FINDING A PLACE AT HOME: THE TRC AS A MEANS OF (R)EVOLUTION IN PRE-SERVICE (SCIENCE) TEACHER EDUCATION

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Article abstract

This paper focuses on how I have been attending to the TRC's calls to action within science teacher education. It draws on personal experiences, my dissertation, Canadian policy regarding Indigenous education, and academic literature to explore what the calls ask of teacher educators. Throughout, I consider how Indigenous and Western ways of knowing, being, and doing might circulate together in specific places, and the role that Land and the natural world might play in reconciliation via science teacher education. Ultimately, the paper offers a still-in-process glimpse into how I have found a place at home to begin engaging with the Calls to Action of the TRC in science teacher education.

FINDING A PLACE AT HOME: THE TRC AS A MEANS OF (R)EVOLUTION IN PRE-SERVICE (SCIENCE) TEACHER EDUCATION

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ABSTRACT. This paper focuses on how I have been attending to the TRC's calls to action within science teacher education. It draws on personal experiences, my dissertation, Canadian policy regarding Indigenous education, and academic literature to explore what the calls ask of teacher educators. Throughout, I consider how Indigenous and Western ways of knowing, being, and doing might circulate together in specific places, and the role that *Land* and the natural world might play in reconciliation via science teacher education. Ultimately, the paper offers a still-in-process glimpse into how I have found a place at home to begin engaging with the Calls to Action of the TRC in science teacher education.

TROUVER UNE PLACE CHEZ SOI: LA COMMISSION DE VÉRITÉ ET RÉCONCILIATION COMME OUTIL DE (R)ÉVOLUTION DANS LE CADRE D'UN COURS D'ENSEIGNEMENT DES SCIENCES EN FORMATION INITIALE

RÉSUMÉ. Cet article porte sur la façon dont j'ai répondu aux appels à l'action formulés par la CVR dans le cadre d'un cours en enseignement des sciences. J'y explore ce que les appels impliquent pour ceux qui forment les enseignants en me basant sur des expériences personnelles, ma thèse, les politiques canadiennes relatives à l'éducation des autochtones et la littérature universitaire. Au sein de cet article, j'examine de quelle manière les principes autochtones et occidentaux d'être et de faire doivent cohabiter à certains moments. J'étudie aussi le rôle que la *Terre* et le monde naturel doivent jouer au sein du processus de réconciliation, dans le cadre d'un cours en enseignement des sciences. Finalement, cet article présente un aperçu — encore en développement — de la manière dont j'ai trouvé dans un cours en enseignement des sciences un lieu pour commencer à répondre aux appels à l'action formulés par la CVR.

The complete *Final Report of the Truth and Reconciliation Commission (TRC) of Canada* (TRC, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g, 2015h)[1] was being made public as I defended my dissertation (Wiseman, 2016);[2] as I was ending a part of my life's work and beginning to think to the future. My Indigenous[3] family, friends, and colleagues have taught me to attend to such simultaneity.

This paper focuses on how I have been attempting to attend to it within science teacher education.

I begin by explaining how I have come to this work and my positionality within it. I move on to outline the TRC's (2015a) Calls to Action with respect to education in order to: (1) situate them in relation to other documents regarding Indigenous peoples and education; and, (2) to underline the consistency of messaging regarding the importance of education in redressing relationships between Indigenous and non-Indigenous people. In considering what that consistency asks of teacher educators, I summarize a (r)evolution in practice implemented in science teacher education at the University of Alberta, and how it led to deeper understandings of place/Land in terms of how, why and what we teach. I then interrogate the idea of place, place/Land, and *Land*[4] in relation to the colonial classification of place-based learning to problematize thinking that suggests particular projects can easily travel from place to place. Next, I bring the thinking together to present a (r)evolution in my current teaching practice that has allowed me to find a place/Land at home. Finally, I conclude the paper with some thoughts about the ongoingness and locatedness of the work, and the need for teacher educators to figure out what that means in their own contexts. To be clear, the paper does not focus on Indigenous science or Indigenous science education — both of those ideas are more community based — but rather it offers a small and still-in-process glimpse into how I am finding a place/Land at home to begin engaging with the Calls to Action of the TRC in science teacher education.

MĀRAMATANGA AS A MEANS OF POSITIONING MYSELF WITHIN THE WORK

> Identifying, at the outset, the location from which the voice of the researcher emanates is an Aboriginal way of ensuring that those who study, write, and participate in knowledge creation are accountable for their own positionality. (Absolon & Willet, 2005, p. 97)

I am a white woman from Montreal, QC. I attended schools from kindergarten through my first degree where teaching and learning were embedded in Western traditions. For the last 25 years, I have lived and worked alongside Indigenous people, peoples, and communities. In this context, I became a teacher, and began the process of struggling with the received wisdom of my previous learning. The work began in 1993 when my long-term mentor, Corinne Mount Pleasant-Jetté, asked a seemingly simple question, "You know those summer science camps you ran as an undergrad? Do you think we could run them for Native kids?" Corinne was a professor in the Faculty of Engineering and Computer Science at Concordia University (Montreal, QC), a member of the Faculty's decanal team, my direct supervisor, and a member of the Tuscarora Nation from Ohsweken (Six Nations of the Grand River) in Ontario. For the next 16 years, we worked together supporting K-12 science and mathematics

teaching and learning for Indigenous children and youth through the Native Access to Engineering Program (NAEP) at Concordia, and its successor, Mount Pleasant Educational Services (Mohawk Territory of Kahnawà:ke).

In taking up doctoral studies and subsequent teaching and research in a university context, I frequently return to the question Kovach (2005) says challenges non-Indigenous people in contexts such as my own, "Am I creating space or taking space?" (p. 26). In the questioning, I have been reminded that the relationships I have been invited into over the years come with responsibilities and obligations to share and put into action what has been shared with me. One manner in which I do so is by attending to Stewart-Harawira's (2005) call for paying serious attention to "the possibilities inherent in indigenous ontologies" (p. 34) within the academy. Therefore, I base research in Indigenist research methodologies (IRMs) (Kovach, 2005, 2009; Smith, 1999, 2005; Shawn Wilson, 2008) as a means of decolonizing research (Denzin, 2005) or, perhaps more accurately, engaging in an ongoing process of "unlearning colonialism" (Dwayne Donald, personal communication, December 21, 2016) with the intent to transform teaching, learning, research, and the "underlying structures and taken-for-granted ways of organizing, conducting, and disseminating research and knowledge" (Smith, 2005, p. 88).

My approach begins by privileging Indigenous Elders, thinkers, activists, and scholars in order to unsettle the origins of my own knowing, being, and doing and to move beyond decolonization as metaphor (Tuck & Yang, 2012) by putting ideas into practice. Here I draw on a concept borrowed from Hawai'ian scholar Manulani Meyer (2013) that she names *māramatanga*. She describes it as "practicing the teachings and ideas that I am teaching so as to live the ideas I believe in" (15:13). *Māramatanga* thus suggests understanding only comes through deep, reflective engagement with embodied practice. In this way, it aligns with advice I received during my M.A. research from Elder Dr. Lillian McGregor (Whitefish River First Nation) at the University of Toronto: "Sometimes you just have to do it. You know, like Nike" (personal communication, April 4, 2002).

As I have come to understand, the just doing it is not for the sake of doing it, but rather a means of beginning (sometimes again) an ongoing, iterative practice without which nothing changes. Given the need for practice, time, and reflection, coupled with my position as a white woman raised in distinctly different traditions, I acknowledge that my attempts at engaging with Indigenous ways of knowing, being, and doing are always in the process of becoming, always "not yet" (Greene in Pinar, 1998, p. 1). Nonetheless, I return to the process again and again with the hope that such a return is not a spinning around in circles, but rather a means of deepening learning that extends back to the invitation offered by Corinne in her question about summer camps (Wiseman, 2016).

THE TRC, ITS (RELATIVELY) RECENT RELATIONS, AND FOMENTING (R)EVOLUTION

One of the things I reflect on with respect to my work are the tensions of reconciliation. As noted in the TRC (2015c):

> To some people, reconciliation is the re-establishment of a conciliatory state. However, this is a state that many Aboriginal people assert never has existed between Aboriginal and non-Aboriginal people. To others, reconciliation, in the context of Indian Residential Schools, is similar to dealing with a situation of family violence. It's about coming to terms with events of the past in a manner that overcomes conflict and establishes a respectful and healthy relationship among people, going forward. (p. 6)

Like the Commissioners, I take up the term reconciliation in this latter sense, but recognize relegating violence to the past is not possible when ongoing violence is perpetuated by individuals and agencies of the Canadian state (see, for example, Jago, 2018; Unist'ot'en Camp, 2019). Nonetheless, I hold on to the difficulty of the concept of reconciliation to see if it allows for anything useful, any *māramatanga* (Meyer, 2013). In this sense, I find it helps to place the TRC and its Calls (TRC, 2015i) in conversation with their historical relations.

The TRC (2015c) calls for a fundamental shift in relationships between Indigenous and non-Indigenous people, peoples, and communities in Canada so that future generations "can live together in dignity, peace, and prosperity on these lands we now share" (p. 13). Of its 94 Calls to Action (TRC, 2015a), eleven directly address education in some manner. The *Education* section (pp. 1-2) contains 6 calls focused on addressing education of and for Indigenous students from early childhood through post-secondary levels. These calls include: tackling inequitable per student funding between Indigenous and non-Indigenous young people; creating mechanisms for school accountability to Indigenous communities and parents; and, developing means for revitalizing Indigenous languages. The *Education for reconciliation* section (pp. 7-8) contains four additional calls focused on education in Canada more broadly. These calls include the focus of my work for the last quarter century, particularly development of K-12 curricula and teacher education that "integrate Indigenous knowledge and teaching methods into classrooms" (p. 7), and research that considers the manner in which such processes can occur.

The TRC (2015i) is a key historical instance of documenting and acknowledging the violence and atrocities perpetuated on Indigenous young people and their families via the Canadian state through the residential school system. At the same time, the report is hardly the first instance where Indigenous people have laid out and reminded settler people and peoples in Canada of the terms for respectful, healthy, and peaceful relationships. With regard to education, many of the TRC recommendations echo other reports, policies, position papers, and treaties dating back to the arrival of European newcomers. Over the last 50 years, notable contributions such as *Indian Control of Indian Educa-*

tion (ICOIE) (National Indian Brotherhood (NIB), 1972), the *Royal Commission on Aboriginal Peoples* (Dussault et al., 1996), the Minister's Working Group on Aboriginal Education (Jeffrey & Mount Pleasant-Jetté, 2002), and the *Accord on Indigenous Education* (Archibald, Lundy, Reynolds, & Williams, 2010) have consistently pointed to the importance of Indigenous languages, Indigenous community control of education, equitable per student funding, and development of K-12 curricula and teacher education programs that engage with Indigenous ways of knowing, being, and doing, as a means of both supporting the teaching and learning of Indigenous students and redressing relationships between Indigenous and non-Indigenous peoples in Canada. A relatively recent outcome of this consistency has been policy mandates in most provinces and territories for integration of Indigenous perspectives across K-12 curricula in all subject areas taught in provincial / territorial schools (e.g. Alberta Learning, 2002; Ontario Ministry of Education, 2007).

Integration is not a new proposal. It arose in the 1950s as an assimilative federal policy aimed at moving Indigenous students from residential schools and into provincial schools (Kovach, 2009). *ICOIE* (NIB, 1972), however, challenged the assimilative notion of integration to suggest it might become a two-way process where both Indigenous and non-Indigenous students might learn within a "curriculum which blends the best from the Indian and the non-Indian traditions" (p. 25). Two-way integration requires shifts and re/alignment across the educational system among a wide range of educational stakeholders. While there were some attempts at such change in the 1980s and 1990s (Abele, Dittburner, & Graham, 2000; Betkowski, 1987; Saskatchewan Education Training and Employment, 1989), the attempts were not taken up in a systemic manner by teacher education programs or by teachers in classrooms (Wiseman, 2016). More recent policy statements (e.g. Alberta Learning, 2002; Ontario Ministry of Education, 2007), and the manner in which they have been / are being translated into provincial / territorial curricular documents (e.g. Alberta Education, 2005; Saskatchewan Ministry of Education, 2009) seem more promising, if only because they are forcing teachers to respond. Darren McKee,[5] a former Deputy Minister of Education in Saskatchewan and current Executive Director of the Saskatchewan School Boards Association, notes that such change, while uncomfortable, amounts to revolution:

> If you're comfortable, you're going to continue to do what you're doing. Right? That's human nature.... You really need to have a revolutionary shift and then allow evolution to manage that shift. In my mind, it's the teacher talking about things like "I have to do this." The revolution is, yes, [ministries of education are] going to force people to do it. The evolution is then they will understand — or come to understand — that it was a great choice to do it, but not everybody does that at the beginning of the process. (Personal communication, December 2, 2011)

I have spoken with teachers and other educational stakeholders (both Indigenous and non-Indigenous) in provinces and territories where policy mandates for integration exist (Wiseman, 2016). In many cases, they acknowledge that the mandates, and the subsequent translation of the mandates into science curricula, have provided the impetus for attempts at implementation in the classroom. Really coming to understand what integration looks like in the classroom, however, is an ongoing, iterative process. In many different ways, the educators with whom I had conversations (Wiseman, 2016) acknowledged the sense of tension, discomfort, unease, unfamiliarity that Darren McKee (personal communication, December 2, 2011) suggests is necessary for beginning the process. At the same time, despite these (often significant) tensions, none of the educators I spoke with had given up. Instead, they were engaged in trying something, being unsatisfied with it, modifying it, and trying again. Their rhythm of return leads me to conceive of the revolution to evolution McKee proposes as (r)evolution.

While (r)evolution and its parentheses may seem like academic affectation, it helps express a concept which I struggle to articulate (Wiseman, 2016), perhaps because it does not exist in English (Little Bear, 2012; Lunney Borden & Wagner, 2013). The work of engaging with Indigenous ways of knowing, being, and doing requires (at least for those of us who do not come from those traditions) a starting point. That starting point may be some kind of push (D. McKee, personal communication, December 2, 2011), or an invitation to think about science camps. Once you have begun, however, what you find – or at least what I have found, what many of my colleagues have found (e.g. Lunney Borden & Wagner, 2013), and what the educators I spoke to within my dissertation inquiry expressed – is an ongoing process of return. Not a spinning around in circles as much as a patterned and complex (r)evolution around what it is you are trying to understand through practice (Wiseman, 2016). You become engaged in an ongoing process of learning where sometimes you feel like you are back where you started, but then realize it both is and is not the same place, because you come back to it having learned more. (R)evolution – at least for the moment – expresses the process in a manner I can live with because it suggests that the process is ongoing and uncomfortable, but also that the process involves return, perhaps to something new.

So, the TRC and its calls (2015i) may not be entirely new, but they may be one of those powerful pieces of thinking that acts to foment (r)evolution. As Kovach (2009) underlines, however, education is always "more than a matter of policy" (p. 160) and government intention. Research supports the notion that teachers in Canada understand their role in implementing policy as presented in curricula, but struggle with the what it might look like, particularly when it challenges their current understandings, practices, and values (Aikenhead & Elliott, 2010; Barrett & Pedretti, 2006; Hart, 2002). Hart (2002) proposes that the negotiation of such challenges is facilitated through "meaningful intellectual

encounters" (p. 1243). As a doctoral student at the University of Alberta, I was directly confronted with what such meaningful encounters might look like in science teaching and learning in teacher education (Wiseman, 2016; Wiseman, et al., 2015).

PLANTING PEDAGOGICAL (R)EVOLUTION IN (SCIENCE) TEACHER EDUCATION

I arrived at the University of Alberta in the late summer of 2009, seven years after the province had adopted its *First Nations, Métis and Inuit Education Policy Framework* (Alberta Learning, 2002). Given delays between policy adoption and translation into provincial curricula documents, the changes with respect to science curricula were still relatively new, and very much in flux, both in terms of how they were taken up in K-12 classrooms and in teacher education. Within science methods courses in my department, integration was generally addressed by a single lecture, delivered by invited guests from a local First Nation or by faculty members and graduate students (Indigenous and non-Indigenous) whose work and research explored how Indigenous and Western conceptions of the world and the way it works might circulate together. Usually these guests had no relationship with students beyond the lecture. Thus, while the one-time interventions occasionally piqued the interest of a few students, they laid little fertile ground for significant change in practice for most students (Wiseman, et al., 2015). Fortunately, in considering how to shift these one-time interventions to more meaningful, extended encounters where pre-service teachers might explore "the idea that the Western (Canadian) knowledge system represents only one way of knowing and being" (Kelly, Shultz, Weber-Pillwax, & Lange, 2009, p. 263), an opportunity arose to reclaim and repurpose some space within the Faculty.

The Indigenous Teaching and Learning Gardens grew in these spaces, and rendered them more particular places/Land with something to teach. The Gardens consist of planters on two balconies, and a larger, on-the-ground site. Each site is populated with plants indigenous to Alberta and the prairies. In many ways, the sites are consistent with school gardens found in schools and school yards across Canada. In others, they have served as a fallow ground for remarkable (re)evolutionary teaching and learning for the community of students (undergraduate and graduate), faculty, staff, and Elders who have been involved in ongoing living relationships in and with the Gardens.

My colleagues and I have attended to and shared multiple stories from the Gardens (e.g. Wiseman, Glanfield, & Donald, 2012; Wiseman, Onuczko, Glanfield, & Donald, 2013; Wiseman, 2016) that demonstrate how they are a place where Indigenous and Western ways of knowing, being, and doing might circulate (and perhaps grow) together. Given the success of the project in terms of supporting pre-and in-service teachers in coming to understand that

engaging with Indigenous perspectives in science education is, as one student participant told us, "totally doable" (personal communication, May 8, 2012), colleagues in other parts of the country have expressed interest in the seeds of what we do / have done in the Gardens — presumably so that it might be reproduced in their own contexts. In response, we have emphasized that what we do may look indistinguishable from other science methods courses, but what is fundamentally different about teacher education in the Gardens, what might be (r)evolutionary, are the assumptions in which we grounded the project.

The root assumption is based on advice offered by Blackfoot Elder Narcisse Blood, a few years before his passing: "The worst thing to do is nothing and just go with the same" (personal communication, March 16, 2012). As such, the Gardens grew out of the idea that provincial policy regarding integration of Indigenous perspectives (e.g. Alberta Learning, 2002) is not primarily about the content of subject areas taught in schools. Instead, we assumed that such mandates are asking for something different in terms of pedagogy. So, even before the Gardens existed in a physical sense, we drew on ideas planted almost 50 years ago regarding two-way integration (NIB, 1972) so that in the Gardens, we might "learn from each other in balanced ways" (Donald, 2013, p. viii) as Treaty peoples with relationships and responsibilities to each other and the *Land* that we share. We also grounded the work in understanding that "the sustainability of human life and living depends on the repeated renewal of good relations with the entities that give us life" (Donald, 2013, p. viii, emphasis in original). These commitments led us to realize that teaching and learning in the Gardens emerges from living with the plants and each other in teaching and learning, but also from living with the plants and the Gardens on their own terms because there is no way to observe plant growth in a garden still covered in snow. In these ways, the Gardens opened up a place for everyone involved in the project to begin learning from *Land* as active teacher (Zinga & Styres, 2011), rather than about land as passive, inanimate object.

UNLEARNING COLONIALISM THROUGH LAND AND PLACE

As I am still coming to understand, *Land*, capitalized and italicized per Zinga and Styres (2011), indicates an identifiable geographical location where animate earth, air, and water come together with all the beings (human and other-than-human) who exist and have existed in physical, emotional, intellectual, and spiritual relationships with and within that place/*Land*. This is *Land* that is "storied" (Donald, 2009, p. 129), *Land* that speaks (Basso, 1996), *Land* that can be listened to (Hogan, 2000), *Land* as first teacher and pedagogy (Zinga & Styres, 2011), and *Land* that has birthed countless generations and accepted them back in death as a part of itself (Stan Wilson, 2001). In their discussion of place and the manner in which it is taken up in contemporary research, Tuck and McKenzie (2015) note that Western interpretations of *Land* as presented above can be overly romantic. They underline that "in Indigenous

worldviews, relationship to land are...familiar, and if sacred, sacred because they are familiar" (p. 51). This conception of *Land* largely falls outside Western ways of knowing, being, and doing (Cajete, 1999, 2006; Tuck & McKenzie, 2015), and leads to tensions in trying to understand the pedagogy of the Gardens. In fact, what I find happens in presenting about the Gardens is one of the activities Tuck and McKenzie (2015) describe as primary to European colonialism: classification. People suggest all sorts of existing and pre-framed constructs for how the Gardens might be classified — STEM, project-based learning, best practice — but nothing comes up more often than place-based education / learning.

Place-based education / learning emphasizes multidisciplinary engagement of students in problem solving or service related to issues emerging from local contexts (Calderon, 2014; Gruenewald, 2003, 2008; Styres, Haig-Brown, & Blimkie, 2013). It is a broad field with significant diversity in uptake and application, but often includes a focus on experiential learning, community engagement and connection, out-of-school / outdoor experiences, intergenerational learning, and student-led projects as a means rendering curriculum less abstract and more relevant to students' lives (Gruenwald, 2003). In these descriptions, I understand why people want to classify the Gardens as place-based learning, because the project shares many of the same features. At the same time, while place-based learning does not preclude Indigenous ways of knowing, being, and doing, Calderon (2014) and Styres, Haig-Brown, and Blimkie (2013) strongly suggest the approach is inadequate for decolonizing education. It does not account for "Land as sentient" (p. 192) and living, nor does it explicitly work to expose the manner in which settler assumptions about the world and the way it works have silenced Indigenous ways of knowing, being, and doing, separating humans from *Land* and *Land* from all its relations, thus breaking down pedagogical relationships that have been in place for thousands of years. Both Calderon (2014) and Styres, Haig-Brown, and Blimkie (2013) suggest that more critical approaches to place-based learning such as Gruenewald's (2003, 2008) critical pedagogy of place can be supportive in addressing some of these insufficiencies, particularly in relation to decolonizing goals, but conclude these approaches are still too grounded in Western ways of knowing, being, and doing to account for a significantly different understanding of place that includes "Land as living fundamental being" (Styres, Haig-Brown, & Blimkie, 2013, p. 192). Here, they identify one of my primary difficulties with the labeling of the Gardens: all the labels on offer are grounded in Western ways of knowing, being, and doing, while in the Gardens, Western ways appear to circulate together with Indigenous ways of knowing, being, and doing. So, identifying the Gardens too closely with pre-existing constructs limits what the Gardens (and the people who learn with and from them) are and what else they might become.

Moreover, these critiques of place-based learning remind me to attend to *Land* as active entity in understandings developed in specific places. That is, *Land* speaks, but does not necessarily speak the same language in every place. As I understand it, within Indigenous ways of knowing, being, and doing there is an intimate relationship between language and place/Land (Basso, 1996; Hermes, 2005; Little Bear, 2012; Watts, 2013) that arises because language is connected to and emergent from *Land*. Dwayne Donald has told me that the *Land* in Alberta speaks Blackfoot and Cree and struggles with English (personal communication, December 21, 2016). Watts (2013) explains the idea as "based upon the premise that land is alive and thinking and that humans and non-humans derive agency through the extensions of these thoughts" (p. 21). The implication is that without access to the language *Land* speaks, it is difficult to understand certain things related to place/Land; that certain ideas may only exist in particular languages (and places/Lands). In the case of the Gardens, as my colleague and mentor Florence Glanfield has said, we see evidence of these kinds of living relationships at play in "how the Gardens are leading with people to act for them" (personal communication, May 31, 2011). I am not claiming that everyone learns to hear the *Land* speak by engaging with place/Land. I am claiming that the experience in the Gardens strongly suggests that developing relationships with place/Land significantly impact educators' (at all levels) understandings of how Indigenous and Western ways of knowing, being, and doing might circulate together in science curricula, and may lead to developing understandings that *Land* exists. Thus, place or place/Land in this sense is a fluid concept. For people unfamiliar with Indigenous ways of knowing, being, and doing, place may just be a location in which they are comfortable, but — because of that comfort — more able to enter into the process of unlearning colonialism through conversations in which Indigenous and Western ways of knowing, being, and doing begin to circulate together. For people more familiar with Indigenous ways of knowing, being, and doing, place may be an intimate relationship with and belonging to specific geographical places, place/Land or *Land*, that allows people to hear and understand what places have to teach.

These understandings of and experience with place, place/Land, *Land*, language, and the relationships between them thus inform my position as a science teacher educator. As I came home to Montreal to take up science teacher education in a different place, in a *Land* that speaks Kanien'kéha (Mohawk) and Algonquin, I kept returning to a point raised by Hermes (2005) about the relationship between place and language; *ma'iingan* removed from *Land* loses its spirit and becomes merely a wolf. It was clear to me that in attempts to consider how Indigenous and Western ways of knowing, being, and doing might circulate together in the context of Québec, I could not engage in "the illusion of benign translatability" (Battiste & Henderson, 2000, p. 80) by misplacing the Gardens from the University of Alberta to a *Land* that does not speak their language. And so I was faced with the question of how to find a place (or place/Land) at home.

FINDING A PLACE AT HOME

While I agree with Kovach (2009) that education transcends the limitations of policy, and it is therefore possible for educators to engage with Indigenous ways of knowing, being, and doing in teaching at any time, policy in place can also be helpful in opening up conversations. As Darren McKee (personal communication, December 2, 2011) said, it is the discomfort of having to do something that begins (r)evolution. Unlike most other provinces and territories Québec has no requirement for engaging with Indigenous perspectives across K-12 curricula, in science or any other subject area (Wiseman, 2016). And so, while I know that many of the underlying assumptions I bring to teacher education are based on what I have learned alongside Indigenous people, peoples, and communities, I was left wondering how I might begin explicit conversations with pre- and in-service educators in the courses I teach at McGill.

My first step was to examine the Québec Education Programs (QEP) for science (Ministère de l'Éducation, 2001, 2004, 2007). While the QEP positions science as human activity embedded in social and cultural contexts, the social and cultural context of science curricula in Québec is firmly ensconced in Western traditions. As an example, from Kindergarten through Grade 10, the QEP for science requires the integration of "cultural references" (e.g. Ministère de l'Éducation, 2004, p. 231) within science teaching and learning. These references include: historical figures and events related to science and technology, such as Leonardo da Vinci and the Industrial Revolution; community resources, such as museums and professional organizations; and application of science and technology to daily life. While the program notes that cultural references may extend beyond the examples provided in curricular documents, there are no explicit references beyond Western examples, with many of the references located not in Québec, Canada, or the Americas, but in Europe. Moreover, of the 81 scientists and engineers named in the general science programs from kindergarten to Grade 10, all of them are white, and only three are women. As such, cultural references in the program seem framed in very particular manner.

Given the above situation, there did not seem to be much place for consideration of Indigenous ways of knowing, being, and doing within the QEP. So, in my first term of teaching at McGill, instead of rushing into conversations that would be difficult to ground in pre-service teachers' understandings and experiences, I held onto a Blackfoot word shared by Narcisse Blood (personal communication, March 15, 2012), *aokakiosiin*, that describes becoming "wisely aware of where you're at.... Of things that you see — not just things you see, but things you don't see. That is very important, one component of pedagogy." As I paid attention to where I was at, I found a place in which I might begin. Unsurprisingly, it was a garden.

Towards the end of my first term at McGill, I found out that the Faculty of Education had a relatively new outdoor learning space. As at the University of Alberta, it is a modest piece of reclaimed land between buildings. Knowing that the lot existed returned me to an early story from the pilot project in which we established the Gardens (see Wiseman et al., 2015). The pilot occurred during a winter term secondary science methods course. Conversations between the project Elder, the course instructor, myself, and other team members regarding what plants indigenous to Alberta should be included in the Gardens, were interspersed with research to determine what seeds were actually available at reasonable cost in Alberta in January. While there were obvious choices such as fireweed (the first plant to spring up after a fire), there was not a lot of overlap between the two lists, and so we dug deep into online research for alternatives. One morning, one of my colleagues arrived confident she had found an answer.

"Corn, beans, and squash" she said.

I shook my head, "Nope."

"Why not?" she asked, looking somewhat deflated.

In some ways she was right. Corn, beans, and squash are plants indigenous to the Americas. They have been cultivated in many places for an extremely long time, but not in northern Alberta because it is too dry; and thus not the place/ Land or *Land* for these plants. I knew about corn, beans, and squash, or the Three Sisters, from Corinne, who knew about them from her Tuscarora family, *Land*, and a cousin in another branch of the family, Jane Mt. Pleasant. Dr. Mt. Pleasant is an Associate Professor of Horticulture at Cornell University whose research focuses on Haudenosaunee agriculture (Cornell University, 2017). The Haudenosaunee are a confederation of six nations: Mohawk, Oneida, Cayuga, Seneca, Onondaga, and Tuscarora (Haudenosaunee Confederacy, n.d.). McGill sits on Haudenosaunee territory, and specifically Kanien'kehá:ka (Mohawk) *Land*[6] (McGill University, 2017).

Finding out about the outdoor learning space helped me begin more grounded conversations with the people who had started the project, and with people in the Faculty's Office of First Nations and Inuit Education (OFNIE). OFNIE connected me with a graduate student from Kahnawà:ke with experience teaching in and with a Three Sisters garden. Together, we planned labs for elementary science methods where the Three Sisters would serve as a means of teaching and learning from place/Land, and also as a means of opening conversations about engaging with Indigenous ways of knowing, being, and doing within Québec. Still, I was experiencing some tension with regard to how to situate these conversations more broadly within science teaching and learning. I had some worries that in providing pre-service teachers with a solitary concrete example of what it might look like to have Indigenous and Western ways of knowing, being, and doing circulate together, they might think that was it,

that there were no deeper implications to this kind of work and learning in teaching, that for them there would be no (r)evolution. And then, the full and final report of the TRC (2015i) was released.

As I have already noted, the TRC (2015i) serves as both an acknowledgement of the horrors of residential schools in Canada, and a map for moving toward healthier relationships between Indigenous and settler peoples. It is a difficult and uncomfortable read, but it is also an important read. I have listened to my colleagues and students discuss how what it lays out has a place within social studies, history, perhaps language arts. I heard similar conversations at the University of Alberta with regard to the provincial mandates with respect to integration of Indigenous perspectives in education (Alberta Learning, 2002). The policy mandates regarding integration are more or less explicit regarding science (and other subject areas) (Wiseman, 2016). At first glance, the connection to science within the TRC is less explicit, but it is there, in the very last volume of the document, *Reconciliation*:

> If human beings resolve problems between themselves but continue to destroy *the natural world, then reconciliation remains incomplete.* This is a perspective that we as Commissioners have repeatedly heard: that reconciliation will never occur unless we are also reconciled with the earth. Mi'kmaq and other Indigenous laws stress that humans must journey through life in conversation and negotiation with all creation. Reciprocity and mutual respect help sustain our survival. It is this kind of healing and survival that is needed in moving forward from the residential school experience. (TRC, 2015c, p. 13, emphasis added)

The natural world is the very focus of science teaching and learning in Canadian provinces and territories (Wiseman, 2016); as such, the TRC asks us to deeply consider how, why, and what we teach within the sciences.

Now, I begin each of my courses with an acknowledgement of territory, discussion of the TRC (2015i), residential schools, teachers' role and obligations in redressing relationships, and how my work and being as a teacher and researcher have developed alongside Indigenous people, peoples, and communities. I then share how the TRC is related to teaching and learning in the sciences to open up conversations about how reconciliation requires deep consideration of what, how, and why we teach within the sciences.

While I continue to develop this aspect of teaching, it is at play in all the courses I teach. It is perhaps best developed for the moment in elementary science methods where we relate Indigenous ways of knowing, being, and doing to concepts and big ideas considered within the QEP (Ministère de l'Éducation, 2001) such as climate change, what constitutes living, and systemic relations and interactions. The culminating exploration in elementary methods is embedded in consideration of the Three Sisters within the Haudenosaunee territory in which my students and I live. In this multi-week lab, we discuss plants indigenous to the Americas, selective breeding, the political, nutritional,

and spiritual importance of corn, beans, and squash to the Haudenosaunee, place/Land and *Land*, the history of the Three Sisters in the conquest and settlement of what is now Québec, and when possible, have a guest from Kahnawake who can share stories about the Three Sisters role in the long-ago emergence of the world. We also plant seeds, make observations of their growth, and then transplant them to a Three Sisters Garden in the Faculty's outdoor learning space.

Ultimately, I hope we harvest the Three Sisters in fall, gather and dry seeds for replanting, and use the vegetables as a base for a community feast where more stories and discussions about cycles of life, place/Land and *Land*, might emerge. In these early versions of the Three Sisters garden, however, we find we are sharing the bounty with many other-than-human relatives on campus and from nearby Mont Royal. Right now skunks, raccoons, and various types of birds and other small critters, are feasting on the fruits of our labour. But they too become part of the discussions in class in terms of relationships and what is needed to sustain life. On the last day of spring courses, we connect all these explorations and discussions back to the acknowledgement of territory on the first day of fall courses. Thus, I feel that pre-service teachers leave for their in-school placements not only with something to do with regard to engaging with Indigenous ways of knowing, being, and doing in science teaching and learning, but also with (at least) the beginnings of understanding how and why it is important to do it in this particular place/Land. And so, I have found a place at home which I hope brings about and contributes to (r)evolution.

CLOSING THOUGHTS

Finding ways for ourselves and future generations to "live together in dignity, peace, and prosperity on these lands we now share" (TRC, 2015a, p. 13) is not a one-time event. It is something we must return to over and over again, and keep working on, together. What works in one place, or in a specific place/Land or *Land*, may not work in another, or not in the same way. (This too is a lesson in science). There is no easy answer for how Indigenous and Western ways of knowing, being, and doing might circulate together in science teaching and learning, just as there are no easy answers to reconciliation and unlearning colonialism. There are only multiple answers that are located and placed, that live and breathe in the *Land* and relations that exist in what is currently Canada — or more accurately in the territories and nations that what is currently Canada is mapped onto. What I offer here then is one small instance of taking up the work and living obligations in my place/Land. I am not saying that others can necessarily do what I have done, for the specificities of each person's context and their experiences are the only things that can help define what occurs in local places / Lands. But I have pointed to places for beginning, for coming to understand, for unlearning colonialism, and, perhaps, for (r)evolution. So, I end by inviting you to begin. *N'ya: weh.*

NOTES

1.   The Final Report of the TRC (2015i) is divided into 6 volumes (TRC, 2015b-h). Where I am referring to the entire work, I will reference the web page where the entire report can be found (TRC, 2015i). Where I am drawing from a specific volume (e.g. TRC, 2015c), I will reference that volume only.

2.   I thank the following organizations for the scholarship and research funding that supported much of this work: the Social Science and Humanities Research Council of Canada, along with the Faculty of Graduate Studies and Research and Faculty of Education at the University of Alberta. I also thank the people with whom I have worked closely in developing and learning from the Gardens — Stephanie Appelt, Dwayne Donald, Florence Glanfield, Isabel Kootenay, Alvine Mountain Horse, and Tracey Onuzcko — and the many students whose courses brought them to the Gardens.

3.   I use the term Indigenous to refer to collectively to First Nations, Métis, and Inuit people, peoples, and communities in Canada. I recognize that such collective terms do not reflect the locatedness and complexities of specific nations' and peoples' epistemological, ontological, and cosmological relationships with the world. I nonetheless use the term because, as Métis scholar Chelsea Vowel (2016) notes, there is nothing better available to us at this time.

4.   I use the terms place, place/Land, and *Land* in different senses. While place may be specific — like Montréal, a garden, or a kitchen — it is a term that suggests a location that can be occupied, used, passed through etc. but not necessarily in a meaningful manner. *Land*, on the other hand, is as described by Zinga and Styres (2013), a meaning/full, sentient, geographic location from which specific peoples have emerged and with / within which people and specific peoples have engaged in long-term, mutually sustaining relationships supported by ceremony. Place or place/Land is a term I am using — at least for the moment — to consider places like the Gardens which have moved beyond place, but that may not yet be *Land*. The difference in terminology is not to categorize into distinct boxes so that place/Land is not, or cannot, simultaneously be *Land*. The difference is rather to indicate that in the process of learning / coming to know and in terms of the experience of long-term mutually, sustaining relationships, people / peoples may, in fact, have different relationships with the place and/or land.

5.   Some of the people cited in this work informed my dissertation (Wiseman, 2016). Many waived anonymity and are identified by their own names. Those who chose a pseudonym are indicated with an asterisk.

6.   Montreal has been a meeting place for a number of Indigenous peoples, including the Anishinabeg. In acknowledging territory at McGill, I include both the Haudenosaunee and Anishinabeg peoples.

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