Wintermaker

Dagwaagin - Spring

Gaadidnaway/Mishihizhii – Curly Tail/Great Panther constellation

Giiwedin Anang – North Star/Polaris

Giizhig – Sky

Ikwe’anung – Women’s Star/Morning Star (Venus)

Maang – Loon (both constellation and bird)

Maingan Mikan – The Wolf Trail, also known as the ecliptic

Masinaa’igan – Map, paper, book, magazine

Madoodiswan – Sweat Lodge constellation

Madoodoowasiniig – Sweating Stones constellation

Mooz – Moose (animal and constellation)

Nenabozho/Nanabozho – Also known as the Original human, Nanabush, and Wiské,
Nenabozho is a well-known hero and trickster figure in many Neshnabek stories.
This is also the name of a constellation representing him.

¹⁸² From Brugge et al, *The Navajo People and Uranium Mining*.

¹⁸³ From Lee et al, *Ojibwe Giizhig Anung Masinaa’igan*.

Niibin - Summer

Noondeshin Bemaadizid – Exhausted Bather/Person constellation.

Ojig – Fisher (animal and constellation)

Onaagoshi Anang – Evening Star/Venus

Waaban Anang – Morning Star/Venus

Ziigwan - Spring

Potawatomi

Bidgen! – Come in!

Bodéwadmi – Potawatomi

Bodéwadmimwen – Potawatomi Language

Bozho – Hello

Démin – Strawberry

De’wegen - Drum

Dbekgises – Moon

Ezhewebek – it happened

Gises – Sun

Iw, Iwk – The end, that’s it.

Kewezi – Old man

Kwe, Kwek (pl.) – Woman/Women

Mamogosnan – Creator, the Great Force

Migwetch – Thank you.

Mnedo – A spirit

Mnokme – Spring (a spring spirit)

Nanabozho/Nanabush – See *Wiské*

Negos – Star

Nene (pl. nenwik) - Man

Neshnabe/Nishnabe, Neshnabek (pl.) – Original peoples, Indigenous Americans.
Regionally, the Three Fires tribes (Ojibway, Odawa, Potawatomi). Also
Anishinabe, Anishinaabe(g/k).

Neshnabemowin – Potawatomi language

Ndezhnekas – I am called.

Ndow – I am.

Odopi – Now/at this time.

Ojik – Fisher

Pondese – Old Man Winter, The Wintermaker

Pwagen – Pipe

She – Just

Wegwendek – Whatever

Windego – A type of monster that comes out during wintertime

Wigwam – House

Wiské – The Trickster, First man. Also a hero figure.

Zibaktoge – Maple Sugar