Whyte K. 2020. Sciences of Consent: Indigenous Knowledge, Governance Value, and Responsibility. *Routledge Handbook of Feminist Philosophy of Science*. Edited by K. Intemann and S. Crasnow, 117-130. Routledge.

9

SCIENCES OF CONSENT Indigenous Knowledge, Governance Value, and Responsibility

Kyle Whyte

Introduction

Peoples' right to consent/dissent to actions of others that affect them is a major norm in the ethics of science. The right to free, prior, and informed consent (FPIC) is one example. Specifically, science refers to some practice authorized as research and sponsored by anglophone universities or non-profit organizations, agencies of industrial nations like Canada, or multinational corporations. Consent—i.e. the right to consent/dissent—is used as a norm that restricts research to reduce risks and prevent harm. The consequences of negating consent are appalling. Research and science-policy practices have allowed Indigenous persons, including children, to be malnourished (Mosby 2013), tortured (George 2019), and poisoned (Brugge et al. 2006; Hoover 2017). Far too often the outcomes were lethal.

As a restriction, consent may be perceived as a norm that is not directly related to the procedures of empirical inquiry. Procedures understood by some as *research itself*, including data gathering and analysis, can be conceived separately from consent. Then consent must be applied later to mitigate risk and harm, including disallowing certain research projects. Empirical inquiry is cordoned off from being considered a consent-based practice. Instead, science is mainly to be regulated by consent when its procedures are risky or harmful. It is sometimes the case that scientists' identities as researchers are not tied to a sense of responsibility to honor consent beyond their complying with the norm's restrictive or regulatory functions.

Some scientific practices and philosophies of science do *not* treat consent *only* as a restriction and regulation. Feminist philosophers have articulated philosophies of science that center diversity in design and procedures of empirical research, including feminist standpoint and feminist empiricist theories (Harding 1995; Intemann 2010; Longino 1990). These theories do not always invoke the specific words *consent* or *dissent*. Yet the theories do typically emphasize that the quality of empirical inquiry improves when its procedures involve wide ranging human perspectives and knowledge. The perspectives and knowledge bring to bear different life experiences, generations, genders, cultures, abilities, and epistemological systems.

Such diversity of perspectives and knowledge increases the degree to which procedures of empirical inquiry are endorsable and revisable by multiple constituencies of humans. To me, this last point suggests a profound commitment to consent in terms of consensus in data gathering and analysis. On the flipside, such diversity increases the opportunities for and the acceptability of constructive criticism (i.e. dissent) from multiple voices. In other areas of feminist philosophy of science and science studies, scholars have theorized the significance of consent by showing how humans are not the only self-determining agents in procedures of empirical inquiry (Barad 2007; Haraway 1997). Plants, insects, animals, ecosystems, among others, have their own expressiveness, are unpredictable, and can act independently in ways that substantially impact procedures like data gathering and analysis.

The subject I will focus on here is that some Indigenous scientific traditions understand consent as involved in every part of empirical inquiry. This essay attempts to dialogue with feminist philosophy science by addressing a shared philosophical issue—science and consent. But I will do so by writing from a standpoint grounded in Indigenous philosophy of science. That is, I will not write about *Indigenous content* by interpreting it through concepts developed by scholars in different philosophical fields. In Indigenous philosophy of science, science means some practice authorized as research and sponsored by institutions emanating from Indigenous peoples, where these institutions range from families, to ceremonial lodges and societies, to First Nations government agencies, to Tribal colleges and enterprises. In future writing by myself and others, I hope there is more circling back to compare side by side some of the aforementioned feminist scholarship with what I'm about to share in the essay.

In my experience, practitioners of Indigenous philosophy of science are not terribly interested in understanding how to improve the objectivity of research claims or how to explain normatively how science might work best. In my own reflection, I see Indigenous philosophy of science as first focused on understanding the *governance value of science*. That is, science or knowledge refers to a set of actions taken by diverse agents, not exclusively humans. The actions aim to exercise responsibilities that improve the relationships of interdependence within collectives of diverse beings and entities who must be responsive together to the constantly changing world around them.

Consent is not mainly articulated as a right. Rather, it is an integral quality of the responsibilities that diverse agents exercise in scientific practices. Consent means that responsibilities are acted out in ways that are accountable to the animacy of diverse beings and entities that makes the world a place that presents itself through unending motion. Here, consent is not a restriction or regulation on science, nor is consent a characteristic that increases the objectivity or rigor of empirical inquiry. Quite differently, it would not be possible for anyone to authorize a practice *as research* unless it is consensual. For non-consensual practices are irresponsible, and some Indigenous scientific traditions do not separate—even for analytic purposes—responsibility from empirical inquiry. The identities of Indigenous scientists, knowledge-keepers, learners, and culture-bearers honor consent as an integral quality of how they exercise their responsibilities across every scientific activity.

In this essay, I will first cover a little bit more information about what I am choosing to call Indigenous philosophy of science and the governance value of science. I will then move to discuss consent and animacy through three entry points into Indigenous philosophy of science: a philosophical tradition, an individual philosopher, and a case. In this analysis, I will both draw on Indigenous traditions I am more personally associated with (Anishinaabe ones) and contribute to inter-Indigenous dialogue across traditions that I engage with through reading or coalitional advocacy. While there isn't really such an accepted English language phrase as *Indigenous philosophy of science*, I am using it to denote the numerous efforts out there in the world to creatively and critically reflect on Indigenous scientific traditions—most often undertaken by Indigenous persons. Usually the word *science* isn't really used, and specific Indigenous language words are used instead, or English language words are used like *traditional ecological knowledge* (TEK) or *Indigenous knowledge*.

Indigenous Philosophy of Science

I am routinely asked by philosophers of science for cases of Indigenous peoples engaging with various sciences. Sometimes my colleagues' interest stems from their hopes of finding examples that support their particular theories of how values and science are related in research, funding, or policy. Perhaps a particular Tribe's struggle with a university doing genetic sampling reveals racism in that very research paradigm; perhaps an Indigenous community organization's grassroots testing of pollution exposure represents an instance of democratic science; perhaps the TEK of a group of Native elders offers more refined environmental knowledge than the research of climate scientists.

I have no doubt that cases of Indigenous peoples' engagement with science are relevant for the lines of inquiry of philosophers of science working in anglophone institutions of research and higher education. At

the same time, there are entire worlds of Indigenous scientific traditions that are practiced in their own right throughout the planet. Indigenous sciences are grounded in particular philosophical assumptions. Indigenous persons also philosophize about these sciences.

Indigenous philosophies of science have not had to struggle with certain scientific issues in quite the same ways as philosophies of science have had to in anglophone institutions of research and higher education. Few Indigenous scientific traditions, for example, have ever been founded philosophically on cultural aspirations to objectivity or value-free inquiry privileged in some European and European diasporic societies. In some places, Indigenous sciences do not have histories in which research practices are rooted in patriarchy, anthropocentrism, ableism, homophobia, and racism.

There is a difference between (A) Indigenous case studies used within non-Indigenous philosophies of science and (B) Indigenous philosophies of science in their own right. This essay is about (B). Regarding (B), *non*-Indigenous cases certainly figure as part of the content of Indigenous philosophies of science. For example, Indigenous scholarship has analyzed certain sciences in the United States or Canada as cases of non-kinship-based knowledge systems that have little respect for consent, trust, or reciprocity (Battiste 2000; Pihama et al. 2002; Smith 1999; TallBear 2013). Indigenous scholarship has also shown how certain environmental sciences, such as ecology, reveal alternative accounts of systems of interdependence that can be put in dialogue with Indigenous science under conditions determined by Indigenous peoples to be safe (Ford and Martinez 2000; Kimmerer 2013; Shilling and Nelson 2018). In this spirit, this essay is about philosophies of science with starting points that do not begin with the analysis of scientific traditions emanating from European and European diasporic societies.

Governance Value of Science

The governance value of science is one of the concepts I have used to make sense of what appears to me as a different starting point for some of the Indigenous philosophy of science with which I'm most familiar. I use *governance* for thinking about the *coordination* of the interdependent mesh of relationships that connect different beings and entities together. The relationships make up a collective. The collective is some group of related members, whether described as a community, network, society, or nation. The members are beings or entities that have diverse intentions, motivations, goals, types of awareness, agency, and learning styles. In some Indigenous philosophies, the members include flows (e.g. water, wind), fishes, insects, mountains, landscapes, animals, forests, and plants, among others.

The members are interdependent because their behavior impacts one another systematically. For example, water temperature affects fish health; fish health affects animal, bird, and human nutrition; human economies affect water temperature through land use; and this example can keep expanding. Depending on the tradition, they are also interdependent because their relationships are determinative of who they are to one another. Many Indigenous persons I know readily acknowledge that depending on the perspective, a plant, flow, animal, landscape, or human is a very different being or entity depending on who or what is perceiving it.

When collectives are *coordinated*, it means that the members' behavior tends to be feasibly conducive to the well-being of all members. Here, *well-being* is not to be taken statically. For in any collective, well-being can be multifaceted, as in the case of humans where it involves psychological, economic, cultural, and moral aspects. Or the meaning of well-being is unknown and contested, as in the steep learning curve for empathizing with the experiences and suffering of animals. The concept of governance refers to a normative field where humans try to figure out what responsibilities they have for performing their part to maintain or promote coordination in a collective.

Responsibilities are actions that are taken with the explicit awareness that the actor intends to contribute to coordination. Responsibilities are better able to serve their intended contributions if they have certain qualities attached to them. Qualities are features of responsibilities that—when present— facilitate their contributory capacity. They include consent, trust, reciprocity, and transparency, among others. In the

traditions I am going to discuss here, coordination is always needed because the world itself—from the environment, to culture, to animals—is animate. That is, the beings and entities in the world are all constantly in motion, which means there is complexity, unpredictability, and perpetual change.

Governance, on this understanding, is also a field seeking to understand how qualities of responsibilities bear on maintaining or promoting coordination. In many Indigenous traditions, science is inseparable from its value for governance—that is, the governance value of science. Consider Robin Kimmerer's Indigenous description of empirical inquiry:

> Because we can't speak the same language, our work as scientists is to piece the story together as best we can. We can't ask the salmon directly what they need, so we ask them with experiments and listen carefully to the answers. We stay up half the night at the microscope looking at the annual rings in fish ear bones in order to know how the fish react to water temperatures. So we can fix it. . . We measure and record and analyze in ways that might seem lifeless but to us are the conduits to understanding the inscrutable lives of species not our own. Doing science with awe and humility is a powerful act of reciprocity with the more-than-human world. *(Kimmerer 2013: 252)*

Using examples of fish and water temperature, Kimmerer understands the procedures of empirical inquiry as exercises of responsibilities. The responsibilities facilitate the coordination of interdependent members of a collective. Beings like salmon are animate (not "lifeless"), as are all the other beings and entities they relate to. The responsibilities are carried out with qualities of consent and reciprocity. Consent involves careful listening, and respect for humans' inability to communicate clearly with fish. Reciprocity involves doing research in good faith since fish support human life and the many other lives that humans depend on (and that, in turn, depend on humans).

I will focus on the quality of consent. Consent has diverse formal and informal meanings that express an overall honoring of the self-determination of any being or entity that is a member of a collective. Honoring self-determination means respecting the animacy or unique agencies of all beings and entities. It means ensuring consensus across beings and entities affected by similar issues—especially where cooperative coordination can improve everyone's situation. Consensus requires that communication across diverse beings and entities is attentive to their languages, behaviors, and needs as best they can be understood or empathized with in good faith.

Within some Indigenous scientific traditions, there are not really tradeoffs that are associated with acquiring knowledge while neglecting responsibility. Deborah McGregor writes that

> Native understandings of [traditional ecological knowledge] tend to focus on relationships between knowledge, people, and all of Creation. TEK is viewed as the process of participating (a verb) fully and responsibly in such relationships, rather than specifically as the knowledge gained from such experiences. For Aboriginal people, TEK is not just about understanding relationships, it is the relationship with Creation. TEK is something one does. *(McGregor 2008: 145)*

For McGregor, there is not really such a thing as responsible or irresponsible science. Without responsibility there can be no science. Science can be philosophized about in relation to its governance value.

The governance *value* of knowledge systems, when taken as a starting point for philosophizing about science, has implications for our historical and thematic orientations. Indeed, Indigenous science already starts with assumptions that topics like consent or animacy are key beginnings for investigating the philosophical challenges of science. In what follows, I share some examples of how consent and animacy may be interpreted within diverse areas of Indigenous scientific traditions and philosophies of science, where governance is a significant value of science.

Anishinaabe Science

Late grandmother and knowledge keeper Josephine Mandamin led the Mother Earth Water Walk as a movement seeking to protect water quality in the Great Lakes and North America by honoring Indigenous knowledge of water. Mandamin spoke to the responsibility that "people of all walks of life" have to water at the same time she emphasized traditions of Anishinaabe women's responsibilities to water. Mandamin spoke about our interdependence and responsibility relating to water. "We have to think of our relatives. . . At a time when we needed them, they were there for us. Take care of them, like they took care of us" (Mandamin 2015: xix). As a Potawatomi person, the philosophy of Anishinaabe persons, with special respect paid to Mandamin, has influenced how I think about concepts of interdependence, coordination, responsibility, consent, and animacy as parts of governance value.

McGregor, in their work with Mandamin, discusses the nature of knowledge in the Mother Earth Water Walk.

> We must look at the life that water supports (plants / medicines, animals, people, birds, etc.) and the life that supports water (e.g., the earth, the rain, the fish). Water has a role and a responsibility to fulfill, just as people do. We do not have the right to interfere with water's duties to the rest of Creation. Indigenous knowledge tells us. . . that water itself is considered a living entity. . . *(McGregor 2009: 37–38)*

For McGregor, in light of Mandamin's work, knowledge or science is described as disclosing the animacy ("living entity") of water. It is through animacy that the critical coordination of relationships is protected, that is, governance.

There is an important principle of consent at work in this account of knowledge. It is about noninterference of water—but so that water can exercise responsibilities it has for others and in coordination with others in a collective of interdependent members. For animacy is also about a being or entities' being able to self-determine their own actions for the sake of contributing to others' well-being. It is not about brute non-interference. Beings and entities, whether considered as human or non-human, are supposed to protect the conditions of their being able to express consent. Knowledge, or science, relating to water, is inseparable from responsibilities laden with this quality of consent.

Concepts in Anishinaabe science that are tied to science often speak to animacy and consensuality. Margaret Noodin discusses this in relation to *ganawendamaw*, which is a verb that can be translated into something like "sustainability" and the knowledge and practices associated with sustainability. She defines the verb as referring to the "spectrum of animacy for all life, allowing rocks, water, and humans to be described as coequal partners in the creation, maintenance, and evolution of a place. This basic concept conveys the idea of observation, protection, and preservation" (Noodin 2017: 247). For Noodin, scientific conceptions like observation are tied to animacy and "coequal" partnerships that promote coordination ("maintenance, and evolution of a place") through the self-determination/consent of all members of the collective.

Christine Sy's work on Indigenous knowledge and land shares Noodin's focus on animacy and its relevance to consent. Based on her interviews, she writes that "Anishinaabe language theorist Helen Roy Fuhst, translating the word *aki*, contends that land is everything physical—the earth and universe that we live in—and that this physicality is animated with constant motion and movement." Sy goes on to state, paraphrasing Roy Fuhst, that "Seeing relationships as animated through persons, inclusivity, reciprocity, and mutual reciprocity must shape then how humans carry out their relationship with land" (Sy 2018: 227–228).

Citing James Dumont, Sy describes four principles of relationships:

> First, all beings are persons (e.g., human, tree), and therefore all relationships are personal. Second, all relationships are inclusive. Third, all relationships are familial (i.e. kinship, relatives). And fourth, relationship is reciprocal and mutually reciprocal, meaning that relationships are maneuvered through a back and forth between two or more persons, and each person in a relationship has the ability to enact their volition. *(Sy 2018: 227–228)*

For Sy, in their work with elders, this conveys a theory of knowledge relating to land that is at heart about interdependence, animacy, and consent ("enact their volition"). Similar to Kimmerer, Sy references other qualities beyond consent, like reciprocity, which I am not focusing on here in this essay.

Basil Johnston describes an Anishinaabe story that discusses one of the origins of humans. In the story, the animals invite humans to the earth, and it is clear at that time that there are relationships of interdependence: "Without the animals the world would not have been; without the animals the world would not be intelligible" (Johnston 1990: 49). Animals provided nourishment, "shelter," "joy," and voluntary "labor" on behalf of humans. Humans and animals could understand each other communicatively. Yet humans abused the consent of the animals by harshly treating them as if humans were owed these services, which animals had previously performed "without complaint." Humans were irresponsible, failing to perform actions that are feasibly conducive to the coordination of the collective.

Johnston writes that

> At last, weary of service, the animals convened a great meeting to gain their freedom. All came at the invitation of the courier. The bear was chosen to be the first speaker and to act as chairman of the session. He explained the purpose of the meeting. 'We are met to decide our destiny. We have been oppressed far too long by [humans]. He has taken our generosity and repaid us with ingratitude; he has taken our labors and repaid us with servitude; he has taken our friendship and fostered enmity among us'. *(1990: 50)*

One of the lessons of the story then is to not abuse consent, as such abuse can ruin the coordination of interdependent relationships. In fact it is really animals who have the knowledge. So science is more like humans acting responsibly to animals, including honoring animals' animacy through respecting consent, in order to benefit from their knowledge.

I see these examples of Anishinaabe philosophy as critical reflections on science. They are part of what I have no problem calling a philosophy of science. In them, governance value is a major starting point. For the examples are about how knowledge relates to the coordination of interdependent members of a collective, and in ways where responsibility is tied to qualities—like consent—in an animate, constantly changing world.

Jeanette Armstrong: Salish Science

Individual Indigenous persons globally have offered detailed philosophies of science across their publicly available bodies of work. Jeanette Armstrong offers significant articulations of such traditions in Salish philosophy. This section considers their contributions as a philosopher, culture-bearer, institution-builder, knowledge-keeper, facilitator, creative writer, and leader from the Okanagan Valley in what is currently called British Columbia, Canada. While I have benefited greatly from learning from Salish persons over the years, I approach the interpretation of Armstrong in the spirit of dialogue, not the spirit of being knowledgeable according to the criteria of that tradition.

For philosophers like Armstrong, the intellectual traditions about knowledge and science have multiple origins, and here I will focus on just a few. Knowledge arises from systems of governance, and their political philosophies, that were designed to be coordinated to seasonal and interannual environmental changes. Knowledge was always in the context of a mobile society, one in which people moved during the year or changed their behaviors annually to adjust to the dynamics of constant ecological change. Enduring questions in such philosophies ask about the challenges of how to organize a society to be as coordinated as possible to constant change—changes could be environmental in nature, or social (e.g. pertaining to trade), or biological, among others. In the work of Armstrong, consent and animacy, as I am understanding the concepts, are key vectors through which to understand science's governance value.

As a prefacing remark to a discussion of knowledge, Armstrong writes about mobility, change, responsibility (caretaking), and coordination:

> We simply move around on the territory at different seasons, and different times of the year, but we always return to our villages in the winter months after all the harvesting is done. So it's like harvesting a huge garden and it's like taking care of a huge garden. Think of the garden as being vertical, rather than flat, then you have some idea of the different seasons and the different levels of growth patterns. Migration patterns of the deer and the moose and the elk and other sources of food that live off the other relatives, and occupy our land and take care of us. *(Armstrong 1998: 175)*

Knowledge is directly tied to movement and responsibility. She writes that

> I have heard elders explain that the language changed as we moved and spread over the land through time. My own father told me that it was the land that changed the language because there is special knowledge in each different place. *(Armstrong 1998: 175)*

Armstrong's account of science is tied to concepts of land that emphasize animacy and consent. She writes that

> . . .language was given to us by the land we live within. . . All my elders say that it is land that holds all knowledge of life and death and is a constant teacher. It is said in Okanagan that the land constantly speaks. It is constantly communicating. Not to learn its language is to die. We survived and thrived by listening intently to its teachings—to its language—and then inventing human words to retell its stories to our succeeding generations. It is the land that speaks *N'silxchn* through the generations of our ancestors to us. *(Armstrong 1998: 176)*

Here, in dialogue with Anishinaabe traditions, Armstrong emphasizes that it is the land which is animate, and that humans must listen to it, which is a way of articulating consent relationships with animate beings and entities.

Consider Armstrong's description of the word *naw'qinwixw* as an account of scientific knowledge. Here I will primarily focus on relationships connecting humans in Armstrong's account, for the sake of brevity. Armstrong describes the word in relationship to governance coordination. For the word has to do with being "able to sustain community, and to be able to transfer that knowledge, and that ethic to each succeeding generation, and to be able to bring the community continuously in balance with all of the other living life forms" (Armstrong 2007). More specifically within this context of governance, *naw'qinwixw* is about coordinating responsibilities. It refers to a particular

> a tool or methodology that can be used for finding out what the best solution to any question might be. . . it's thought about as a dialogue tool. Again, that word has a series of images that are attached to it. *(Armstrong 2007)*

For Armstrong, something like knowledge is referenced when they write that *naw'qinwixw* is about a "solution to any question." Knowledge is about the bonds conducive to dialogue. But the meaning of knowledge, and *naw'qinwixw* more broadly, is best explainable through discussing images. Here I will quote at length some of the images that Armstrong provides.

> The first part of the word, "*naw'qin,*' -'*aw*" has to do with water dripping in a really slow, one drop at a time, that kind of action. So that would be an image. And "*naw'qin*" the meaning of "*qin*" always has to do with the top of the head, or the top of a mountain. So there is water dripping one drop at a time in the top of the head. The last part of the word, "*wixw*," means we do that for each other. I do it for you, you do it for me. That's what the "*wixw*" at the end means. If we "*tkwinsenwixw*" and

> "*wixw*"—you hear the "*wixw*" on the end?—that means we are shaking each other's hands. *(Armstrong 2007: 8)*

Their interpretation of the imagery concerns knowledge.

> So what the symbol is speaking about is being able to put into the mind the knowledge, to be able to let it drop in. You know how if you were to take a drop of water and put it on say cotton, and you'd see that the drop slowly permeate the cotton. . . If you were to give knowledge in that way, then knowledge becomes integrated into the whole person: into their mind, and their spirit, and their emotions, every part of them. It becomes integrated into their family, and into the work that they do, they way that they live and think. It becomes a part of them. So when we are making decisions, unless a person can receive information and knowledge in that way, it doesn't become a part of them, it becomes something that's external to them and remains external to them. So knowledge must be brought in in a way that takes into consideration the feelings of a person, the level of knowledge or information or facts a person might have, the background that the person might have been exposed to, the understanding and the status that the person's role might have in the community itself. *(Armstrong 2007: 8)*

Knowledge is inextricable from governance ("the person's role might have in the community itself"). Consent is a key part of this, for unless people are involved in a consensus process that engages their communicative capacities and needs appropriately, then knowledge that supports governance cannot be achieved. Honoring people's animacy, including their differences and uniqueness, motivates the importance of consent.

> So, you wouldn't speak to say a teenager and tell them in the same way you would tell my grandmother about something. So that difference in terms of diversity in the community is the primary request in our dialogue, that says, "you have to respect diversity, you have to respect that the other person never is going to think like you, be like you, know what you know, because they're not you." They have all of these different experiences. That is, in dialogue, really necessary for you to know, so you can't assume anything. So, you have to try and clarify for the person in the way that they can take it, in a way that they can understand. And that's your role whenever there is something in-between us that we don't understand. *(Armstrong 2007: 8)*

Moral qualities of consent, trust, transparency, accountability, among others, are present here given that knowledge exchange must recognize and respect difference.

> It's not your role to come and convince me, "this is what it looks like; this is how it is because that's the way I see it." Which is very disrespectful and destructive because you're not seeking clarity, you're seeking to be aggressive, you're seeking to dominant, and that's not acceptable. What you should be doing, very clearly saying, 'we have this problem, clearly, one of us doesn't understand it, and so I'll try and tell you how I see it, what I know about it, how I think about it, how I feel about it, how I feel it might affect me, or effect things that I know about, and that will help inform you. But I'm requesting the same things from you. I want you to tell me how you feel about it, how it affects you, the things you know about how it affects you. Then we'll have a better understanding; we'll have a chance at a better understanding of what it is we need to do. We can only do that by giving as much clarity from our diverse points of view.' So, to seek the most diverse view is what *naw'qinwixw* asks for. *(Armstrong 2007: 8–9)*

For Armstrong, it is impossible to speak about knowledge or science without—at the same time— speaking about difference, dialogue, and community in ways that prioritize consent. Since knowledge is for the community, it has to be relevant to the members of the collective so that their animacy can be honored and they can consent to and invest in the knowledge. Taking this approach, for Armstrong, is tied to the conditions that need to be established for coordinated action, or governance, that is aimed at being responsive to a constantly changing world composed of many animate beings and entities.

Haudenosaunee Science

Haudenosaunee peoples living in what are currently called the United States and Canada have published widely on their scientific work to address environmental concerns. Their communities have faced industrial pollution, land dispossession, and climate change. By science, of course, I mean both Haudenosaunee knowledge systems and Haudenosaunee adaptations of scientific methods stemming from Canadian and US institutions. Haudenosaunee people keep some of the oldest traditions of Indigenous governance that are tied to consent, self-determination, animacy, and science—among many other dimensions. I want to discuss some of these governance relationships as told through Haudenosaunee scholarship and writing. In particular, Haudenosaunee have endeavored to pursue science as always involving cooperative partnerships and coordination with other groups in shared regions.

Mary Arquette writes about the governance value of the knowledge and science conveyed in "Our original instructions." She discusses how the instructions

> tell us that we must acknowledge, respect, and give thanks to the Animal Nations. . . animals are our ancestors. . . In the Skyworld, they were acknowledged as people and for that reason, we continue to see them as such today. . . When we think about our elders, the Animals, we realize that from the start, we owe our very survival to their existence. *(Arquette 2000)*

Arquette talks about animacy through the unique personalities of different animals and their mutual responsibilities in relation to human and non-human beings and entities like water and air. She discusses that animals that threaten to harm humans should be treated with respect, and that human societies must respect the exercise of animals' own self-determination.

Arquette emphasizes how humans depend on animals, both for nutrition and ecosystem services, but also for spiritual and emotional health. But animals and plants, as animate beings, can better exercise these responsibilities if humans treat animals in ways that respect their self-determination (consent).

> Unlike plants, we cannot directly use the energy of the sun to make food. . . we are the most dependent of all species. . . There have been times when humans have thought they knew more. . . we have become manipulative, trying to make the Creation suit our needs, wants, and desires. . . *(Arquette 2000)*

For Arquette, the world is an interdependent collective of interdependent beings and entities that have responsibilities to be coordinated to respond to change. When humans violate animals' consent, then interdependence is less supportive of well-being.

Another Haudenosaunee governance tradition is the *Kaswentha* treaty relationship, which Susan Hill describes as follows:

> Within the oral record of the Haudenosaunee, it is noted that the relationship was to be as two vessels travelling down a river—the river of life—side by side, never crossing paths, never interfering in the other's internal matters. However, the path between them, symbolized by three rows of white wampum beads in the treaty belt, was to be a constant of respect, trust, and friendship. Some might say that this is what kept the two vessels apart, but in fact, it is what kept them connected to each other. Without those three principles, the two vessels could drift apart and potentially be washed onto the bank (or crash into the rocks). This agreement was meant to provide security for both sides. In essence, they agreed to live as peaceful neighbors in a relationship of friendship, predicated on an agreement to not interfere in each other's internal business. The contemporary oral record of the treaty also notes that individuals could choose which boat to travel in with the understanding that one must be clear in one's choice and avoid "having a foot in both." The premise of non-interference, within the concept of brotherhood,

> demonstrates the desire to be allies rather than to have one side be subjects of the other. *(Hill 2008: 31)*

Hill's description of the *Kaswentha* philosophy highlights "respect, trust, and friendship" as qualities of relationships that create mutually accountable connections. Consent is woven throughout the proposed relationship, including the "[provision of] security," an "agreement to not interfere in each other's internal business," the freedom of individuals to "choose which boat to travel in," and the "desire to be allies rather than to have one side be subjects of the other." These are fine-grained fabrics of consensual relationality that demonstrate respect to partners in diverse ways.

The *Kaswentha*, among many other traditions, grounds how some Haudenosaunee initiatives approach their own sciences and knowledge systems and their interactions with settler and other non-Indigenous peoples. James Ransom and Kreg Ettenger write that

> According to Haudenosaunee tradition, indigenous knowledge and western science are analogous tools developed and used by their respective societies. The former is used by Native people to help them fulfill their responsibilities given to them by the Creator. It is their science, and part of how the canoe navigates the river. Western science is the tool used by the environmental agencies responsible for achieving the goals of the ship. *(Ransom and Ettenger 2001: 225–226)*

Ransom and Ettenger's article discusses numerous Haudenosaunee environmental projection initiatives that seek to put the different knowledge systems in dialogue and coordination. In the different cases, the Haudenosaunee proposed the *Kaswentha* as a basis of knowledge exchange but also of consensual science that brings different groups together by respecting their self-determination. The very idea of a knowledge system is already grounded in the *Kaswentha* philosophy, which has the basics of consensual relationality that Hill describes.

Haudenosaunee people have created scientific research aimed at governance across regions of many interdependent members. Ransom and Ettenger describe some cases in their article, including "collaborative partnerships which respect and support Haudenosaunee sovereignty and cultural identity while addressing critical environmental problems." They include "(1) a regional organization representing traditional Haudenosaunee Nations on environmental issues; (2) an action plan for environmental restoration; (3) a proposal to create culturally-based environmental protection processes; and (4) guidelines for environmental research in Haudenosaunee territories" (Ransom and Ettenger 2001: 222). They write that the work of these projects

> reflects the fundamental concept of the *Kaswentha*—the ability to preserve one's identity and autonomy while working with allies in response to common interests. . .. The development of community environmental processes to protect traditional ways of life, the natural world, and future generations while being consistent with the sovereignty of the Haudenosaunee. *(Ransom and Ettenger 200: 223)*

In this way, consent and governance are completely woven throughout the basic activities of empirical inquiry.

Haudenosaunee peoples and their allies have developed a portfolio of scientific work studying the relationship among pollution, health, self-determination, and cultural vitality in the Saint Lawrence River watershed. They designed this research to respond to widespread industrial pollution burdening Mohawk communities on both the US and Canadian sides, including toxicants like polychlorinated biphenyls, which has been widely documented by Mohawk scholars, scientists, and leaders (Tarbell and Arquette 2000). The work had to be based on coordination of the interdependent members of the collective of humans and non-humans in the region. The work has been about governance value. Henry Lickers, speaking of planning and environmental science in relation to consensus, writes that

> Planning is then seen as a long-term activity with a time period of many generations. Characteristics which help to maintain place are beneficial. Time is sacrificed for understanding, sensitivity, and consensus. A place is better protected, preserved and enhanced when everyone knows why. *(Lickers 1993)*

Understanding interdependence and coordination was truly crucial to the Mohawk's efforts. Elizabeth Hoover has written that, in Akwesasne, "the relationship between fish–whose duty it is to cleanse the water and offer themselves as food–and humans–whose role it is to respectfully harvest these fish–has been interrupted by environmental contamination" (Hoover 2017). Those most at risk from pollutants include women of childbearing age, pregnant and nursing women, and children under 15, especially given the bioaccumulation of some toxicants in breast milk. Indigenous environmental scientists Alice Tarbell and Mary Arquette estimate that 50% of the economy used to be based on fishing before the pollution started. Beyond fish, they tell how the contamination of medicinal plants leaves traditional health care providers unable to recommend natural remedies that some elders in Mohawk communities rely on (Tarbell and Arquette 2000).

Arquette and their collaborators at Akwesasne have famously discussed how the consent of Mohawk people is essential to acceptable science. When non-Indigenous scientists did not involve Mohawk persons in the determination of risks of contamination, they came up with some problematic and irresponsible conclusions. They argued irresponsibly that when people avoid eating contaminated foods, there is no risk. Yet Mohawk people later pointed out that "alternative diets are consumed that are often high in fat and calories and low in vitamins and nutrients," which produces additional negative health outcomes that affect Mohawks acutely, including diabetes (Arquette et al. 2002). Mohawk advocate Katsi Cook, through the Mother's Milk Project, has worked to make environmental health science accessible to affected communities. Importantly, Cook sees the *scientific* work as motivated by how the project participants "bless the seeds, pray to corn, and continue a one-on-one relationship with the earth" (LaDuke 1999: 20).

Haudenosaunee actions have made powerful contributions to what I am calling the governance value of science. Knowledge cannot be detached from consent as a way of honoring animacy, whether that is the self-determination of non-human beings and entities, or the consensus of humans collaborating to protect the environment. Consent is integral to the governance value of science and is generative of coordination of members of collectives.

Conclusion

Some Indigenous scientific traditions and philosophies of science, I hope to have shown, understand science as a responsibility. Empirical inquiry, no different from any other dimension of science, represents a domain of actions that must be understood as responsibilities to uphold and promote the coordination of interdependent members of a collective. Consent, as an honoring of animacy, which includes honoring self-determination, is a quality that makes it possible for responsibilities to be exercised for the sake of governance. Consent is not only a right, and not merely a restriction or regulation. Indigenous peoples value consent and animacy *not* because these concepts merely represent assumptions of Indigenous worldviews. Rather, consent and animacy are critical concepts and qualities of responsible action that contribute to the governance of interdependent members of collectives.

I would argue that some Indigenous scientific traditions and philosophies of science would not deem a practice to be counted as research if consent is not pervasive in the procedures of empirical inquiry. For any irresponsible actions—e.g. science without consent—cannot have governance value. At the beginning of the essay, I covered some well-known violations of consent within research ethics. Insofar as these cases have generated deep-seeded distrust among Indigenous peoples that their consent will be honored by scientists, is it really acceptable to say that the scientific studies should still be articulated as research? The unethical studies affected relationships negatively among interdependent members of shared and overlapping collectives (e.g. settler Canadian and Indigenous communities). The same could be said for scientific cases involving studies that fail to honor the challenges of having consensual relationships with animals, plants, insects, flows, and landscapes (recall Kimmerer's description of listening to salmon in science).

Indigenous philosophy of science should be a partner with the feminist philosophy of science that occurs in European and European diasporic societies. Partnership does not refer to philosophical practices that delimit *Indigenous content* to case studies or examples within books and papers written according to the standards of, for example, settler Canadians or settler Americans. As Indigenous philosophies of science reflect on scientific traditions that have their own histories, the philosophical treatment of issues like diversity in empirical inquiry or patriarchy in science arise from different sources of experience, culture, politics, and knowledge. As these sources of experience, culture, politics, and knowledge are rarely (if at all) countenanced in anglophone institutions of higher education, the well of possibilities for partnership and dialogue is poisoned.

References

Armstrong J. (1998) "Land Speaking," in Ortiz, S. (ed.), *Speaking for the Generations: Native Writers on Writing*. *Sun Tracks: An American Indian Literary Series*. Tucson: University of Arizona Press, pp. 174–194.

Armstrong J. (2007) "Native perspectives on sustainability: Jeannette Armstrong," (Syilx)[Interview transcript]. *Native Perspectives on Sustainability* (www. nativeperspectives. net).

Arquette M. (2000) "The Animals," in Haudenosaunee Environmental Task Force (ed.), *Words That Come Before All Else*. Akwesasne: Haudenosaunee Environmental Task Force, pp. 82–101.

Arquette M, Cole M, Cook K, et al. (2002) "Holistic Risk-Based Environmental Decision-making: A Native Perspective," *Environmental Health Perspectives* 110, pp. 259–264.

Barad K. (2007) *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.

Battiste M. (2000) *Reclaiming Indigenous Voice and Vision*. Vancouver: University of British Columbia Press.

Brugge D, Benally T and Yazzie-Lewis E. (2006) *The Navajo People and Uranium Mining*. Albuquerque: University of New Mexico Press.

Ford J and Martinez D. (2000) "Traditional Ecological Knowledge, Ecosystem Science, and Environmental Management," *Ecological Applications* 10, pp. 1249–1250.

George J. (2019) "Igloolik Inuit Sue Feds Over Medical Experiments that They Saw Them Treated Like 'Monkeys'," *Nunatsiaq News*. Nunavut, Quebec, Canada: Nortext Publishing Corp., June 21.

Haraway DJ. (1997) *Modest_Witness@Second_Millennium*. *FemaleMan__Meets OncoMouse*. New York: Routledge.

Harding S. (1995) "Strong Objectivity": A Response to the New Objectivity Question," *Synthese* 104, pp. 331–349.

Hill S. (2008) "Travelling Down the River of Life Together in Peace and Friendship, Forever: Haudenosaunee Land Ethics and Treaty Agreements as the Basis for Restructuring the Relationship with the British Crown," in Simpson, L. (ed.), *Lighting the Eighth Fire: The Liberation, Resurgence, and Protection of Indigenous Nations*. Winnipeg: Arbeiter Ring, pp. 23–45.

Hoover E. (2017) *The River Is in Us*. Minneapolis: University of Minnesota Press.

Intemann K. (2010) "25 Years of Feminist Empiricism and Standpoint Theory: Where Are We Now?" *Hypatia* 25, pp. 778–796.

Johnston B. (1990) *Ojibway Heritage*. Lincoln: University of Nebraska Press.

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

LaDuke W. (1999) *All Our Relations: Native Struggles for Land and Life*. Cambridge: South End Press.

Lickers H. (1993) "Talking to My Granddaugther," in Ahenakew, F., Gardipy, B., and Lafond, B. (eds.), *Native Voices*. Toronto: McGraw-Hill Ryerson.

Longino H. (1990) *Science as Social Knowledge*. Princeton: Princeton University Press.

Mandamin J. (2015) "Water Is Life," in Scott, D.N. (ed.), *Our Chemical Selves: Gender, Toxics, and Environmental Health*. Vancouver: UBC Press, pp. xi–xix.

McGregor D. (2008) "Linking Traditional Ecological Knowledge and Western Science: Aboriginal Perspectives from the 2000 State of the Lakes Ecosystem Conference," *The Canadian Journal of Native Studies* XXVIII, pp. 139–158.

McGregor D. (2009) "Honouring Our Relations: An Anishnaabe Perspective on Environmental Justice," in Agyeman, J., Cole, P., Haluza-DeLay, R., and O'Riley, P. (eds.), *Speaking for Ourselves: Environmental Justice in Canada*. Vancouver: UBC Press, pp. 27–41.

Mosby I. (2013) "Administering Colonial science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952," *Histoire Sociale/Social History* 461, pp. 45–172.

Noodin M. (2017) "Ganawendamaw: Anishinaabe Concepts of Sustainability," in Haladay, J. and Hicks, S. (eds.), *Narratives of Educating for Sustainability in Unsustainable Environments*. East Lansing: Michigan State University Press, pp. 245–260.

Pihama L, Cram F and Walker S. (2002) "Creating Methodological Space: A Literature Review of Kaupapa Maori Research," *Canadian Journal of Native Education* 26, pp. 30–43.

Ransom JW and Ettenger KT. (2001) "'Polishing the Kaswentha': A Haudenosaunee View of Environmental Cooperation," *Environmental Science & Policy* 4, pp. 219–228.

Shilling D and Nelson M. (2018) *Traditional Ecological Knowledge: Learning from Indigenous Methods for Environmental Sustainability*. Cambridge: Cambridge University Press.

Smith LT. (1999) *Decolonizing Methodologies: Research and Indigenous Peoples*. London: Zed Books.

Sy WC. (2018) "Relationship with Land in Anishinaabeg Womxn's Historical Research," in: Gallagher, J. and Winslow, B. (eds.), *Reshaping Women's History*. Urbana-Champagne: University of Illinois Press, pp. 227–228.

TallBear K. (2013) *Native American DNA: Tribal Belonging and the False Promise of Genetic Science*. Minneapolis: University of Minnesota Press.

Tarbell A and Arquette M. (2000) "Akwesasne: A Native American Community's Resistance to Cultural and Environmental Damage," in Hofrichter, R. (ed.), *Reclaiming the Environmental Debate: The Politics of Health in a Toxic Culture*. Cambridge: MIT Press, pp. 93–111.