

THE PLAINS CREE CONNECTIVE STONES THEORY: EARTH-SKY VERTEBRAL SPINES AND UMBILICAL CORDS

Line Laplante, MA, BA, BA

Interdisciplinary Studies

Specialization in Native Spirituality

International Indigenous Studies & Development Studies

elksmile2@gmail.com

Abstract

Set within the context of a traditional Plains Cree sweat lodge ceremony, the connective stones theory is interpreted according to Cree cosmologies of the Swampy (Ontario), Woodlands (Manitoba), and Plains (Alberta) Peoples that recognize parallel vertebral spines and umbilical cords between the sky and earth worlds. I make a connection between the human spine and five other-related forms of being: 7 stars constellations, 12 thoracic and (12 x 2) ribs of a ceremonial sweat lodge frame, the first 5 hot rocks of a sweat lodge fire, the cradle (or pit) of the lodge, and the sacred pipe. This theory utilizes Indigenous metaphor as a research tool to explore concepts of interconnectivity, relationality, and communication between earthly beings, human activities, and the cosmos. Everything in the universe is made of stardust: bones of spinal columns, willow saplings, animals, and all other forms of beings of physical and spiritual states—all are considered *asiniyak* (stones) in the connective stones theory.

Résumé

Dans le contexte d'une cérémonie traditionnelle de suerie des cris des plaines, on interprète la théorie des pierres liées d'après les cosmologies des cris des marais (Ontario), des bois (Manitoba) et des plaines (Alberta). Tous ces peuples reconnaissent l'existence, entre les mondes céleste et terrestre, de colonnes vertébrales et de cordons ombilicaux parallèles. Je fais le lien entre l'épine dorsale humaine et cinq autres manières d'être apparentées : les constellations à sept étoiles, les côtes (12 + 24) d'une suerie traditionnelle, les cinq premières pierres chaudes d'un feu de suerie, le fossé de la suerie, et la pipe sacrée. Cette théorie se sert de métaphores autochtones comme outils de recherche afin d'explorer des

concepts de liens, de relations et de communications entre les êtres terrestres, les activités humaines et le cosmos. Tout dans l'univers est constitué de poussière d'étoiles : l'os de la colonne vertébrale, les plants de saule, les animaux, et toutes les autres sortes d'êtres et d'états physiques et spirituels : dans la théorie des pierres liées (connective stones theory), tous sont perçus comme étant des pierres (asiniyak)

Stories of the sacred were always there; Indigenous people experienced a period of forgetting, now they are remembering.

Crier (Maskwacis, Alberta), 20 April 2019

Introduction

What sets Indigenous worldviews apart from Western ways of knowing, is their spiritual orientations where belief, recognition, and acceptance of the physical (visible) and spiritual (invisible) spheres are considered as one seamless symbiotic whole. For example, time and space on earth and throughout the universe are considered flexible where the past, present, and future occur simultaneously, as in "polychromatic time" (Cajete, 2019). Space and time are undefined and unrestricted by man-made boundaries and include notions of folding time, mind travel, and powers of invisibility.

Indigenous educator Dr. Gregory Cajete stresses the importance of incorporating Indigenous education in Western academia,

Native science is a metaphor for Indigenous knowledge and that education is a kind of condition, thus what is turned on and what is turned off, is a form of orientation. To come into resonance order requires the mind to accept that what happens in the cosmos, affects what happens on earth. There is no separation between the physical and spirit world, which is observed in patterns left on earth in the form of petroglyphs, medicine wheels, and other models of the cosmos. Knowledge comes into a project as spirit directs it. Humans need to be in connection with the natural order. (September 25, 2019)

The connective stones theory is timely and aligns with Cajete's vision of Indigenous education suggesting that we reflect on "what causes us to think about our relationship with the natural world" (Cajete, 2019).

The sacred continues to reveal itself as personal awakenings, epiphanies, ceremonies, knowledge systems, and rememberings of ancient memories. The connective stones theory observes that the human spine is related to all that exists on earth and throughout the cosmos.

The connective stones theory

The inception of the connective stones theory begins with a dream, my dream (Laplante, 2018), where the *pawâkanak* (dream helpers) form part of the Cree consciousness (McLeod, 2007, pp. 29-30) and bring messages in dream states to humans.

While in the dream, I see two *pawâkanak* men, and hear two others, talking about an old sweat lodge frame in the distance. One *pawâkan* says to another, “show her” — meaning me. As I approach the willow frame, I see a second, third, and fourth frame nested one within the other. I intuitively know that the frames extend outward to the universe and inward into the earth. The multitude of frames represent infinity — into the past, the present, and beyond into the future. The *pawâkanak* tell me, “we are all a sacred sweat lodge living a ceremony.”

This dream is followed by an epiphany a couple of months later, while I look at a skeleton in a physiotherapy office. I make a connection between the human spine, the cosmos, and Cree teachings; it becomes the connective stones theory (Laplante, 2018).

Crier confirms that this epiphany is an “ancestral teaching remembered” (2019).

The connective stones theory recognizes a complex system of inter-creativity, connectivity, and communication between the sky world of stars and the earth plane of vertebrate beings, plants and rocks, and the sweat lodge ceremony. As everything in the universe shares the same sacred energy, there is relationality between all forms of being (Wilson, 2008). At the heart of the connective stones theory are five segments of the human spine, which mathematically correlate to other non-human states: star constellations, the natural world, and various aspects of the Cree sweat lodge ceremony.

The connective stones theory purports that each region of the human spine (*mâwikan*) relates to activities on earth and are reflected in the universe. Seven cervical bones of the human spine relate to seven star constellations, twelve thoracic discs represent the joining and crossing over of willow ribs (12 x 2) to create the sweat lodge frame, five lumbar vertebrae represent the first five hot rocks placed within the pit of the lodge, the sacrum (5 fused bones) form the pit (or cradle) inside the lodge, and the coccyx (on average 4 fused bones) are associated with the sacred pipe and the forging of male and female energies.

When equating the shape of the human spine to the frame of the willow sweat lodge, both are observed as convex and curling inward, as in

a fetal position that denotes comfort and vulnerability. Within the lodge is a concave-shaped pit—the sacrum, where the sacred *asiniyak* (grandmother and grandfather rocks) are placed. Under every ribcage are vital organs of human participants, animal spirits, and ancestors of present, past, and future. The analogy of ribs applies to vertebrate beings, willow frames of lodges, and celestial beings—all exist under metaphorical ribs of a larger living biosphere, the universe.

Numerical parallels, comparisons of microcosm and macrocosm spheres, and earth-sky reflections illustrate three types of mathematical correlations within the connective stones theory: these correlations demonstrate how the Great Spirit has formed an interwoven, related, and interdependent conglomerate of beautifully created stones.

The Plains Cree Sweat Lodge Ceremony

The Plains Cree sweat lodge ceremony is an ancient spiritual practice that takes in all elements of nature—the earth, willows, rocks, water, air, and fire. When around, within, and during a sweat lodge ceremony, participants are in direct flow with life force energies shared by all creation. From an Indigenous perspective, the expression “as above, so below,” refers to an act of mirroring, where what exists above in the universe is reflected below, throughout the sky, on the land, and in the water (Cardinal, 2019).¹

Common to Plains Cree sweat lodge ceremonies are teachings that beneath the curvature of the lodge willow spine is a space where the star nation, earth world, and sacred fire converge. The human spine is central to the connective stones theory in that each region of the vertebral spine is observed and reflected in the sky world, in human activities, and in relation to the natural world. All other-related beings of humans, plants, animals, air, water, soil, and fire are connected to songs, dreams, thoughts, and words—all interact, communicate, and relate on higher spiritual levels beyond human comprehension.

The human being as stone

In a lecture at the Banff Centre on *Indigenous Knowledge and Western Science*, Rob Cardinal, astrophysics researcher explains the beginning of the universe,

...coming from this big bang, the development of stars and galaxies, the building up of the periodic table of the elements in the furnaces of these stars, which then coalesced into stones, around yet other stars forming planets and those stones. So that great mystery of life, coming from essentially nothing, the

big bang, starting with nothing, you've got all this – that's the mystery and that's why we have science – why, how? (2015).

Cardinal goes on to say that, "human beings are made of stardust – we are essentially made of stone" (2015).

Interestingly, the Cree word for human being is *ayisiyiniw*, while for rock is *asiniy* – notice how the root words *yin* and *niy* are reflections of each other. As everything in the universe is made of stardust, all spirit embodied forms whether stars, bones, or plants and animals are considered *asiniyak* (stones). The connective stones theory examines multiplicities of cosmic and earthly relationships to discover that every vertebral being is a unique and sacred sweat lodge experiencing a life-long ceremony.

The connective stones theory puts forth that there are three forms of umbilical (*mitisiyêyâpiy*) and spinal (*mâwkankan*) cords, all of which possess mirrored (physical and spiritual) states between the earth and sky worlds. A physical umbilical cord is cut at birth, while an invisible spiritual cord remains connected to the Creator Spirit throughout life and beyond. Upon physical death, the body returns to the earth, while the spiritual umbilical and spinal cords retract to the spirit world (Bird, 2008).

In chatting with John Crier, he posits that, "stories of the sacred were always there. Indigenous people experienced a period of forgetting, now they are remembering. Many people feel a deep sense of loneliness at birth when the physical umbilical cord is cut; they spend most of their lives seeking reasons for their existence" (2019). Ceremony assists in healing from this sense of loneliness and provides spiritual clarity as to why we are here on earth.

Wagamese (2019) writes, "When we are born and we come out into this reality to find our identity, the first thing we do is cry. We cry at the sudden separation from th[e heartbeat of our spirit mother]. Our spirit journey on the planet is to seek reunion with that heartbeat" (p. 23).

A passage by Hogan (1992) offers a glimpse into what transpires inside the womb of mother earth as a place where,

The entire world is brought inside the enclosure...thunder clouds travel in from far regions of the earth...wind arrives from the four directions...it is the same air elk have inhaled air that passed through the lungs of a grizzly bear...the sky is there, with all that stars...it is as if skin contains land and birds...we remember that all things are connected (p. 34).

When water is splashed on the hot rocks during a sweat ceremony, the vapour released is considered to be the breath (*yehewin*) of the *asiniyak*,

as told in an Ininew story of *Assini Awasis*, the Stone Child (Buck, 2018, 2009, p. 79).

Cree populations across Canada vary in cultural and spiritual practices due to a number of factors, namely available natural resources, landscape, plant and animal species, and Indigenous cosmologies. For example, among the boreal forest peoples, the number of willows used for a sweat lodge can vary where, “a men’s Lodge [is] built with one hundred forty-five willow branches, and a women’s Lodge [is] built with sixty-five willow branches” (Garvin, 2005, p. 52).

Whether peoples of the boreal forest, the plains, or muskeg flats, each Indigenous group relates somewhat differently to the connective stones theory due to their geographical location and materials used in ceremony. Individual regions and the relationship between people, the land, and ceremonies creates variations in the application of the connective stones theory.

The following assumptions situate the connective stones theory in an Indigenous context and consciousness to better comprehend crossings between the spirit and physical world.

Assumptions of Indigenous sacred knowledge

Four assumptions of Indigenous sacred knowledge include: 1) at the time of creation, the Great Spirit imbues all forms of life with the same sacred life force energy, 2) Indigenous knowledge systems consider the physical and spiritual realms as one symbiotic relationship, 3) Cree spiritual beliefs include a multitiered universe that acquiesces communication between the sky, earth, and water world observable in ceremonial practices (Mandelbaum, 1940; Waugh, 2010), and 4) all that the universe encompasses is governed by unique sets of natural laws, some of which are revealed to humans on their own accord (Deloria, 2010; McAdam, 2015).

Assumptions of the connective stones theory

Assumptions pertaining to the connective stones theory include: 1) all life forms begin with stardust, 2) everything on earth is a reflection of the cosmos, 3a) there are three vertebral spines—earthly, ethereal, and cosmic, and b) there are three umbilical cords—of an earthly parent mother, of a spiritual source, and of a connection to mother earth, 4) mathematical correlations between segments of the human spine and the cosmos, the natural world, and ceremony, 5) all spinal formations of the cosmos and those living on earth are related, capable of movement, and spiritual in nature, and 6) other-related beings refers to all animate and inanimate forms.

All life forms within the cosmos are related

Late Cree Elder Albert Lightning spoke about the principles of natural law stating that, “humans’ inner natures are an exact copy of the nature of the universe, and deep knowledge of the self comes from nature” (Meili, 2012). Such knowledge is achieved through a comprehension that every aspect of life is a ceremony; life begins and ends with a breath. What matters is the journey humans experience and the energy that is generated and left behind for “it is in the journey that one becomes wise” (Wagamese, 2019, p. 53).

Indigenous Elders speak about creation stories in how they are multilayered. Deep understanding of such comes with time, age, and bearing witness when the sacred reveals itself. Cajete speaks of sacred revelations as “polychromatic time, [where] multiple time is possible, they are not linear, fast-to-slow time depends on what we are doing” (2019).

At times, earth’s beings converse in what I refer to as “earth’s multilingual comprehension” (Laplante, 2016). Examples of such comprehensions can occur when an animal takes the form of a spirit being and superimposes itself over that of a dog for instance, or a plant that telepathically speaks and teaches a person how to use its leaf, root, or when a dream helper (*pawâkan*) communicates with humans in a dream state to provide insight, direction, and knowledge of the sacred (McLeod, 2007, pp. 29-30; Auger, 1997; Peat, 1994). When this occurs, assigned natural laws cross over each other in an effort to converse with humans. The connective stones theory examines how the sacred converses with humans through ceremony, lifting the limitations of a physical body to where communication with spirit is possible regardless of form.

Next, is an explanation of Indigenous metaphor and its application as a research method in the connective stones theory.

Indigenous metaphor

The use of metaphor in Indigenous epistemologies differs from mainstream Western literary models of substitution, analogy theory, elliptical simile, conceptualism, and theory of interaction (Kessler, 2013). Metaphor in Indigenous epistemology is utilized as a vessel for the transmission of knowledge. Metaphors act as invisible companions to assist in learning cultural ways of knowing found in traditional knowledge such as reading the stars (Buck, 2018, 2009; Lee et al., 2019), beading (Dumont, 2009), canoe making (Michell, 2012), and berry gathering (Michell, 2009).

All types of learning include a sense of movement that connects speaking, active listening, doing, giving, and receiving such as in an exchange of spiritual energy that occurs between a storyteller and a story-listener. As “Indigenous epistemologies are action-oriented” knowledge is

acquired experientially through the senses by “doing” something (Kovach, 2009), where the mind travels to visualize movements, concepts, and ideas (Bell, 2004).

Indigenous metaphors have chameleon-like qualities able to mold themselves into the shape of knowledge itself. They are capable of transferring emotions, thoughts, and wisdom. They are intangible mechanisms that carry the spirit of creative thought manifested outward such as with a beading design, artwork, or celestial beings. Indigenous metaphors also take-on a neutral, non-judgmental, and third person-like quality of mirroring.

Indigenous metaphor examines concepts of connectivity, relatedness, and communication between similar states of being. Beings in the connective stones theory include humans and vertebrate animals bearing a spine and ribs; non-human life forms such as stars, trees, plants, rocks, water, air, and fire; and other-related beings such as prayers, dreams, and thoughts that function as communicative vessels. All embodied spirits regardless of physical or spiritual state “are born of the same spiritual energy,” thus have a capacity to cross communicate (Wagamese, 2019, p. 23; Auger, 1997, pp. 339-340, 346-348; McLeod, 2007, pp. 29-30).

Applications of Indigenous metaphor in the connective stones theory illustrates similarities and differences between various physical and spirit forms in how they relate and compare to each other. The firing of neurons in the human brain, for example, is compared to the sparkling lights of star constellations above, to the spiritual intelligence of rocks in the sacred fire, and to the grandfather and grandmother rocks nestled in the pit of the lodge structure. Such comparisons expands on Wilson’s (2008) discourse of relationality between people, the environment and land, the cosmos, and ideals. The concept of Indigenous metaphor requires an open mind to grasp an unfamiliar way of seeing the world around us.

The following section provides cultural context to imagine how physical and spiritual umbilical cords and spinal columns connect the sky and earth realm.

Cultural teachings

Swampy (Omushkego) Cree of Northern Ontario - The Legend of Ehep, the Giant Spider

The legend of *Ehep*, the Giant Spider told by Elder Louis Bird (*Omushkego Cree*) speaks of a giant spider who spins and creates a basket to lower two humans down to earth. An excerpt from an interview with George Fulford and Louis Bird, *Our Voices*, University of Winnipeg (2008).

FULFORD

Can you tell me that story in English now?

BIRD

And it's something like this... When the first human beings appeared on earth... came to the earth, was that these two people, the man and woman they were there somewhere, somewhere in the land where we don't know for sure exactly where it is, but they were there. And noticed that there is a land down there, the land that is so beautiful. And they so wished to go and see that land. So, there was a... there was a giant spider who noticed that they were longing to go there.

So, he [Ehep] said to them: "Do you wish to go and see and live in that land?" So, the people say: "Yes, I wish we could go there and see that land." So Ehep, which is a giant spider says: "I will help you if you do what I say. I will lower you down with my string. But you will have to sit in here, in this sort of basket, but it is actually like a... like a nest. I will lower you down in this nest, but the thing is you have to do, is you... have to do is not look at the land even when you are thinking you are getting closer. You must not look down until you touch down to this land. Because if you do that, if you look at it before you hit the ground, you will not be happy. You will have to suffer to live in that land, even though it's beautiful."

And so, they got on, agreed not to look. So Ehep the giant spider lowered them with his nest. And so, it goes down and down, but we don't know how far it is, but it seems to be far away, and it took some time to lower them into this... it is the land. It's more like the earth, sort of. So, they... they're so eager, they're so excited. And when they think that they should be there we should see it, wondered what it looks like closer. So, they went down, they look, they look over the side and notice the land. And it was just that moment that the string that hold them up sort of let go and landed on the ground forcefully. They didn't get hurt really. But what ah... what Ehep has said to them that if they should look down, they would not be happy on that land and that they would suffer, in order to live there.

Understood in Bird's story of *Ehep* are mysteries involved in the manifestation of the threads and strands in the creation of life—umbilical cord, spinal cord, muscles, ligaments, veins, and chains of amino acid sequencing that include nucleic acids, namely deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The length of these cords in living organisms vary, as do the gestation periods of newborns.

The analogy of the spider's thread that brings new life from the

above world applies to all spirit embodied forms—humans, animals, plants and also to the sun, moon, planets, and stars. To accept that all cosmic forms come from a spiritual source requires deep insight of Indigenous sacred ecologies and philosophies. In the words of Lickers, “there is an ever evolving space that humans tend to miss altogether. The relation to ceremony and human nature through the cosmos, its relation to us and our relation to it, is a symbiotic nature of our relations within the universes is ceremony” (Lickers, January 3, 2020).

As for the spider, much remains a mystery about its ability to produce a string in mid-air to ascend and descend from. The string is equated to the umbilical cord, as is the nest (or womb) that carries an unborn child into the physical world. Although scientific explanation on how the human umbilical cord is formed, the spiritual element remains a mystery, similar to the source of the spider’s string. Moreover, *Ehep* tells the humans not to look over the side of the nest until they are set on the ground or they will suffer on earth. We learn many teachings in this story, one of which is that violation of protocols results in consequence. *Wesakechak* (a Cree mythical figure) is sent by the Creator Spirit to assist humans on how to live on the land (Bird, 2008; Buck, 2018). Later in the story *Ehep*, we learn that the humans were assisted by a bear and a wolf upon their descent to earth, thus a relationship between humans and animals was formed early-on in time (Bird, 2005).

Plains Cree and Anishnawbe

A cultural teaching by Alvin Manitopyes, (2008).

Bush and Woods Cree share similar stories about the sweat lodge as an ancient purification practice. There are many different kinds of lodges built in different variations. The bear sweat was instructed to the people of the bear spirit in how many willows to be used. The bear spirit would come in during the ceremony and cover the lodge himself with his body, this is why the bear skin is placed on top of the sweat lodge. In the real old sweat lodges, there were only four very large rocks used. The lodge was very small, only four people fit in there. There were twelve standing willows and four willows around. The joining willows at the top of the lodge formed a star shape, which joined the higher plane of the spirit world. The construction of the sweat lodge varies greatly depending on its purpose.

The placing of the bear skin on top of the lodge calls-in the spirit of the bear and connects to the Big Dipper constellation—the bear’s spine is imagined as connecting the earth to the sky realm.

Earth-Sky: Umbilical and Spinal Cords

There's as many atoms in a single molecule of your DNA as there are stars in the typical galaxy. We are, each of us, a little universe. (Neil deGrasse Tyson, *Cosmos*)

Umbilical cords

Life begins with sacred energy imbued by the Creator Spirit at the time of creation. Indigenous cosmologies, philosophies, and ways of knowing deem this energy to be sacred and mysterious. The Creator Spirit mixes sacred energy with stardust to create different life forms throughout the entire universe—stars, planets, galaxies, water, birds, animals, soil, and humans. Ephemeral and physical umbilical cords are all connected to the Creator Spirit (Bird, 2005).

Three categories of umbilical cords, *mitisiyêyâpiya* are identified in the connective stones theory: the first is of a spiritual source (Bird, 2005); the second is physical and observed in humans, plants, and animals; the third pertains to our Earth Mother, *okâwîmâwaskîy*, as fundamental elements of land, water, sun, and air create life (Johnston, 2003).

First, a spiritual link between the sky and earth realm is spoken about in the *Story of Ehep, the Giant Spider* (Bird, 2008, 2005, pp. 15-17). Bird addresses mysteries shrouding the making of the ephemeral (umbilical) cord that delivers the first humans to earth. Second, life on earth begins with the severance of a physical umbilical cord from its parent mother. Evidence of this is left behind in the form of a belly button on a newborn baby. At the time of death, the physical body dies, while the soul returns to the spirit world. Third, the earth mother, *okâwîmâwaskîy* provides nutrients to all sky, earth, and water beings. Whether plants, humans, or animals of two-legged, four-legged, winged-ones, shelled-ones, and scaled-ones—all life forms depend on the earth's natural resources for survival; Everything of the earth is connected to Mother Earth's umbilical cord (Johnston, 2003, pp. 145-149). "The Great Spirit created everything that we see, everything that is here on earth. This is the great spirit, who has the mind power to create anything" (Bird, 2007, p. 95). "We emerge onto the breast of her [mother earth] as spiritual energy embarking on a journey to find the highest possible expression of ourselves" (Wagamese, 2019, p. 65). In the connective stones theory, umbilical and spinal cords are central to understanding human existence in spirit and physical forms.

Spinal cords

There are three categories of spinal cords, *mâwikana* discussed in the connective stones theory: 1) physical spines of earthly vertebrate

beings—these are the easiest to conceive; 2) The second set involves willow saplings. Willows are compared to and equated to human and animal physical and spiritual spines; and 3) The third category of spine is even more challenging to accept, as it relates to spirit spines of star constellations and cosmic spines of animals within the universe (Buck, 2018). Movements of spirit spines from the sky to the earth, particularly during the sweat lodge ceremony, is part of the third category.

An example of the second category pertains to willow saplings. How the willows are used in the construction of a sweat lodge frame—they are referred to as spines and ribs (Crier, 2019). The construction of the lodge begins with two sets of willow saplings placed parallel to each other, approximately three feet apart. These willows join the east and west directions together to form the primary lodge spine. This spine observes a linear path from the sacred fire, to the altar, to the door (on the east side) that continues onto the back of the lodge (on the west side). The second bending of willow saplings joins the north and south directions—this is a secondary spine. Subsequent willows cross and bend between the cardinal directions. Four willow saplings of horizontal rungs form the side ribs. The completed structure is referred to as the womb of mother earth.

Now, imagine that the earth mother bends her body forward—her spine becomes the spine of the lodge. Her womb is next to the surface of the earth. Within the womb are all vertebrate beings—humans, the bear, wolf, and bison spirits (the animals are in spirit form; and in skin forms such as drums, rattles, and eagle fans). As she bends and stretches, her neck forms a line to the sacred fire. The rocks (*asiniyak*) are the brain of the earth mother, the brain of the ancestors in the sacred fire that burns outside the lodge, and the brain of the universe as stars.

Star constellations of humans, animals, and lodges have spines such as Orion the Hunter, the Big Dipper (Ursa Major), and Corona Borealis (*mahtootisan*, *the sweat lodge*). There are numerous animals in the sky that possess spines and skeletons, such as the fox, fisher, wolverine, coyote, dog, eagle, and turtle illustrated in the Cree Star Map Book (Buck & Lee, 2016).

The Milky Way galaxy also is considered a spine-like or serpent structure (Stross, 2007). In Mayan cosmology, “the Milky Way gather[s] along the southern and eastern edges of the sky to form a heavenly version of the great *way* hole or portal to the Otherworld”² (Stross, 2007, p. 25). Astrophysical studies by Aragón-Calvo et al. (2010) discover that,

The spine of the cosmic web is the cosmic web’s framework, consist[ing] of [a] network of filaments and walls and their connections at clusters nodes. Over the years a variety of heuristic measures have been forwarded to analyze specific aspects of the spatial patterns in the large-scale universe, but only in recent

years there have been attempts toward developing complete descriptors of the intricate spatial patterns that define the Cosmic Web. (pp. 365-369)

This research furthers studies of the cosmic web that examines, “stars organized into galaxies, which in turn form galaxy groups, galaxy clusters, superclusters, sheets, walls and filaments, which are separated by immense voids, creating a vast foam-like structure” (Cosmic Web, 2017). This particular form of cosmic spine is beyond the scope of this paper, however it is noteworthy that galactic spines exist, “though the spine surrounding our local cosmology is observed in a metaphorical sense, from an Indigenous perspective” (Cardinal, 2019).

The connective stones theory is based on Indigenous cosmologies that bear comparison to astrophysical research of the cosmic universe. How the five segments of the human spine are related to the cosmos is observed in human activities on earth and in ceremony explained through the application of mathematical correlations.

Mathematical correlations

Three forms of mathematical correlations are observed in the connective stones theory: 1) in numbers, 2) microcosm and macrocosm comparisons, and 3) as earth-sky reflections.

1. Five segments of the human spine agrees in numbers to five states of being: 7 cervical discs to seven star constellations, 12 thoracic to twelve points along the lodge spine and (12×2) sets of ribs of the sweat lodge frame, 5 lumbar to first five hot rocks, 5 sacrum bones to the pit of the lodge, and 4 coccyx vertebrae to four cardinal directions of the sacred pipe ceremony.

2. Comparisons of microcosm and macrocosm spheres are juxtapositions of a smaller unit by a larger one — both spheres share in number and similarities of their natures. For example, the human spine is a microcosm of the willow spine of a sweat lodge structure (macrocosm); or, the seven cervical bones of the upper human vertebrae (microcosm) relates to the seven stars of the Big Dipper constellation (macrocosm).

3. The earth and cosmos are a reflection of each other. For example, the sweat lodge structure on earth is reflected in the sky as the star constellation Corona Borealis, *mahtootisan* (Buck, 2018, p. 20). Likewise, the sweat lodge fire (with rocks) as a microcosm is reflected in the sky as Pleiades, a macrocosm (Buck, 2018, p. 23).

To further the first point, the human body has been used as a base measurement system in numerous ways for centuries, in: sacred geometry and mathematics (Peat, 1994; Newman, 1956; Skinner, 2006); clothes making among the Yup'ik culture of Alaska (McLean, 2002); skeletal formalism (Montag, 1960); human-scale measurement in architecture (Vitruvius, 1490, 2006); Pre-Columbian weights and measures (Duncan, 2019); and at a higher level of sophistication, astrophysics studies, on the cosmic spine of the universe (Sousbie et al., 2018; Bond et al., 1996).

The following section situates the theory in an Indigenous context and consciousness to better comprehend how human spine connects to both physical and evanescent, spirit forms.

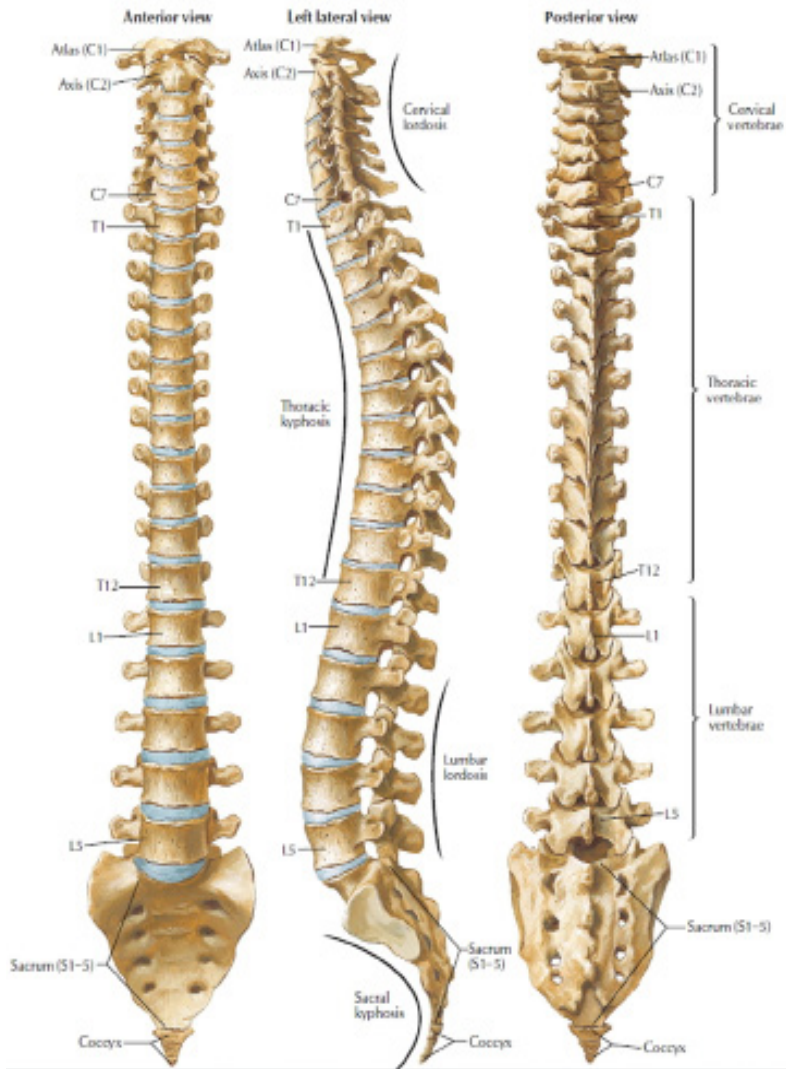
The human vertebral system and the earth-sky connection

An illustration of the human spinal column (anterior, left-lateral, and posterior views) provides a visual image to imagine how the connective stones theory functions.

The human being is placed at the centre, where segments of the spinal column act as metaphorical eyes to see one's self in relation to all. Beginning with the upper cervical vertebrae of the spinal column and moving down to the coccyx bone, parallels are drawn to the Plains Cree sweat lodge ceremony. Medicine stories of ancestors, animals, stars, rocks, and the sun and moon provide context to the sweat ceremony and demonstrate how the outside world is brought into the lodge. Stories from other nations are also told in ceremonies, which show similarities between Indigenous cosmologies.

7 cervical 7 stars formations

Numerically, the upper seven cervical discs of the human spine relates to seven stars constellations above such as the Big Dipper (*mista muskwa*), Corona Borealis (*mahtootisan: the sweat lodge*), and Orion the Hunter (*mistapew* or *Wesakechak*) (Buck, 2018). The upper spine reflects the sky world, as both, the upper spine and constellations point upward. The small earth human and large star human is an example of comparison between micro and macrocosm.



Vertebral column

Source: Health Jade. <https://healthjade.net/human-skeletal-system/>

A likeness between humans and bears is reflected in ceremony with the use of bear (*maskwa*) medicine—bear grease, bear root, and bear songs (Manitopyes, 2008). Bears overwinter and hibernate in dens; humans crawl into a domed-shaped structure to pray, find direction, and listen to ancient stories. A trapper once told me that, “If a person were to find bear bones in the woods, they could be mistaken for human bones”

(Lethbridge, 2009).

When *Ehep* lowers the basket with the two humans to earth, they are assisted by bear (*maskwa*) and wolf (*mahihkan*) (Bird, 2007). A relationship between humans and wolves is prominent in stories involving the Milky Way, also known as the River of Stars (*achahkos sîpiy*) (Buck, 2018).

Eagle Tail Feathers tells a story of the sundog phenomena during a winter pipe ceremony. According to Blackfoot mythology,

During cold winter nights on full moons, wolves are said to run along hard crusty snow so they can raise up to climb the Milky Way—the wolf path. Sundogs appear on one or both sides of the sun—they resemble three suns in the sky. When a momentary flash of bright light pierces through these arcs, it is said that the wolf has returned to earth. It is also said that the opposing faces of the sun are a reminder that ancestors are present with us, we are not alone. (2016)

Sundogs appear in the southern sky of Alberta, generally on frigid January or February afternoons. They are often observed as semi-arched rainbows bearing white, yellow, orange, red and sometimes blue colours.^{3, 4} This story is relevant to the connective stones theory for it illustrates a need to receive messages from the sky world, the moon and sun, particularly during dark winter days. “It is important not to lose our way during dark winter days, which is why traditional stories are told in the winter, to occupy the mind and practice the art of remembering” (Crier, 2019).

Thus, nature is in constant communication with all life forms in ways that often appear as anomalies to humans. Earth’s multilingual forms of communication take place daily, though such communication can easily be missed (Laplante 2016). Indigenous Elders speak of a time when animals and humans used to communicate through a shared language, but due to misuse of this gift by humans, this ability was almost lost. Late Sakâw Cree artist Dale Auger (2009) paints stories of the sweat lodge ceremony and communication between humans, medicines, birds, and horses—they remain ceremonial; see the following paintings: *The Prayer*, p. 8; *Guardian of the Water Medicine*, p. 16; *Visions of the Four Directions*, p. 108; *Mothers of the Earth*, p. 120; and *Rides with You on Your Journey*, p. 122.

12 thoracic

12 (ribs) x 2 (sets) = 24 willow sweat lodge

12 thoracic (spine and pathway between the lodge, altar, and sacred fire)
+ 12 x 2 (ribs) = 36

The sweat lodge frame is equated to the second set of vertebral discs—the thoracic—twelve discs with twelve ribs attached on either

side. A Cree medicine lodge is made of 24 willows ribs, which are bent and overlap to form a dome-shape on the earth. The protruding womb of mother earth is likened to pregnant wombs of women and other vertebrate beings. The curvature of the willow bends inward like that of the human spine that curls on the earth in a position of vulnerability; likewise, animals also curl their spines inward in fetal shapes. A sequence of spinal columns appears, one cradled within the other – the outer rib cage of the lodge, the inner rib cages of humans, and smaller rib cages of spirit animal beings. Under the curved willow ribs sit sweat lodge participants – *Protector of the Lodge* (Auger, 2009, p. 99).

Beneath the willow frame are humans with vital organs that they cannot live without – the brain, heart, liver, kidneys, lungs, and skin. There are over 70 major systems in the body, some of which include: digestive, nervous, endocrine, lymphatic, respiratory, vestibule, musculoskeletal, reproductive, and urinary systems; many of which organize about the thoracic.

The Human Body - *miyaw*

human skin - <i>masakay</i>	head - <i>mistikwân</i>	brain - <i>mîthp</i>
spine - <i>mâwikan</i>	umbilical cord - <i>mitisiyêyâpiy</i>	blood - <i>mihko</i>
spirit, soul - <i>ahcâhk</i>	mouth - <i>mitôn</i>	tongue - <i>miteyani</i>
eye - <i>miskîsik</i>	ear - <i>mihtavakay</i>	nose - <i>mikot</i>
human ribs - <i>ospikêkanak</i>	rib bone - <i>mispikêkan</i>	heart - <i>mîteh</i>
lung - <i>ohpan</i>	liver - <i>miskon</i>	stomach - <i>matay</i> kidney -
<i>mitihtihkosiy</i>	urinary bladder - <i>sikîwîwîhkway</i>	gallbladder - <i>wisopi</i>
hand(s) - <i>micihiy(a)</i>	foot/feet - <i>misit(a)</i>	arm(s) - <i>mispiton(a)</i>
leg(s) - <i>miskat(a)</i>	appendix - <i>paskê-cakisis</i>	pancreas - <i>omaw</i>
small intestine - <i>mitakisiyâpiy</i>	large intestine/colon - <i>mistakisiy</i>	
penis - <i>mitakay</i>	uterus - <i>okosisimâw</i>	

Source: Cree translation using the “Y” dialect. Nehiyaw Masinahikan, Online Cree Dictionary, www.creedictionary.com.

The name of a human body part in the Cree language begins with the letter “m.” Reference to a body part in the first person, the “m” is

replaced with an “n” such as, *nistikwân*—my head, *niskisik*—my eye, and *nikot*—my nose.

Brain - *mîtilhp*

Under the willow frame are human heads that represent the universe, the conscious mind, and cosmic brains. All brain forms are mirrored in the ancestral beings placed in the pit of the sweat lodge. The sky world is expressed in twinkling star constellations, like the firing of neurons within the brain. Sacred invisible umbilical and spinal cords stretch between the sky world and the earthly plane connecting all vertebrate beings of physical and spiritual beings. Spiritual communication takes place during ceremonies where the *asiniyak* (ancestral brains) placed in the pit, sing in ancient languages.

While walking with my late friend Lori at Nose Hill Park in Calgary, we spoke of ceremony, when a sudden epiphany came to her, and she said, “It’s in the language of the willow” (Villebrun, 2000). The willows represent a spinal column where information about the self travels up and down the body, from the brain, through to the toes. How are we like the willow spine? What do the willows say?

5 lumbar

$$7 + 12 + 5 = 24$$

24 willow medicine lodge

The lower 5 lumbar discs are situated at the base of the spine, symbolic of the first five hot rocks that are placed in the pit of the sweat lodge. These rocks come directly from the sacred fire that burns outside, and is located opposite the doorway of the lodge.

Preparation of the sacred fire begins by strategically placing two logs parallel to the doorway of the lodge, the logs are then crossed to form a base. Rocks are stacked on the wooden base with offerings of tobacco in the four directions. Firewood is placed on top of the rocks—then the fire is lit. When the rocks are red hot, they are brought into the lodge for ceremony.

A circular motion is observed between the sky world through the invisible umbilical cord and down to the sacred fire. From this fire the first five rocks continue the circle by moving to the altar to be smudged before entering the lodge. The *asiniyak* are then placed into the pit—the sacrum, cradle of the soul, *nipêwinis ahchâk*.

Often the lodge-keeper sits at the back of the lodge where it is hottest. An imaginary line is drawn between the pit, to the door, to the altar, and to the sacred fire. Envision a woman’s body as she sits facing the doorway of the lodge, the sacrum is the pit or cradle of the lodge, her spine bends forward with her head pointing to the sacred fire outside,

her ribs become the ribs of the sweat lodge frame, her arms and legs are the rungs of the frame. Just as new life is gifted through the process of ceremony, participants leave the sweat lodge with a sense of feeling rebirthed, renewed, and refreshed.

5 sacrum

4 holes on either side with a vertical transverse lines =
4 cardinal directions,

4 stages of life, 4 seasons, 4 in-between doorways

2 sides = the women and men's side inside the lodge; the sky above and the earth below; much of the human body has pairs – 2 sides to the body (left/right, front/back), 2 ears, 2 eyes, 2 nostrils, 2 brain hemispheres, 2 lungs, 2 kidneys, 2 arms, 2 hands, 2 legs, 2 feet...

The sacrum vertebrae is 5 fused bones located below the similar-looking sequence of vertebral regions – cervical, thoracic, and lumbar. The sacrum has a concave shape and is likened to the pit (or cradle) of the lodge. After each of the first five rocks (of the lumbar set) are smudged at the altar, they are strategically set down. The first *asiniy* is placed in the centre and represents a connection between the Creator Spirit and Mother Earth. The subsequent four *asiniyak* are placed around the centre stone beginning in the east, then south, west, and north directions. Each of the grandmothers and grandfathers are sprinkled with medicine – *tawâw omosômimâw*, welcome grandfathers, there is room (Thomas, 2019).

The sacrum is a link between the sky world, earth world, and below world that reflects the third mathematical correlation of the connective stones theory. The trail between the outer sacred fire, to the altar, and then to the pit inside the sweat lodge resembles a spine – from the outer world that descends and curls into the womb of mother earth. Another trail is that of the Milky Way (*achahkos sîpiy*) that connects sky and earth – the union of female and male energies produce new life. The sweat lodge ceremony is a process of spiritual renewal, of rebirth.

The sacrum *asiniy*, is a large, triangle with five vertebrae running down its middle. The sacrum has four holes (foramina, pl.; foramen, sing.) on either side along its mid-rib; nerves and blood vessels pass through these holes. The outward shape of the sacrum is likened to the shape of a uterus. Interestingly, the first five rocks of the sacred fire agree in number with the five sacral segments that fuse together between the ages of 18 and 30 years. The sacrum has an anterior and posterior view – the concave shape of the sacrum forms a cradle holding all life embodied forms of the past, present, and future, while the posterior side sits next to the earth.

As the spine of the lodge bends inward, an imaginary head points toward the door and onward to the sacred fire. The head and brain are

mirrored in the *asiniyak* of the sacred fire, which are then brought into the pit of the lodge. As rocks are said to be ancestral grandmothers and grandfathers—they have cognitive capacities of brains—the *asiniyak* think, listen, and respond to prayers said and songs sung. Studies of Mesoamerican cosmology show that the sacrum bone is a “doorway to the otherworld” (Stross, 2007). The opening of portals to the spirit world in Plains Cree sweat lodge practices takes place with the lighting and smoking of the sacred pipe. This is observed in the next explanation of the lower vertebral bones of the coccyx.

4 coccyx

4 cardinal directions (east, south, west, north) come together
in ceremony

The number of stones placed in the sacred fire depends on how the lodge is transferred to the lodge keeper—such a number is not universal among all Cree groups.

At the tail end of the spine is the coccyx—this *asiniy(ak)* has four parts fused together and is commonly known as the tailbone and likened to the shape of a penis. As all human beings possess a coccyx vertebra; it represents the joining of male and female energy—both of which are present in all humans. In terms of ceremony the coccyx is associated with the sacred pipe. The long wooden stem represents trees, living a spiritual life (walking with a straight spine), and male energy. The bowl represents blood, bone, and female energy. When both are joined, the pipe is ready to be smoked—this is done at the beginning of the ceremony.

Daigneault states that, “As the pipe is smoked, the base of the bowl is pressed into the earth to form a connection with all energies. When the pipe and bowl and earth and sky are brought together, a strong vibration is felt” (2019). As human beings possess a coccyx bone, it can be said that all beings share both male and female vivacity.

The total cervical, thoracic, and lumbar vertebrae is $7 + 12 + 5$
= 24

If the ribs are counted ($24 + 12$), the total is 36

The total cervical, thoracic, lumbar, sacrum, and coccyx
vertebrae is $7 + 12 + 5 + 5 + 4 = 33$

If the ribs are counted, ($33 + 12$), the total is 45.

Depending on a lodge keeper’s teachings, the sacred fire is prepared with 36, 40, 44 and at times, 45 rocks. There is no fixed number of *asiniyak* used, however guidance from the spirit world may determine this. Be mindful that application of the connective stones theory depends on the geographical location, varying cosmologies, and relationships to

plants and animals.

A Story Remembered

Crier's words, "we are going through a time of remembering" (2019) reverberates throughout the connective stones theory; a theory brought about by dream and epiphany. This story remembered, also addresses Cajete's point that, "humans need to be in connection with the natural order... to ponder on what causes us to think about our relationship with the natural world?" (2019).

The connective stones theory illustrates how earth-sky vertebral spines (*mâwkankan*) and umbilical (*mitisiyêyâpiy*) cords connect the physical and spirit realm on earth and throughout the universe. A metaphorical spine in the cosmos has the ability to move, flex, and reach the earth. *Asiniyak* heated in a sacred fire create a path between the sky, the fire, the altar, and the pit inside the lodge. This is referred to as a spine—a sacred path similar to the Milky Way. Water is poured onto the hot rocks that expels vapour, like the breath of the Creator Spirit—a combination of earth, air, heat, and water that bring about new life.

Set within a Plains Cree worldview of the connective stones theory, the human being is placed at the centre, where segments of the spinal column serve as metaphorical eyes to see one's self in relation to the rest of the natural world and beyond into the cosmic universe. One comes-to-know our own sacredness through the sweat lodge ceremony, our relationship with the sky world, and how land-based and star-based education teaches about our oneness with the universe.

Notes

1. The term "as above, so below" is most frequently accredited to Hermès Trismégiste, author of *Corpus Hermeticum*. "The *Hermetica* are Egyptian-Greek wisdom texts from the 2nd century or earlier." Wikipedia, <https://en.wikipedia.org/wiki/Hermetica>.
2. Stross (2007) states that "In Mesoamerica the sacrum represented one index of the more generalized but variously manifested 'portals' or doorways permitting translocation of shamans, spirits, and deities between worlds or levels of the cosmos. Data from the Old World links the 'holy bone' or sacrum directly to resurrection, which implies passage through at least a figurative cosmic portal or doorway between this world and the other world," <http://research.famsi.org/aztlan/uploads/papers/stross-sacrum.pdf>
3. The word for sundog in the Cree language is *mamahtawinakwa* meaning "it looks awesome and unearthly, e.g. sundogs and eclipse

or a landscape picture.” Nehiyaw Masinahikan, Online Cree Dictionary, www.creedictionary.com

4. Wikipedia (2019). Sun dog. https://en.m.wikipedia.org/wiki/Sun_dog
5. Origin of Sacrum, 1745–55; Late Latin (os) sacrum holy (bone), translation of Greek *hieròn ostéon* ‘sacred bone’ (from the belief that the soul resides in it). Oxford dictionary, <http://www.lexico.com>

References

- Aragón-Calvo, M., Platen, E., Rien van de Weygaert, R., & Szalay, A. S. (2010). The spine of the cosmic web. *The Astrophysical Journal*, 723:364-382.
- Auger, D. (1997). Empowerment through First Nation control of education: A Sakaw Cree philosophy of education. In R. Ponting (Ed.), *First Nations in Canada: Perspectives on opportunity, empowerment, and self-determination* (pp. 326-351). McGraw-Hill Ryerson.
- Bell, N. (Sum. 2014). Teachings by the medicine wheel: An Anishinaabe framework for Indigenous education. *EdCan Network*. <https://www.edcan.ca>
- Bird, L. (2008) [Transcribed, 2002]. Ehep Legend. *Our Voices*. Interview with Fulford. University of Manitoba. 0024-Our Voices-Ehep Legend. <http://www.ourvoices.ca/index/ourvoices-story-action/id.0024>
- Bird, L. (2005). Brown, J., P. DePasquale & M. F. Ruml (Eds.). *Telling our stories: Omushkego legends and histories of Hudson Bay*. University of Toronto Press.
- Bond, J. R., Kofman, L., & Pogosyan, D. (1996). How filaments of galaxies are woven into the cosmic web. *Nature: International Journal of Science*, 380:603-606.
- Buck, W. (2018). *Tipiskâwi kîsik: Night sky star stories*. Manitoba First Nations Education Resource Centre Inc.
- Buck, W., A. Lee & W. Wilson. (2016). *Ininew achakos masinikan - Cree Star Map-Book*. *Native Starwatchers*. St. Cloud State University. <https://web.stcloudstate.edu/aslee/ININEWMAP/home.html>
- Buck, W. (2009). Atchakosuk: Ininewuk Stories of the Stars. *First Nations Perspectives Journal*, 2(1), 71-83. <http://www.iportal.usask.ca>

- Cajete, Gregory. (2019, September). *Astronomy through Native eyes: Finding the dynamic center of resonance with the multiuniverse*. Lecture presented at the University of Calgary, Calgary, AB.
- Cajete, G. (2000). *Native science: Laws of interdependence*. Clear Light Publishers.
- Cardinal, R., Siksika, AB. Treaty 7. Oral teaching. personal communication. December 18, 2019.
- Cardinal, Robert. (2015, January14). Indigenous knowledge and western science: Contrasts and similarities. Banff Events. *The Banff Centre, AB.: Inspiring creativity*. YouTube Video. <https://www.youtube.com/watch?v=QDOTxN8J0T8&index=4&list=PL7Fv1MMCuqMD-v1PIStCsavT8wz7HU5Z7c>, (10:30-11:40).
- Crier, J., Maskwacis, AB. Treaty 6. Oral teaching. personal communication. January 20, 2019.
- Daigneault, P., Ile-A-La-Crosse, SK. Lives in Calgary, AB. Oral teaching. personal communication. August 12, 2019.
- Deloria, V. (2003). Sacred land and moral responsibility. God is red: A Native view of religion, pp. 271-286. (3rd ed.). Fulcrum Publishing.
- Dumont, M. (2009, March 28). *And with second sight she pushes. I'POYI: Aboriginal Writers Gather: Marilyn Dumont reads at the Nickle Arts Museum, University of Calgary*. YouTube Video. https://www.youtube.com/watch?feature=player_embedded&v=bKrCk-Audrlg, (14:30-19:50).
- Duncan, T. (2019). Before the melting pot: Pre-Columbian weights and measures. *NIST General*. <https://www.nist.gov/blogs/taking-measure/melting-pot-pre-columbian-weights-and-measures>.
- Eagle Tail Feathers, J., Kainai First Nations. Treaty 7. Mahmawi-atoskwin, Calgary, AB. Traditional pipe ceremony. personal communication. December 7, 2016.
- Garvin, T. (2005). *Carvings faces, carving lives: People of the boreal forest*. Heritage Community Foundation.
- Hogan, L. (1992). All my relations: Reestablishing universal connections in a sweat lodge ceremony. *Parabola*, 17(1), 33-35.
- Johnston, B. (2003). *Honour earth mother: Mino-audjaudauh mizzu-kum-mik-quae*. Kegedonce Press.

- Kessler, S. (2013). *Theories of metaphor revised*. Logos Verlag.
- Kovach, M. (2009). *Indigenous methodologies: Characteristics, conversations, and contexts*. Toronto University Press.
- Laplante, L. French/Cree Métis. Ottawa Valley, ON. Lives in Calgary, AB. Dream of sweat lodge frames. July 23, 2018.
- Laplante, L. (2016, October). Earth's Multilingual Comprehension. *Storytelling: Connections to the Land*. Performance hosted by the First Nations Student Association (FNSA) at the University of Calgary, AB.
- Lee, A. S., Wilson, W., Tibbetts, J., Gawboy, C., Meyer, A., Buck, W., Knutson-Kolodzne, J., & Pantalony, D. Celestial calendar-paintings and culture-based digital storytelling: cross-cultural, interdisciplinary, STEM/STEAM resources for authentic astronomy education engagement. EPJ Web of Conferences 200, 01002 (2019). <https://doi.org/10.1051/epjconf/201920001002> ISE2A 2017.
- Lethbridge, S., Wood Mountain Lakota First Nation, SK. personal communication. November 1, 2009.
- Lickers, M., Six Nations of the Grand River, ON. Lives in Calgary, AB. Peer review of paper. Personal communication. January 3, 2020.
- Mandelbaum, D. (1940). *The Plains Cree: An ethnographic, historical, and comparative study*. University of Regina.
- Manitopyes, A., Muskowekwan First Nations. SK. Lives in Calgary. Oral teaching. personal communication. February 2, 2008.
- McAdam, S. (2015). *Nationhood interrupted: Revitalizing nêhiyaw legal systems*. Purich Publishing Ltd.
- McLean, D. (Nov. 2002). Honoring traditions: Making connections with mathematics through culture. *Teaching Children Mathematics*, 9(3), 184-188. National Council of Teachers of Mathematics.
- McLeod, N. (2007). *Cree narrative memory: From treaties to contemporary times*. Purich Publishing Ltd.
- Meili, D. (2012). *Those who know: Profiles of Alberta's native elders*. NeWest Press.
- Michell, H. (2012). The canoe trip: A northern Cree metaphor for conducting research. In *Education* 18(1), 2-8. Creative Commons Attribution 3.0 License, University of Regina.

- Michell, H. (2009). Gathering berries in northern contexts: A Woodlands Cree community-based research. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health* 7(1), 65-73.
- Montagu, A. (1960). *Handbook of anthropometry*. Springfield, Ill.: Thomas.
- Newman, J. R. (2003) [1956]. *The World of Mathematics*. Dover.
- Peat, F. D. (1994). *Lighting the seventh fire: The spiritual ways, healing, and science of the Native American*. Carol Publishing Group.
- Skinner, S. (2006). *Sacred geometry: Deciphering the code*. Sterling Publishing.
- Sousbie, T., Pichon, C., Colombi, S., Novikov, D., & D. Pogosyan. (2018). The three-dimensional skeleton: Tracing the filamentary structure of the universe. *Mon. Not. R. Astron. Soc.* <https://arxiv.org/pdf/0707.3123.pdf>
- Thomas, B., Plains Cree. Lives in Calgary, AB. Oral teaching. personal communication. April 12, 2019.
- Villebrun, L., Hay River Dene, NT. Oral teaching. personal communication. March 15, 2000.
- Vitruvius Pollio, M. (c. 1480). *De architectura*. Itàlia.
- Vitruvius Pollio, M. (2006). On symmetry: In temples and in the human body. *The ten books on architecture*, pp. 73-75. The Project Gutenbergy EBook, www.gutenberg.org
- Wagamese, R. (2019). *One drum: Stories and ceremonies for the planet*. Douglas & McIntyre Ltd.
- Waugh, E. H. (1996). *Dissonant worlds*. Wilfred Laurier University Press.
- Wilson, S. (2008). *Research is ceremony: Indigenous research methods*. Fernwood Publishing.

