

Living within the Earth's Carrying Capacity: Towards an Education for Eco-Social-Cultural Change

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Executive Summary

Background: the issue

Our knowledge synthesis project set out to provide scholars, activists, educators, and policy-makers with a wide-ranging review of the current state of education for eco-social-cultural change. The starting point for our work was an acknowledgment that modern educational traditions, processes and institutions have played a key role in fostering the attitudes, discourse and behaviour driving the current ecological crisis, and thus learning to live within the Earth's carrying capacity implies far-reaching, systemic educational transformation.

Objectives

The project had three main components:

- A review of contemporary philosophical and theoretical work that critiques damaging or limiting assumptions and practices in mainstream education and offers alternatives;
- A review of generative and transformative educational practices for eco-social-cultural change, scattered throughout both formal and informal educational systems;
- A review of the implications of current work on systemic social change and generative resilience for large-scale educational change.

A fourth component emerged during the project: developing a conceptual framework that brought together key themes emerging from these explorations. Taken together, these four pillars of the work attempt to map out the scope and scale of the challenge, and to identify some promising directions for educational innovation and research.

Results and Key Messages

The change conversation

Education is strikingly absent from the literature on transformative social and institutional change, in two senses: one, educational scholarship is rarely referred to as a relevant source of insight into large-scale processes of change; two, educational systems are rarely the focus of studies and initiatives in transformative change. Our review suggests that more ambitious and wide-ranging educational research in this area should be encouraged, both on its own terms and in the context of multi- or inter-disciplinary approaches to eco-social-cultural change.

We identified the emerging field of systemic design as holding particular promise for cross-fertilization between educational and social change perspectives. Broader frameworks in which work on transformative educational change might fruitfully be embedded include the socio-ecological resilience paradigm and the Multi-Level Perspective on the spread of social-technological innovation.

The practice conversation

In creatively synthesizing a wide range of competencies, capacities and capabilities relevant to eco-social-cultural change, we came to group them as follows:

- The *community educator* who facilitates relationship-building and collective flourishing that includes children, caregivers, knowledge holders, the more-than-human;
- The *critical educator* who leverages the power of diversity and alterity to move people out of entrenched habits and assumptions into spaces of growth;
- The *coeur/care educator* who supports and nurtures wellbeing, self-care, resilience and connection with the sacred in response to the diverse needs of individuals and families;
- The *change educator* who helps develop individual and collective strategies to respond to challenges and losses and supports transformation, emergence, and resurgence.

The philosophical conversation

A wide range of scholarship suggests that many of the basic assumptions of mainstream Canadian culture will have to change and continue to do so over time, in response to the challenge of living within the Earth's carry capacity; this has profound implications for education. Our findings are organized into two parts: one, a review of work in epistemology, ontology, and axiology, as standard categories in (Western) philosophy of education; two, a summary of Reckonings that includes challenges with respect to cosmology and psychology. That is, at the educational level of cultural change, our foundational stories and our theories about human development must be reconsidered, then reconceptualized.

A guiding conceptual synthesis

The intersecting and overlapping concepts of wildness, sacredness and justice are used to frame a set of principles that might guide education for eco-social-cultural change. We acknowledge the essential and evolving role of Indigenous scholarship and teachings.

Methodology

The two lead researchers worked with a team of four research assistants (D. Chang, L. Cole, C. Humphreys, S. Sage), all of whom were engaged in or had recently completed their doctoral studies. The team's expertise encompassed outdoor, experiential, nature-based and environmental education, intercultural, multilingual and imaginative education, pre-service and in-service teacher education, educational, existential and hermeneutic philosophy, Indigenous and decolonial studies, social innovation and organizational change. Team meetings took place weekly over Zoom for the best part of a year, with occasional breaks. The approach was highly collaborative: team members nominated and interviewed participants with expertise relevant to the project, shared readings around specific research questions as they arose, took part in oral and written discussions, and contributed to various writing projects including a speculative fiction workshop. Emerging ideas and organizing concepts and principles were co-constructed and tracked using Google Docs and the referencing software Zotero. The final report was written by the two lead researchers with detailed input from team members.

1. Background, Objectives, Methods

About the project

Our knowledge synthesis project set out to provide scholars, activists, educators, and policy-makers with a wide-ranging review of the current state of education for eco-social-cultural change. The starting point for our work was to acknowledge the following:

- that the ecological crisis (i.e. the overshoot of the Earth's carrying capacity by modern civilization) is the consequence of entrenched attitudes, discourses and behaviours in human societies worldwide;
- that modern educational traditions, processes and institutions have played a key role in fostering and reinforcing these cultural traits;
- that these same structures and processes are implicated in myriad forms of social inequity and injustice, and thus education for living within the Earth's carrying capacity is necessarily also education for more equitable and just societies;
- therefore, learning to live within the Earth's carrying capacity implies far-reaching, systemic educational transformation.

The project had three main components:

- A review of contemporary philosophical and theoretical work that critiques damaging or limiting assumptions and practices in mainstream education systems and points towards ways of being, thinking, valuing, acting, learning and teaching that are more consonant with the goal of living in harmony with the Earth;
- A review of generative and transformative educational practices, scattered throughout both formal and informal educational systems, with the goal of bringing these disparate practices into conversation with each other in the context of a shared project of eco-social-cultural change;
- A review of current work on systemic social change and generative resilience, with a particular focus on how large-scale change in systems of formal schooling could be brought about.

The primary value of our work is to map out the scope and scale of the challenge, and to identify some promising directions for urgently needed educational innovation and research.

Project team and collaborative methods

The project team consisted of the following individuals, listed in alphabetical order and with brief notes on the expertise they brought to the project:

- Sean Blenkinsop (Professor; philosophy; outdoor, experiential and nature-based education)
- David Chang (doctoral candidate; teacher education, contemplative inquiry, ecological virtues)
- Lindsay Cole (doctoral candidate; social and systemic change, public policy innovation)

- Mark Fettes (Associate Professor; sociocultural theory, Indigenous and place-based education)
- Chloe Humphreys (PhD; philosophy, early childhood education, nature-based education)
- Skylar Sage (doctoral candidate; community psychology, anti-oppressive positive psychology)

The work of the team took place during the Covid-19 pandemic, and hence proceeded at a distance, with team meetings and interviews done over Zoom. The scope and focus of the project were developed collaboratively. Because of the pandemic, it was decided to shift from the original plan to hold focus groups with key stakeholders to conducting interviews with selected individuals. Each member of the team also recommended particular readings in areas of their own expertise, and these were compiled in a shared library on Zotero. Wide ranging 90-minute discussions took place weekly during much of the year. In September 2020, the entire team participated in a speculative fiction writing exercise inspired by similar workshops connected to Afro- and Indigenous futurism (See: Appendix A for examples). This process gave rise, over time, to the conceptual synthesis presented in Section 2. Meanwhile, the collection of data through interviews and the ongoing literature review provided key organizing concepts for the remaining sections of the report. Fettes and Cole were the lead researchers and writers on Sections 2 and 3, while Blenkinsop and Sage collaborated on Section 4 and Blenkinsop, Humphreys, and Sage on Section 5.

2. Conceptual Synthesis

Our original proposal pointed to the need for “a conceptual lens for supporting, guiding and challenging the work of teaching people how to be in the world in ways that are less damaging, less unjust, and within the actual physical limits of the planet itself.” We envisioned this framework emerging from the philosophical review described in Section 5 of this report. In practice, we found that it emerged through the collaborative process of the research team as a whole, through thinking and dialogue that were both inductive and deductive, divergent and convergent. To some extent, this conceptual synthesis stands independent of any of the sections that follow.

We have structured this synthesis in terms of three organizing concepts (wildness, sacredness, and justice) and six principles (all my relations, abundant time, mystery/unknowability, embeddedness/integration, ancient futures, and (re)creative dissonance). As will be apparent, however, these diverse perspectives intersect and overlap; each offers a partial insight into a complex whole.

Wildness as an organizing concept

What does it mean, “to live within the Earth’s carrying capacity”? Essentially, for human societies to live in dynamic equilibrium with geological, hydrological, atmospheric and climate systems, and with self-renewing assemblages of soil and water and microorganisms and the larger, multicellular species that they support. It implies a dynamic dance in which social and human wellbeing needs are met within these ecological limits, and thus the enactment of

substantive equity, wherein all humans have equal rights and responsibilities with regard to their fundamental needs and freedoms.¹

Following Abram² and subsequent writers, we term this larger world of which humans are part “the more-than-human.” That world is not ultimately subject to human will and control, even though human activity has now spread and expanded to impact it on a global scale. Because it is possible to sustain the illusion of control over short distances and time scales, modern societies have yet to come to terms with the need to accommodate our lifeways, as a whole and over the long term, to how Earth systems operate and what they can support. Given the extraordinary capacity of human activity to affect the wellbeing of more-than-human kin, the heart of the educational challenge lies in our learning, as individuals, cultures and societies, to acknowledge the intrinsic worth of all beings and of their co-existence in mutual flourishing.³ Only such a shift in perceptions, values and actions will ensure that what is human is responsive to and shaped by Earth, rather than to its own self-referential fantasies and desires.⁴

We propose to use the terms “wild” and “wildness” to refer to this understanding of the life of the Earth, the more-than-human, as defined by a capacity for dynamic, reciprocally relational self-renewal. As noted by the American poet and essayist Gary Snyder, such a definition must include humans themselves, insofar as they form part of this larger self-renewing system:

The wild is self-creating, self-maintaining, self-propagating, self-reliant, self-actualising, and it has no ‘self’. It is perhaps the same as what East Asian philosophers call the Dao. The human mind, imagination, and even natural human language can also thus be called wild. The human body itself with its circulation, respiration and digestion is wild. In these senses ‘wild’ is a word for the intrinsic, non-theistic, forever-changing natural order.⁵

In modern Western discourse, “wild” is often counterpoised to “civilized,” and thus positioned as something essentially alien, or at least marginal, to social order. We prefer, however, to contrast “wild” with “colonized.” The wild is not uncivilized or disordered, if these words are taken to imply a lack of self-restraint, propriety, dignity, care. On the contrary, the wild offers an image of how patterns and beauty can emerge from the actions and interactions of free wild beings.⁶ As Canadian poet and scholar Robert Bringhurst comments in his own essay on

¹ Kate Raworth, *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist* (White River Junction, VT: Chelsea Green Publishing, 2017).

² David Abram, *The Spell of the Sensuous: Perception and Language in a More-than-Human World*. (New York: Vintage Books, 1996).

³ Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* (Minneapolis: Milkweed Editions, 2013).

⁴ Emilio F. Moran, *People and Nature: An Introduction to Human Ecological Relations*, 2nd ed. (Hoboken: John Wiley & Sons, 2016).

⁵ Gary Snyder, “Writers and the War against Nature,” *Resurgence*, no. 239 (December 2006), <https://www.resurgence.org/magazine/article291-writers-and-the-war-against-nature.html>.

⁶ Tanya Tagaq, *Split Tooth* (Toronto: Penguin Canada, 2019).

wildness, “at their best, human civilizations actually start to resemble the forest. They start to attain — and to sense and respond to — the forest’s supple and self-reinforcing order.”⁷

To live within the Earth’s carrying capacity is to live within a civilization of this kind: that is a central premise of our approach to this knowledge synthesis. Thus, in the way we are working with it here, wildness stands in explicit opposition to colonization and other systems of oppression and repression within human societies, as well as with respect to humans vis-à-vis the more-than-human world.⁸ Wildness implies freedom, not just for particular privileged individuals or groups, but for all beings; and not the “freedom” of selfish individuals acting out of narrow self-interest, but freedom enjoyed in the context of mutually beneficial flourishing relationships of all kinds.⁹ From wildness flow what are commonly referred to as the four “Rs” of Indigenous education: respect, reciprocity, relevance and responsibility, the principles according to which free beings associate and interact meaningfully and productively with one another.¹⁰ As Ellis & Perry state in the context of “anticolonial pathways for Indigenous sacred site protection,” the four Rs “guide human, physical, and spiritual world interactions” and are thus part of the groundwork for addressing the social and ecological devastation caused by colonization.¹¹

Sacredness as a property of the wild

The mention of sacredness brings us to a second premise: that human cultures in close contact with the wild experience as sacred the self-maintenance and self-renewal of land and the wider cosmos. This embodied and encultured understanding of sacredness is, we suggest, an essential human way of recognizing the intrinsic and irreducible value of more-than-human others, beyond their utility to human creatures or to the individual self. Regarded this way, the Earth comprises myriad different forms of intelligence, many of which are non-animal and not bound within the limits of a single organism or entity. It is in this sense that anthropologist Eduardo Kohn refers to the tropical rainforest as “an ecology of selves.”¹²

A self is a kind of whole — what Kohn calls “an open whole,” because it depends for its continued existence on living, dynamic relationships with other selves. Another, etymologically

⁷ Robert Bringham, “Wild Language,” in *The Tree of Meaning: Language, Mind and Ecology* (Berkeley: Counterpoint, 2008), 276.

⁸ Leanne Betasamosake Simpson, *As We Have Always Done: Indigenous Freedom through Radical Resistance* (Minneapolis: University of Minnesota Press, 2017).

⁹ The Crex Crex Collective, “On Wilderness,” in *Wild Pedagogies: Touchstones for Re-Negotiating Education and the Environment in the Anthropocene*, eds. Bob Jickling et al., Palgrave Studies in Educational Futures (London: Palgrave Macmillan, 2018), 23–50.

¹⁰ Verna Kirkness and Ray Barnhardt, “First Nations and Higher Education: The Four R’s — Respect, Relevance, Reciprocity, Responsibility,” *Journal of American Indian Education* 30, no. 3 (1991): 1–15.

¹¹ Rachel Ellis and Denielle Perry, “A Confluence of Anticolonial Pathways for Indigenous Sacred Site Protection,” *Journal of Contemporary Water Research & Education* 169, no. 1 (April 2020): 8–26.

¹² Eduardo Kohn, *How Forests Think: Toward an Anthropology beyond the Human* (Berkeley: University of California Press, 2013), 75.

related, term for this wholeness is *haleness*, which in turn is related to the notion of *health* and also to *holy* and *hallow*. The wholeness of selves is a fractal phenomenon, involving interrelated and resonant patterns of wholes at multiple scales — shapes and patterns that reverberate from the scale of a cell, to an individual being, to the universe.¹³ A sense of sacredness, then, is a kind of recognition of what is free, self-willed, and healthy or hale. Similarly, the work of “hallowing” — of fostering and elevating the health and wholeness of a being or place — is a way of participating in such open wholes and thus inhabiting, at least for a short space, the freedom and belonging inherent in the wild. Such experiences can be life-changing.¹⁴

Spirituality and sacredness are therefore, we believe, concepts that must be included in any rethinking and reworking of the relationship of humans with the more-than-human world. Yet they are also contentious in many education settings, as diverse religious traditions claim a privileged understanding of the spiritual and the sacred. We have no easy answers to this issue. We are not claiming that this conception of spirituality or the sacred includes everything people use those words to refer to; yet no synthesis of the relevant work in our field would be complete without it. Education for living within the Earth’s carrying capacity is clearly education for a kind of haleness, and we need to embrace all the cultural means we have for perceiving, fostering and participating in such haleness.¹⁵

This takes us onto the terrain of sacred *practices*. We address questions of practice later in this review, but here we want to suggest that many sacred practices function educationally as practices of attunement, whether of the individual self to the more-than-human (or for that matter to its own complex inner selfhood) in a particular place and moment, or of a human group gathered together for some shared purpose. That is, sacred practices are designed to *foster our ability to learn* from the immanent holiness, or haleness, or wholeness, of the individual-, place- or group-in-relation.

Justice as intrinsic to the wild and sacred

A vast literature attests to the fact that the social systems driving the ecological and climate disasters are also responsible for massive social inequities within and between nations, including differing degrees of exposure to the consequences of environmental collapse.¹⁶ Educating for living within the Earth’s carrying capacity therefore implies educating for a more

¹³ Manulani Aluli Meyer, “The Context within: My Journey into Research,” in *Indigenous Pathways into Social Research: Voices of a New Generation*, eds. Donna M. Mertens, Fiona Cram, and Bagele Chilisa (Walnut Creek, CA: Left Coast Press, 2013), 249–60; Adrienne M. Brown, *Emergent Strategy: Shaping Change, Changing Worlds* (Chico, CA: AK Press, 2017).

¹⁴ Douglas A. Vakoch and Fernando Castrillón, eds., *Ecopsychology, Phenomenology, and the Environment* (New York: Springer New York, 2014), <https://doi.org/10.1007/978-1-4614-9619-9>.

¹⁵ Such means include many kinds of artistic practice, implying that education oriented to the wild and the sacred must include art as fundamental; exploring this in depth would require another project, however.

¹⁶ Levi Van Sant, Richard Milligan, and Sharlene Mollett, “Political Ecologies of Race: Settler Colonialism and Environmental Racism in the United States and Canada,” *Antipode* 53, no. 3 (May 2021): 629–42; Max Liboiron, *Pollution Is Colonialism* (Durham: Duke University Press, 2021).

equal distribution of costs and vulnerabilities, or, to put it in more positive terms, educating for a world in which all people are enabled to live within flourishing social-ecological systems. Such a goal is widely accepted, for example within the “education for sustainable development” paradigm promoted by the United Nations and UNESCO.¹⁷

Such human-centered conceptions of justice are essential; human societies cannot possibly live in harmony with the Earth if they include populations made desperate by want or furious by oppression. Yet care must be taken to draw the circle of justice larger than around humans alone. Consider, for example, conflicting demands for water from a particular aquifer or watershed. Justice from a sustainable development perspective asks us to consider the access to water of Indigenous communities, rural communities, racialized urban communities and so on, and also the ethical and environmental practices of agriculture, mining, hydro power and other large-scale water users. Yet there is a risk that, in seeking more equitable solutions for the people involved, we will be tempted to overlook or downplay the interests of the fish and birds and plants and insects — or, for that matter, the lakes and rivers themselves.¹⁸ Justice that *includes* the more-than-human goes well beyond what is commonly understood as implied by sustainable development; it might, for instance, mean an overall reduction of human presence in a particular landscape, in order that the remaining communities might live in greater freedom and relationality with the wild.

That might be one implication of what has become known as “reconciliation” In the Canadian context, a realignment of the relationship between Indigenous peoples and the Crown. As noted by the Truth and Reconciliation Commission, this is a more-than-human matter; on the territories now known as Canada, it “requires our collective reconciliation with the Earth.”¹⁹ In many Indigenous traditions, both across North America and more widely, the land is seen as the ultimate source of law.²⁰ Anishinaabe legal scholar John Borrows has outlined “how Indigenous peoples’ own legal systems and lifeways” facilitate “understanding and working within our environment’s inherent limits.”²¹ His colleague James Tully puts it still more emphatically:

¹⁷ Marco Rieckmann, *Education for Sustainable Development Goals: Learning Objectives* (UNESCO, 2017); K. Shulla et al., “Sustainable Development Education in the Context of the 2030 Agenda for Sustainable Development,” *International Journal of Sustainable Development & World Ecology* 27, no. 5 (July 3, 2020): 458–68, <https://doi.org/10.1080/13504509.2020.1721378>.

¹⁸ Erin O'Donnell and Elizabeth Macpherson, “Voice, Power and Legitimacy: The Role of the Legal Person in River Management in New Zealand, Chile and Australia,” *Australasian Journal of Water Resources* 23, no. 1 (2019): 35–44.

¹⁹ Truth and Reconciliation Commission of Canada, *Honouring the Truth, Reconciling for the Future: Summary of the Final Report of the Truth and Reconciliation Commission of Canada* (Truth and Reconciliation Commission of Canada, 2015), 18; John Borrows, “Earth-Bound: Indigenous Resurgence and Environmental Reconciliation,” in *Resurgence and Reconciliation: Indigenous-Settler Relations and Earth Teachings*, eds. Michael Asch, John Borrows, and James Tully (Toronto: University of Toronto Press, 2018), 49–81.

²⁰ C.F. Black, *The Land Is the Source of the Law: A Dialogic Encounter with Indigenous Jurisprudence* (Oxford: Routledge, 2011).

²¹ Borrows, “Earth-bound: Indigenous Resurgence and Environmental Reconciliation,” 50.

This great project of our time [learning to live sustainably on the Earth] cannot be done justly or intelligently without the ongoing consent and cooperation of Indigenous people who have co-evolved with and learned from their ecosystems: the very ecosystems from which non-Indigenous people now want to learn how life sustains life in order to save themselves from the anthropogenic crisis they have created by ignoring both teachers.²²

Educating for ecological justice thus goes hand in hand with education for Indigenous justice. In recognition of this fact, throughout this report we have drawn on Indigenous scholars and educators; at the same time, we acknowledge that our overall frame of reference is a non-Indigenous one, situated as most of us are in personal histories and professional contexts far removed from Indigenous communities and relationships with land. (It should be noted, however, that one team member, doctoral candidate Skylar Sage, is Secwépemc and maintains strong ties with her community.) We have endeavoured to be mindful and respectful in drawing on this literature, but we are aware that the body of relevant Indigenous scholarship far exceeds our ability to do it justice here.

Another approach to ecological justice that is broadly aligned with our focus on the wild is the recent elaboration of conceptions of multi-species justice.²³ In the words of Celermajer and her colleagues, “Multispecies justice redesigns justice away from the fiction of individualist primacy, toward an ecological reality where humans actually exist: in a larger set of material relationships.” In keeping with the premises posed earlier in this report, “human and nonhuman animals, species, microbiomes, ecosystems, oceans, and rivers – and the relations among and across them – are all subjects of justice.”²⁴ We suspect that education that responds to this conception of justice, like education that takes Indigenous sovereignty and understandings of land seriously, will be “unsettling” for many Canadians, in the sense described by Paulette Regan. It is education that calls for action: “settlers cannot just theorize about decolonizing and liberatory struggle: we must experience it, beginning with ourselves as individuals, and then morally and ethically responsible socio-political actors in Canadian society.”²⁵

²² James Tully, “Reconciliation Here on Earth,” in *Resurgence and Reconciliation: Indigenous-Settler Relations and Earth Teachings*, eds. Michael Asch, John Borrows, and James Tully (Toronto: University of Toronto Press, 2018), 86–87.

²³ Danielle Celermajer et al., “Justice Through a Multispecies Lens,” *Contemporary Political Theory* 19, no. 3 (September 2020): 475–512; Danielle Celermajer et al., “Multispecies Justice: Theories, Challenges, and a Research Agenda for Environmental Politics,” *Environmental Politics* 30, no. 1–2 (February 23, 2021): 119–40.; Petra Tschakert et al., “Multispecies Justice: Climate-just Futures with, for and beyond Humans,” *WIREs Climate Change* 12, no. 2 (March 2021).

²⁴ Celermajer et al., 127.

²⁵ Paulette Regan, *Unsettling the Settler Within: Indian Residential Schools, Truth Telling, and Reconciliation in Canada* (Vancouver: UBC Press, 2010), 24–25.

Wild, sacred, just: some generative principles

The three interlinked concepts we have just described emerged through a process in which team members wrote short speculative fiction pieces about imagined futures, inspired by contemporary work in Black, Indigenous and Queer futurism.²⁶ These pieces seemed to draw on a cluster of underlying principles, including those we initially called emergence, ancient futures, all my relations, abundant time, integrity, embedded meaning, calling forth the gifts, loving-kindness, incompleteness, mystery and paradox, dissonance and divergence, letting go and shedding, and acting in uncertainty. Eventually, we came to focus on six principles that reminded us of the functioning of flourishing ecosystems, such as an old growth forest, and this in turn led us to think in terms of the wild as an overarching frame of reference.

The principles (which are interconnected and overlapping, not independent of one another) are intriguing. Even this preliminary exploration suggests they have deep implications for how we understand education for eco-social-cultural change.

All My Relations

The phrase “all my relations” originated with Plains Indigenous cultures (Lakota, Cree, Métis), but it has come to be used widely as an acknowledgment of “everything as alive and elemental to your being. There is nothing that matters less than anything else. By virtue of its being, all things are vital, necessary and a part of the grand whole, because unity cannot exist where exclusion is allowed to happen. This is the great teaching of this statement.”²⁷ Educationally, it points towards relational work – not only epistemological, but ontological and ethical – as central to a curriculum informed by wildness, sacredness and justice. The question is always: how are we already in relation to what we are seeking to understand? And how, through that relationship, is it already teaching us? And how might shifting or deepening that relationship reshape our understanding?

“Knowledge cannot be owned or discovered but is merely a set of relationships that may be given a visible form.”²⁸ This is how Cree scholar Shawn Wilson sums up a central tenet of Indigenous research methodologies; increasingly, Western scholars are coming to similar conclusions across a variety of fields related to our Earthly ways of life.²⁹ Much leading

²⁶ Walidah Imarisha and Adrienne Maree Brown, eds., *Octavia's Brood: Science Fiction Stories from Social Justice Movements* (Chico, CA:AK Press, 2015); Alexis Lothian, *Old Futures: Speculative Fiction and Queer Possibility* (New York: New York University Press, 2018); Mark Rifkin, *Fictions of Land and Flesh: Blackness, Indigeneity, Speculation* (Durham: Duke University Press, 2019).

²⁷ Richard Wagamese, “Wagamese: ‘All My Relations’ about Respect,” *Kamloops Daily News*, June 11, 2013, <https://www.kamloopsnews.ca/opinion/columnists/wagamese-all-my-relations-about-respect-1.1237759>.

²⁸ Shawn Wilson, *Research Is Ceremony: Indigenous Research Methods* (Winnipeg: Fernwood, 2008), 127.

²⁹ Zack Walsh, Jessica Böhme, and Christine Wamsler, “Towards a Relational Paradigm in Sustainability Research, Practice, and Education,” *Ambio* 50, no. 1 (January 2021): 74–84.

scholarship in education is now guided by relational philosophies of practice³⁰ coupled with relational approaches to educational inquiry.³¹ In the context of this review, such trends are encouraging; they suggest that the educational field itself is more ready to engage relationally with the ecological and climate crises than it was even a decade ago.

Of the “Four R’s” of indigenous education cited earlier, reciprocity, in particular, emerges in much contemporary work as key. Reciprocity is embodied in countless Indigenous practices, for example the many ways of expressing gratitude to the plant and animal and other beings on whom we depend for our survival and well-being. “All of our flourishing is mutual,” Robin Wall Kimmerer says in her influential 2013 book of essays, *Braiding Sweetgrass*. “Respect one another, support one another, bring your gift to the world and receive the gifts of others, and there will be enough for all.”³² In such teachings, the intertwining of wildness, sacredness and justice is clear.

Abundant Time

It is common, in the context of the ecological and climate crises, to insist that time is short. Yet in our interviews with community educators, this understanding of time was seen as problematic, an integral part of the very mindset that has brought those crises into being. It is, indeed, well established that culturally specific concepts and practices related to time played a key role in colonialism and in the formation of 19th- and 20th century modernity.³³ The same, essentially colonial notion of time as a scarce resource now permeates modern culture, with far-reaching consequences for the organization of work, parenting, leisure and other key dimensions of human existence, including formal education.³⁴

³⁰ Nel Noddings, *Caring: A Relational Approach to Ethics and Moral Education*, 2nd ed. (Berkeley: University of California Press, 2013); Sean Blenkinsop and Daniel Ford, “The Relational, the Critical, and the Existential: Three Strands and Accompanying Challenges for Extending the Theory of Environmental Education,” *Journal of Outdoor and Environmental Education* 21, no. 3 (December 2018): 319–30, <https://doi.org/10.1007/s42322-018-0027-4>; Julian Kitchen and Karen Ragoonaden, eds., *Mindful and Relational Approaches to Social Justice, Equity, and Diversity in Teacher Education* (Lanham, MD: Lexington, 2019).

³¹ David W. Jardine, *Pedagogy Left in Peace: Cultivating Free Spaces in Teaching and Learning* (New York: Bloomsbury, 2012); D. Jean Clandinin, Vera Caine, and Sean Lessard, eds., *The Relational Ethics of Narrative Inquiry* (Oxford: Routledge, 2018); Lone Hersted, Ottar Ness, and Søren Frimann, eds., *Action Research in a Relational Perspective: Dialogue, Reflexivity, Power and Ethics* (Oxford: Routledge, 2019).

³² Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*, 166, 132.

³³ Sian Beynon-Jones and Emily Grabham, eds., *Law and Time* (Oxford: Routledge, 2018); Giordano Nanni, *The Colonisation of Time: Ritual, Routine and Resistance in the British Empire* (Manchester: Manchester University Press, 2017); Vanessa Ogle, *The Global Transformation of Time: 1870–1950* (Boston: Harvard University Press, 2015).

³⁴ David William Jardine, Sharon Friesen, and Patricia Anne Clifford, *Curriculum in Abundance* (Hove, UK: Psychology Press, 2006); Dale Southerton, *Time, Consumption and the Coordination of Everyday Life* (London: Palgrave Macmillan, 2020).

Common features of Western discourse about time include positioning tradition and modernity as mutually exclusive, assuming that all people have a shared experience of the present, drawing a sharp line between “beliefs” and “facts” about time, and insisting on the linear temporality of history.³⁵ Indigenous scholars are clear in their dissent: “Time is not a river running inexorably to the sea, but the sea itself—its tides that appear and disappear, the fog that rises to become rain in a different river. All things that were will come again,” writes Robin Wall Kimmerer.³⁶ Or, in Leanne Betasamosake Simpson’s words, “Indigenous thought doesn’t dissect time into past, present and future. The future is here in the form of the practices of the present, in which the past is also here influencing.”³⁷

The key point in all this is that our understandings and practices of time can be sites of colonization or decolonization, can contribute to the renewing of the Earth or to its devastation. Philosopher Roman Krznaric, for example, argues that modern society is “colonizing the future” by treating it as a dumping ground for its toxic legacies. Living within the Earth’s carrying capacity requires us to become, in his terms, “time rebels” and “good ancestors.” To this end, he offers six ways to “think long”: deep-time humility, a legacy mindset, intergenerational justice, cathedral thinking, holistic forecasting, and transcendent goals.³⁸ Such are the radical implications of taking time’s abundance seriously as a feature of the wild.

Mystery/Unknowability

Wildness, sacredness and justice all concern ethical encounters with the Other — “alterity,” as it is often termed in the phenomenological literature.³⁹ This literature is largely focused on human others, yet phenomenological inquiry is readily extended “to open up and make manifest the veiled and increasingly buried features of the interplay between ‘nature out there’ and the ‘nature in here,’ as Castrillón puts it in his introduction to a collection of such studies.⁴⁰ Alterity, he suggests, is a central theme of such work: “There is in the smell, taste, and feel of the wild, an uncanny otherness. This indelible and radical alterity acts as the mainspring for much of the vitality and vibrancy that we experience when immersed in the wild.”⁴¹

From such alterity, Indigenous teachings infer the necessity of respect, caution and humility. Leanne Betasamosake Simpson writes of the “nationhood” of other species, which have

³⁵ Mark Rifkin, *Beyond Settler Time: Temporal Sovereignty and Indigenous Self-Determination* (Durham: Duke University Press, 2017).

³⁶ Kimmerer, 206–7.

³⁷ Simpson, *As We Have Always Done: Indigenous Freedom through Radical Resistance*, 213.

³⁸ Roman Krznaric, *The Good Ancestor: How to Think Long Term in a Short-Term World* (New York: Random House, 2020).

³⁹ Emmanuel Levinas, *Emmanuel Levinas: Basic Philosophical Writings*, eds. Adriaan Peperzak, Simon Critchley, and Robert Bernasconi (Bloomington: Indiana University Press, 1996); Charles S. Brown and Ted Toadvine, eds., *Eco-Phenomenology: Back to the Earth Itself* (New York: SUNY Press, 2012).

⁴⁰ Vakoch and Castrillón, *Ecopsychology, Phenomenology, and the Environment*.

⁴¹ Fernando Castrillón, “Ecopsychology and Phenomenology: An Introduction,” in *Ecopsychology, Phenomenology, and the Environment*, eds. Douglas A. Vakoch and Fernando Castrillón (New York: Springer, 2014), 3.

“power, agency, and influence... language, thought, and spirit—intellect” that are different from those of human nations and that call for “consent, reciprocity, respect and empathy” in all dealings with them.⁴² Similarly, Robin Wall Kimmerer evokes the different languages spoken by those nations:

Imagine walking through a richly inhabited world of Birch people, Bear people, Rock people, beings we think of and therefore speak of as persons worthy of our respect, of inclusion in a peopled world. We Americans are reluctant to learn a foreign language of our own species, let alone another species. But imagine the possibilities. ... Imagine how much less lonely the world would be.⁴³

At the same time as it points to the possibility and value of such relationships, Indigenous thought emphasizes the *inexhaustibility* of the world’s mystery. As Maori scholar Carl Mika points out, this can be seen as a corollary of the world’s interrelatedness; if everything is in relation to everything else, there is a sense in which the entire world is present in anything we perceive: “one thing is never alone, and all things construct and compose it,” a holistic metaphysics he calls “worlding”. In such a perspective, the limitations of human knowing (or *any* knowing) are rendered self-evident:

As one thing presents itself to me, others within it may appear and hide, but even if I cannot perceive them (which I cannot) we can be assured that they are there. An object that I perceive is therefore fundamentally unknowable; I can speculate on it and give it a name, but all I can be certain of is that it is mysterious precisely because it is “worlded”. I can experience the thing in its full force without actually sensing that influence, but talk of knowledge is only minimally useful where we are considering it. I am no more familiar with any one thing than if I had never encountered it. Indeed, I experience an aspect of the worlded thing and its mystery when I meet the limits of my ability to say much about it, or when I realise that I cannot fully know it. Perception is given rise by the formation of the self with the full force of all things in the world.⁴⁴

Educationally, it follows that less emphasis should be put on developing any single mode of knowing, because this fosters the illusion of knowability.⁴⁵ Rather, multiple ways of allowing our encounters with the world to “form the self” will allow for more fully alive, aware, skilled and

⁴² Simpson, *As We Have Always Done: Indigenous Freedom through Radical Resistance*, 61.

⁴³ Kimmerer, 58.

⁴⁴ Carl Mika, *Indigenous Education and the Metaphysics of Presence: A Worlded Philosophy* (Oxford: Routledge, 2017), 5.

⁴⁵ David Graeber, “Radical Alterity Is Just Another Way of Saying ‘Reality’: A Reply to Eduardo Viveiros de Castro,” *HAU: Journal of Ethnographic Theory* 5, no. 2 (September 2015): 1–41.

reciprocal — in short, more wild, less colonized — ways of inhabiting and moving through that world.⁴⁶ Among the guides for such education, wonder and imagination emerge as key.⁴⁷

Embeddedness/Integration

The phrase at the heart of this knowledge synthesis, “living within the Earth’s carrying capacity,” implicitly positions humans with respect to a greater whole, the Earth itself. And of course the fact that humans have spread across the Earth’s surface and are affecting processes such as climate on a global scale is something we need to reckon with collectively. Nonetheless, we cannot really *experience* the Earth as a whole; we can intuit its wholeness, learn about it through prose, poetry, art and music, try to grasp it imaginatively, but Earth processes unfold on too vast a scale for us to learn from directly; they must be translated into other forms.

We do, however, have access to smaller versions of that whole, landscapes large enough to demonstrate the self-sustaining, self-renewing capacity of the wild, but small enough to invite intimacy, and also special places and sacred sites that possess a sense of wholeness. These are the scales at which the Indigenous conception of “land as first teacher” can most readily be experienced. Land in this sense teaches us, not simply by offering a place to live, or the food and material resources necessary for survival, but more fundamentally by showing us and letting us experience, continually and in myriad ways, what living relationships look like and feel like and how they weave together to make greater, more complex, self-sustaining and adaptive wholes. In Indigenous creation stories, humans are typically the late arrivals, the youngest member of the family, the last to be created, arriving on a scene where action and intelligence are already in full swing, and where our main task is to learn by observing and participating in the webs of relationship that carry both doing and thinking.⁴⁸

Education that honours land as first teacher takes children onto and into the land from an early age. It also de-centres the human teacher in such a way that the natural world and its denizens

⁴⁶ Cash Ahenakew, “Grafting Indigenous Ways of Knowing onto Non-Indigenous Ways of Being: The (Underestimated) Challenges of a Decolonial Imagination,” *International Review of Qualitative Research* 9, no. 3 (November 2016): 323–40; Cash Richard Ahenakew, “Mapping and Complicating Conversations about Indigenous Education,” *Diaspora, Indigenous, and Minority Education* 11, no. 2 (April 3, 2017): 80–91.

⁴⁷ Kieran Egan, Annabella I. Cant, and Gillian Judson, eds., *Wonder-Full Education: The Centrality of Wonder in Teaching and Learning Across the Curriculum* (Oxford: Routledge, 2014); Mark Fettes, “Imagination and Experience: An Integrative Framework,” *Democracy and Education* 21 (2013): 1–11; Joe Sheridan and Rononhiakewen “He Clears the Sky” D Longboat, “The Haudenosaunee Imagination and the Ecology of the Sacred,” *Space and Culture* 9, no. 4 (November 2006): 365–81.

⁴⁸ Sandra D. Styres, “Land as First Teacher: A Philosophical Journeying,” *Reflective Practice* 12, no. 6 (December 2011): 717–31; Leanne Betasamosake Simpson, “Land as Pedagogy: Nishnaabeg Intelligence and Rebellious Transformation,” *Decolonization: Indigeneity, Education & Society* 3, no. 3 (2014): 1–25; Sandra D. Styres, *Pathways for Remembering and Recognizing Indigenous Thought in Education: Philosophies of Iethi’nihstehna Ohwentsia’kekha (Land)* (Toronto: University of Toronto Press, 2017).

and particularities can become actual co-teachers in the students' learning.⁴⁹ And it carries implications for the kinds of stories one chooses to listen to and to tell, as Sandra Styres notes:

For those who want to live in deeply sacred and intimate relationship to Land must understand that it first and foremost requires a respectful and consistent acknowledgment of whose traditional lands we are on, a commitment to journeying—a seeking out and coming to an understanding of the stories and knowledges embedded in those lands, a conscious choosing to live in intimate, sacred, and storied relationships with those lands and not the least of which is an acknowledgment of the ways one is implicated in the networks and relations of power that comprise the tangled colonial history of the lands one is upon.⁵⁰

“Land as first teacher” thus offers guidance both in the languages of the more-than-human world and in the stories that mirror and transmute our relationships with that world in the medium of human language. Stories of both kinds are to be encountered and experienced as wholes, and this implies the development of skills of listening quietly and carefully to the same or similar stories told over and over again. This is education that takes the time that it needs.⁵¹

Ancient Futures

The dynamic, self-renewing quality of the wild is one of its defining characteristics: new beings are constantly joining the community, differing subtly from their predecessors; old beings are constantly passing, ceding space and resources to the next generation. This is the familiar encounter of human education as well: “the often harrowing, deeply dependent and interdependent work of confronting the mortality of the world that must be set right anew in concert and solidarity with the young”.⁵² Fear of the “wildness” of the young, suspicion that they will not value the things their elders do, is one of the pitfalls that always lurk in education:

Living with children means living in the belly of a paradox wherein a genuine life together is made possible only in the context of an ongoing conversation which never ends, yet must be sustained for life together to go on at all. Homes, classrooms,

⁴⁹ Sean Blenkinsop and Chris Beeman, “The World as Co-Teacher: Learning to Work with a Peerless Colleague,” *The Trumpeter* 26, no. 3 (2010): 27–39; Bob Jickling et al., eds., *Wild Pedagogies: Touchstones for Re-Negotiating Education and the Environment in the Anthropocene* (London: Palgrave Macmillan, 2019).

⁵⁰ Sandra Styres, “Literacies of Land: Decolonizing Narratives, Storying, and Literature,” in *Indigenous and Decolonizing Studies in Education: Mapping the Long View*, eds. Linda Tuhiwai Smith, Eve Tuck, and K. Wayne Yang (Oxford: Routledge, 2018), 29.

⁵¹ Sean Blenkinsop and Mark Fettes, “Land, Language and Listening: The Transformations That Can Flow from Acknowledging Indigenous Land,” *Journal of Philosophy of Education* 54, no. 4 (August 2020): 1033–46, <https://doi.org/10.1111/1467-9752.12470>.

⁵² Jardine, *Pedagogy Left in Peace: Cultivating Free Spaces in teaching and learning*, 4.

schools wherein the people in charge cannot lay themselves open to the new life in their midst, always exist in a state of war.⁵³

Yet such mistrust of the young can be matched or surpassed by modern culture's disdain for the old. As the pace of social and economic change has accelerated, faith in the accumulated experience and wisdom of elders has tended to diminish, and they are often deprived of any meaningful role in the education of their own grandchildren or those of others. Educational spaces have become age-segregated to remarkable degrees. The "ongoing conversation" between generations has become more sporadic, less wide-ranging, less rich than it was; less relationally and ecologically diverse, we might say. And of course this is also true of the conversation with the more-than-human, with land as ancient, patient, and enduring – not only "first teacher" but "first elder".

What Leanne Betasamosake Simpson and other Indigenous scholars have theorized as "grounded normativity" is based in this ongoing dialogue between natality and mortality, both human and more-than-human, a dialogue that is part and parcel of wildness itself.⁵⁴ And so education for living within the Earth's carrying capacity needs to revitalize the relationships between young and old and between the ancient past and the unfolding future. Future-oriented discourse on education is typified by the claim that "today's challenges cannot be solved by old thinking," and so "we need to support learners to become innovators, capable of leveraging their own imagination and creativity to realize new outcomes for society."⁵⁵ Yet imagination and creativity are different when they are shaped within "a series of complex, interconnected cycling processes that make up a non-linear, overlapping emergent and responsive network of relationships of deep reciprocity, intimate and global interconnection and interdependence, that spirals across time and space."⁵⁶ In *this* kind of educational future, the question of what is old and what is new thinking becomes irrelevant as a criterion of judgment. The question instead is, what will honour the wisdom and the needs of old and young alike, including the ancestors who have passed on and the generations yet unborn.

(Re)creative Dissonance

In spite of its dynamic qualities, the wild is conservative in significant respects; as the literature on ecosystem resilience has demonstrated, even quite dramatic disturbances may not undo the underlying network of relationships, which over time will rebuild its equilibrium.⁵⁷ Yet to put things this way is itself a choice of perspective; as Anna Tsing writes, "disturbance is always in

⁵³ David Geoffrey Smith, "Children and the Gods of War," in *Pedagon: Interdisciplinary Essays in the Human Sciences, Pedagogy, and Culture* (Bern: Peter Lang, 1999), 139; cited in Jardine, *Pedagogy Left in Peace*, 4.

⁵⁴ Simpson, *As We Have Always Done: Indigenous Freedom through Radical Resistance*, 23.

⁵⁵ John W. Moravec, ed., *Emerging Education Futures: Experiences and Visions from the Field* (Education Futures, 2019), 258.

⁵⁶ Simpson, *As We Have Always Done: Indigenous Freedom through Radical Resistance*, 24.

⁵⁷ Lance H. Gunderson, Craig Reece Allen, and Crawford S. Holling, eds., *Foundations of Ecological Resilience* (Washington: Island Press, 2012).

the middle of things: the term does not refer us to a harmonious state before disturbance. Disturbances follow other disturbances. Thus all landscapes are disturbed; disturbance is ordinary. ... Whether a disturbance is bearable or unbearable is a question worked out through what follows it: the reformation of assemblages.”⁵⁸

Education for eco-social-cultural change is education for an era of disturbances. Notwithstanding the emphasis placed, in the other principles discussed here, on relationality, wholeness and mutual flourishing, the teachings of the wild tell us to accept the certainty of upheaval, reality’s lack of deference to good intentions, to any desires we may have for certainty or comfort. This report draws substantially on Indigenous scholarship and teachings, which tend towards optimism regarding what the Earth can teach us and the restoration of balance; yet there are other powerful voices that posit harsher lessons:

My claim is that because black people have been excluded from the category human, we have a particular epistemic and ontological mobility. Unburdened by investments in belonging to a system created to exclude us in the first place, we develop marvelous modes of being in and perceiving the universe. I am claiming that there is real power to be found in such an untethered state - the power to destabilize the very idea of human supremacy and allow for entirely new ways to relate to each other and to the postapocalyptic ecologies, both organic and inorganic, in which we are enmeshed. I argue that those of us who are dislocated on the planet are perfectly positioned to break open the stubborn epistemological logics of human domination. To imagine as best we can outside these epistemological and ontological circumscriptions does not mean we save the human race, at least not that race as we know it. Salvage may not be possible at this point, although this is not necessarily a catastrophe. The untethered state does allow for the possibility of real change on a vast inhuman scale.⁵⁹

Openness to such voices seems essential. There is the risk that a focus on “living within the Earth’s carrying capacity” becomes self-limiting; that whatever way we interpret that as an educational goal carries within it the seeds of its own failure. Instead, we suggest that education guided by wildness will always make room for the Trickster, the sower of disaster and possibility, the spirit for whom creation and destruction are inextricably linked. As Lewis Hyde observes:

The arts of hunting, the arts of cooking meat — such things belong to the beginning of time, when trickster was first involved in shaping this world. But he has not left the scene. Trickster the culture hero is always present; his seemingly asocial actions continue to keep our world lively and give it the flexibility to endure. ... [T]he origins,

⁵⁸ Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton: Princeton University Press, 2015), 160.

⁵⁹ Jayna Brown, *Black Utopias: Speculative Life and the Music of Other Worlds* (Durham: Duke University Press, 2021), 7.

liveliness and durability of cultures require that there be space for figures whose function it is to uncover and disrupt the very things that cultures are based on.⁶⁰

The ecological crisis is a sign of an educational culture in desperate need of being rendered more lively. Difference, contradiction, paradox, dissonance: rather than insisting on resolution, we need to allow ourselves to recognize and be moved by what lies beyond our expectations, understanding and control. Such practices are part of the path towards the transformative changes that are needed.

3. Approaches to Eco-Social-Cultural Change

Having sketched out an overarching conceptual framework in the previous section, our goal in this section is to consider what is currently understood with respect to the multi-scale transformation of human societies, seeking insights into what might help catalyze a systemic process of eco-social-cultural change.⁶¹ This work draws on the literature on social innovation, entailing a shift in both vocabulary and in the concepts that organize the discussion. In the longer term, we anticipate aligning these ideas more closely with those in the previous section; as our review has helped to confirm, scholars in this field have rarely considered the concepts, structures and processes of education as being among those features of human societies that most need to change, or even realized that education is necessarily part of all social and cultural change. There is a lot of work to be done to open up those conversations.

The literature on processes of innovation and change is vast, and includes many different ways of thinking about and facilitating change. We begin by describing how we chose to narrow our focus to certain sections of the literature, before taking up some particularly promising frameworks and approaches in greater detail.

Transformation, emergence and resurgence

Given the framing outlined in the previous sections, we confined our attention to approaches to social change that explicitly addressed *transformation* or its sister concepts *emergence* and *resurgence*, as opposed to incremental change or adaptation. While the latter, more gradualist approaches have tended to dominate responses to the climate and ecological crises to date (as well as the educational change literature), we do not believe they will prove adequate, whether in the realm of education or in other areas of public policy. Our three chosen concepts provide more helpful guidance, each with a somewhat different emphasis.⁶²

⁶⁰ Lewis Hyde, *Trickster Makes This World: Mischief, Myth, and Art* (New York: Farrar, Straus and Giroux, 2010), 9.

⁶¹ Frances Westley et al., "Tipping Toward Sustainability: Emerging Pathways of Transformation," *Ambio* 40, no. 7 (2011): 762–80, <https://doi.org/10.1007/s13280-011-0186-9>.

⁶² Claus Otto Scharmer, *Theory U: Leading from the Future as It Emerges: The Social Technology of Presencing*, Second Edition (San Francisco: Berrett-Koehler Publishers, 2016); Frédéric Laloux,

Transformation refers to a significant shift in people, structures, processes, and systems. Some sources refer to it as second-order change: “First-order change, amelioration, creates change within a system, while second-order change, transformation, strives to change the system and its assumptions.”⁶³ Transformation is often triggered by a growing problem, challenge, or crisis within a system that is “stuck” in a particular state; it involves shifting or dislodging key assumptions or habits, while retaining recognizable features of the organization or institution. Because of this, the process is generally taken to be path dependent, meaning that the range of possible outcomes is determined by previous states of the system. Despite the significant shifts involved, many fundamental parameters remain the same.

In *emergence*, a more wholesale shift in parameters takes place. This is essentially a new system, one that has broken free of previous constraints and entered into a new field of possibilities. The crisis of the existing system is rarely sufficient to generate emergence; a crucial role is played by aspiration, the ‘becoming’ of a vision for a new or resurgent opportunity that was not there, or perhaps not seen before. In the process of creatively imagining and generating possible futures, emergence harnesses intuition, emotion and spirit; it tends to significantly expand the potential, capacity, and capability of people, organizations, and systems to work on the challenges that they face.

Resurgence refers to emergence catalyzed by efforts to recover and revitalize possibilities of being and relationship that have been suppressed and marginalized by the dominant system. As Indigenous scholar Jeff Corntassel observes, “processes of resurgence are often contentious and reflect the spiritual, cultural, economic, social and political scope of the struggle.”⁶⁴ As noted in the previous section, Indigenous resurgence is strongly focused on restoring relationships to land, sometimes theorized as “grounded normativity,” and thus holds particular relevance for our project.

All of these terms point to what is coming to be; they leave unstated what must be abandoned or destroyed. Educationally, these are of equal significance. For people who have been granted comforts and privileges by the system that is being replaced, the un/relearning process can be “disruptive to the sense of self, meaning, security, certainty, futurity, and even reality that has been cultivated” within familiar educational and cultural frameworks.⁶⁵ We take up the implications of this later, in Section 4.

Reinventing Organizations: A Guide to Creating Organizations Inspired by the next Stage of Human Consciousness (Millis: Nelson Parker, 2014); Benyamin Lichtenstein, *Generative Emergence: A New Discipline of Organizational, Entrepreneurial and Social Innovation* (London: Oxford University Press, 2014).

⁶³ G. Nelson and I. Prilleltensky, eds., *Community Psychology: In Pursuit of Liberation and Well-Being (3rd Ed.)*. (London: Palgrave MacMillan, 2010).

⁶⁴ Jeff Corntassel, “Re-Envisioning Resurgence: Indigenous Pathways to Decolonization and Sustainable Self-Determination,” *Decolonization: Indigeneity, Education & Society* 1, no. 1 (2012), 88.

⁶⁵ Sharon Stein et al., “From ‘Education for Sustainable Development’ to ‘Education for the End of the World as We Know It,’” *Educational Philosophy and Theory*, October 18, 2020, 1–14.

Resilience and systems change

Over the past twenty years, resilience has become one of the major theoretical frameworks for understanding the ways in which social-ecological-cultural systems respond to disturbance.⁶⁶ Originating in the study of ecological systems impacted by humans,⁶⁷ the concept of resilience is now common in studies on social development and adaptation, where it is typically defined as “the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth,” “the ability of systems to function in the face of disturbance,” or “the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation.”⁶⁸

If resilience were useful only for thinking about the ability of social systems to preserve themselves, it would be of marginal relevance for this review. As Carr points out, however, this emphasis on stability is based on a selective reading of the resilience literature:

Discussions about what constitutes resilience have evolved considerably since Holling’s foundational work. No longer do researchers uncritically privilege stability and persistence. Instead, the field has broadly adopted Folke’s argument that “resilience is not only about being persistent or robust to disturbance. It is also about the opportunities that disturbance opens up in terms of recombination of evolved structures and processes, renewal of the system and emergence of new trajectories.”⁶⁹ Second, a growing body of critique has focused on the relatively shallow theorization of the social in discussions of socio-ecological resilience ... Béné and his co-authors⁷⁰ define this challenge in stark terms, arguing that current framings of socio-ecological resilience are marked by an “inability to appropriately capture and reflect social dynamics in general

⁶⁶ Bill Sharpe et al., “Three Horizons: A Pathways Practice for Transformation,” *Ecology and Society* 21, no. 2 (2016): art47, <https://doi.org/10.5751/ES-08388-210247>; Margaret Wheatley and Deborah Frieze, “Using Emergence to Take Social Innovation to Scale”; Donella H. Meadows and Diana Wright, *Thinking in Systems: A Primer*, (London: Earthscan, 2009), <https://doi.org/10.4324/9781849773386>; Craig R. Allen et al., “Panarchy: Theory and Application,” *Ecosystems (New York)* 17, no. 4 (2014): 578–89, <https://doi.org/10.1007/s10021-013-9744-2>; Lance H. Gunderson and C. S. Holling, *Panarchy: Understanding Transformations in Human and Natural Systems*, (Washington: Island Press, 2002).

⁶⁷ Carl Folke, “Resilience: The Emergence of a Perspective for Social–Ecological Systems Analyses,” *Global Environmental Change* 16, no. 3 (August 2006): 253–67, <https://doi.org/10.1016/j.gloenvcha.2006.04.002>.

⁶⁸ Edward R. Carr, “Properties and Projects: Reconciling Resilience and Transformation for Adaptation and Development,” *World Development* 122 (October 2019): 70–84; Edward R. Carr, “Resilient Livelihoods in an Era of Global Transformation,” *Global Environmental Change* 64 (September 2020): 102155.

⁶⁹ Folke, “Resilience,” 259.

⁷⁰ Christophe Béné et al., “Resilience, Poverty and Development,” *Journal of International Development* 26, no. 5 (July 2014): 606.

and issues of agency and power in particular.” Relatively little work has answered these explicit and implicit calls⁷¹ for a more robust theorization of the social in resilience.⁷²

It is this more complex and dynamic understanding of resilience, oriented towards the possibility of transformation, emergence and resurgence, that offers promise for thinking about education for eco-social-cultural change. Interestingly, it also resonates with calls from within the psychological⁷³ and educational⁷⁴ literature for more “dynamic, systemic, ecological” conceptions of resilience as manifested in the lives of individuals. These recent interventions, drawing on ecological and Indigenous conceptions of human development, confirm our sense that the resilience conversation needs to be taken up in the context of education for living within the Earth’s carrying capacity; it promises both to enrich conceptions of what such education needs to encompass and, at the same time, to bring educational theory and practice to bear in useful ways on the problems that resilience theory attempts to address.⁷⁵

Yet although resilience may provide an invaluable interpretative framework extending across many of the relevant levels of scale – from individuals to communities and the landscapes and ecosystems they are part of – it is not designed to answer the question of *how to bring about* transformative systemic change. For that reason, we do not explore resilience further here. Instead, we turn to the literature on social innovation, a developing inter- and trans-disciplinary field “which is mainly concerned with the possibilities and conditions for the realisation of viable, sustainable and/or human development, corresponding designs for society, and accompanying transformation processes, as well as the necessary transformative knowledge.”⁷⁶

Social innovation for systems change

Drawing on studies of innovation systems, resilience theory, entrepreneurship theory, organizational change literature, and others, social innovation has recently emerged as a broad tent for a wide range of approaches to purposeful, value-driven social change.⁷⁷ Where the

⁷¹ Muriel Cote and Andrea J Nightingale, “Resilience Thinking Meets Social Theory,” *Progress in Human Geography* 36, no. 4 (2012): 475–89.

⁷² Carr, “Properties and Projects.”

⁷³ Laurence J Kirmayer et al., “Rethinking Resilience from Indigenous Perspectives,” *The Canadian Journal of Psychiatry* 56, no. 2 (February 2011): 84–91.

⁷⁴ Adeela ahmed Shafi et al., eds., *Reconsidering Resilience in Education: An Exploration Using the Dynamic Interactive Model of Resilience* (Cham: Springer International Publishing, 2020).

⁷⁵ See, for example, Richard Millican and Paul Vare, “A Rounder Sense of Purpose: Educator Competences for Sustainability and Resilience,” in *Reconsidering Resilience in Education*, eds. Adeela ahmed Shafi et al. (Cham: Springer International Publishing, 2020), 199–212.

⁷⁶ Jürgen Howaldt and Michael Schwarz, “Social Innovation and Its Relationship to Social Change” (Dortmund: TU Dortmund University, 2016).

⁷⁷ Per Olsson et al., “The Concept of the Anthropocene as a Game-Changer: A New Context for Social Innovation and Transformations to Sustainability,” *Ecology and Society* 22, no. 2 (2017); Al Etmanski, *Impact: Six Patterns to Spread Your Social Innovation* (Surrey, BC: Orwell Cove, 2015); Zaid Hassan, *The Social Labs Revolution*, 1st ed., (San Francisco: Berrett-Koehler Publishers, 2014); Frances Westley

resilience literature has tended to focus on exogenous shocks, the focus here is primarily on how to generate and sustain change; how to intervene in complex, stuck systems to catalyze transformation, emergence and resurgence. To date, for the most part, the ecological and climate crises have served only as a backdrop to this work, which has had a range of social issues as its focus. As the impact of those crises accelerates, however, social innovation research will increasingly be shaped by “human-environmental interactions and the related feedbacks,” so that its primary concern becomes “large-scale change and transformations to global sustainability.”⁷⁸

An early programmatic bridge between this field and the resilience literature is offered by Benyamin Lichtenstein in *Generative Emergence*, an ambitious application of systems thinking to “organization, entrepreneurial and social innovation.”⁷⁹ Although the book is largely focused on case studies of emergence in firms and organizations, the final chapter suggests directing the same processes, knowledge and skills towards “the proactive creation of new social ecosystems,” or *generative resilience*. In two sentences, Lichtenstein summarizes the promise of this work: “It is possible that human foresight and proactive design might be able to channel [the adaptive] cycle toward greater resilience and sustainability. It may be possible, working collaboratively across and within networks, to catalyze systemwide shifts and emergences.”⁸⁰

Although it may not immediately be obvious, “design” is an educationally significant word here, in view of the way the field of creative design has expanded and evolved through a number of domains or stages or generations, each more expansive and inclusive than its predecessor.⁸¹

These stages are:

- 1.0: Traditional Design – design as making, artifacts and communications;
- 2.0 Product/Service Design – design for value creation, as integrating; products and services;
- 3.0 Organizational Transformation Design – change oriented, design for work practices, strategies, organizational structures; and
- 4.0 Social Transformation Design – design for complex societal situations, social systems, policy-making, community design.

Each of these domains addresses a new level of systemic complexity and involves a greater range of participants in the design process. By stages 3.0 and 4.0, this is clearly, among other things, an *educational* process, involving employees (3.0) and stakeholders (4.0) in learning

et al., *The Evolution of Social Innovation: Building Resilience through Transitions* (Cheltenham, UK: Edward Elgar Publishing, 2017).

⁷⁸ Olsson et al., “The Concept of the Anthropocene as a Game-Changer.”

⁷⁹ Lichtenstein, *Generative Emergence: A New Discipline of Organizational, Entrepreneurial and Social Innovation*.

⁸⁰ Lichtenstein, *Generative Emergence*, chapter 18.

⁸¹ Peter H. Jones, “Systemic Design Principles for Complex Social Systems,” in *Social Systems and Design*, ed. Gary S. Metcalf, vol. 1, Translational Systems Sciences (Tokyo: Springer Japan, 2014), 91–128, https://doi.org/10.1007/978-4-431-54478-4_4.

new ideas, participating in new kinds of creative group work, and thinking together about their values, purposes and needs. Where in stages 1.0 and 2.0 the designer is still clearly in the driver's seat, in 3.0 and 4.0 there is more likely to be a design team working in a facilitator role.

This evolution in the field of design has made it plausible to posit an emerging “integrated systems-oriented design practice” that “brings human-centered design to complex, multi-stakeholder service systems as those found in industrial networks, transportation, medicine and healthcare.”⁸² (We shall return to that “human-centered” claim below.) Systemic design is, by its nature, much more inclusive than the systems-analytical approach that dominated attempts to tackle complex social problems in earlier decades; among other features, it “requires deliberate variety enhancement and refraining from early closure” – that is, elicitation of and engagement with a wide range of ideas, contributed by as diverse a range of participants as possible.⁸³ This approach is now driving grassroots initiatives such as the Creative Reaction Lab's⁸⁴ “Equity-Centered Community Design” process, focused (at least initially) on health care, education, public services and media.⁸⁵ In the hands of such community organizations, systemic design resembles a new movement in non-formal education.

But what about that “human-centered”? There is little doubt that “design for social change” is still preoccupied with human concerns, and indeed there are huge social inequities that must be dealt with in the design process. It is no small matter to design with social justice in mind, as Vink and her colleagues have pointed out:

Design activities are infused in the social and economic structures within and for which design functions, and its relationship to existing power dynamics and capital are often taken for granted... Design carries with it legacies of colonization and imperialism, often ignoring alternative ways of thinking and knowing... Issues of cultural production, design culture, relationship to capital, and colonization, become central in the discussion of politics when designing with societal ambitions.⁸⁶

As argued in Section 2, the educational change strategy here is not to pit the human against the more-than-human, but to expand the concept of justice to include both. This seems to imply an additional Design 5.0 stage in the progression outlined above, which we might term Eco-Social Transformation Design. Concepts and processes of Indigenous justice and multi-species justice could be intentionally embedded in systemic design processes, as could the six principles we proposed in Section 2. Design processes could also be strengthened through insights from educational research on such topics as “generative learning” – learning that calls

⁸² Jones, 93.

⁸³ Jones, 97–98.

⁸⁴ Based in St. Louis, MO, the Creative Reaction Lab was founded in the wake of the Ferguson uprising in 2014. See <https://www.creativereactionlab.com/about>.

⁸⁵ *Equity-Centered Community Design Field Guide* (Creative Reaction Lab, 2018).

⁸⁶ Josina Vink, Katarina Wetter-Erdman, and Vanessa Rodrigues, “Designing Good(s)? Exploring the Politics of Social Design Processes,” *Design Management Academy Conference 2017*, 2017, 18.

into question one's existing theories-in-use and is the basis of personal transformation.⁸⁷ We see a fruitful opportunity for new research in this area, perhaps through collaboration with the worldwide DESIS network of labs working on "design for social innovation towards sustainability" (Canada's only DESIS lab is hosted by Emily Carr University in Vancouver, BC).

A multi-level perspective on educational change

Systemic design offers a route to generating promising innovations in social systems. It leaves unaddressed, however, the question of scale: What is the connection between local-level and macro-level change? Given that we are considering the carrying capacity of the Earth itself, we need to ask what processes can lead to societal and global transformation.

Scale has long been of interest in the social innovation field, where theorists are now using concepts and frameworks developed to study the spread of technological innovation to consider "sustainability transitions" – how major systems within a society (such as energy, transport, construction, agriculture) can be induced to undergo substantive, permanent change in some of their key processes. Geels, one of the foremost proponents of the Multi-Level Perspective, sums up the challenges succinctly:

...sustainability transitions are necessarily about interactions between technology, policy/power/politics, economics/business/markets, and culture/discourse/public opinion. Researchers therefore need theoretical approaches that address, firstly, the multi-dimensional nature of sustainability transitions, and, secondly, the dynamics of structural change. With regard to structural change the problem is that many existing (unsustainable) systems are stabilized through various lock-in mechanisms, such as scale economies, sunk investments in machines, infrastructures and competencies. Also institutional commitments, shared beliefs and discourses, power relations, and political lobbying by incumbents stabilize existing systems. Additionally, consumer lifestyles and preferences may have become adjusted to existing technical systems. These lock-in mechanisms create path dependence and make it difficult to dislodge existing systems. So, the core analytical puzzle is to understand how environmental innovations emerge and how these can replace, transform or reconfigure existing systems.⁸⁸

With only minimal adaptations, this entire passage can be applied to the problem of educational change as well. Consider, for example, the system of compulsory public schooling. For "technology," think of the built environment, rules, routines, curriculum and other material and symbolic resources that structure schools. Consider the sunk costs, the institutional

⁸⁷ Lyle Yorks and Aliko Nicolaidis, "Toward an Integral Approach for Evolving Mindsets for Generative Learning and Timely Action in the Midst of Ambiguity," *Teachers College Record* 115, no. 8 (2013): 1–26.

⁸⁸ Frank W. Geels, "The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms," *Environmental Innovation and Societal Transitions* 1, no. 1 (June 2011): 25, <https://doi.org/10.1016/j.eist.2011.02.002>.

commitments, the fact that nearly every voter and taxpayer has spent thousands of hours of their formative years in school, and the hold of those experiences on their imagination. Such a complex self-reinforcing system is an example of what, in the Multi-Level Perspective (MLP) championed by Geels, is termed a “regime”. Regimes are the primary focus of interest in the MLP, both in terms of understanding their relative stability and resistance to change, and for insights into gaps, tensions and contradictions that may allow opportunities for innovations to spread and catalyze a shift to a new regime.

There are two potential driving forces in such change. At the larger scale, a regime exists within a broader socio-technical “landscape” that normally changes relatively slowly; it includes “not only the technical and material backdrop that sustains society, but also... demographic trends, political ideologies, societal values, and macro-economic patterns.”⁸⁹ In this era of accelerating shifts in climate patterns, food production, the spread of infectious diseases, and so on, the landscape may no longer provide the stable backdrop from which the school system derives much of its legitimacy. At the same time, coexisting with the dominant regime are “niches” where innovations are generated; some of these may generate system-wide shifts if they propose a new, more appealing or satisfying means of fulfilling the regime’s core functions, or perhaps even altering what those functions are conceived to be.⁹⁰

Promising as the MLP appears to be in terms of thinking about systemic educational change, our review turned up only one journal article that applied the MLP to a formal education system. Deleye, Van Poeck and Block conducted a multi-level analysis of sustainability education within the Flemish higher education system. As expected, they found examples of “lock-ins” in the dominant regime that impede the upscaling of sustainable niches; however, the regime also demonstrated internal contradictions that, according to the authors, “create windows of opportunity for niches to become viable alternatives.”⁹¹ We also found a Master’s thesis from Lund University in Sweden, using the MLP to examine nature schools as an innovation within the Iranian education system.⁹² These meagre findings confirm a general pattern in the literature: studies of social innovation in business contexts are common, in health care and social services somewhat less common, and in education almost non-existent. We suggest that this should be cause for concern.

Brief as it is, this review of the social change literature has pointed to some promising possibilities for original work on eco-social-cultural change, as well as to some alarming gaps in the research base. While it is unsurprising to find an almost exclusive focus on human

⁸⁹ Geels, “The Multi-Level Perspective on Sustainability Transitions,” 28.

⁹⁰ Frank W Geels, “Socio-Technical Transitions to Sustainability: A Review of Criticisms and Elaborations of the Multi-Level Perspective,” *Current Opinion in Environmental Sustainability* 39 (August 2019): 187-201, <https://doi.org/10.1016/j.cosust.2019.06.009>.

⁹¹ Maarten Deleye, Katrien Van Poeck, and Thomas Block, “Lock-Ins and Opportunities for Sustainability Transition: A Multi-Level Analysis of the Flemish Higher Education System,” *International Journal of Sustainability in Higher Education* 20, no. 7 (November 4, 2019): 1119, <https://doi.org/10.1108/IJSHE-09-2018-0160>.

⁹² Fateme Bashiri, “Walking a Tightrope towards Sustainability” (Lund: Lund University, 2020), <https://lup.lub.lu.se/student-papers/search/publication/9012425>.

concerns, the absence of serious work on innovation and emergence in education systems is remarkable. It is also noteworthy that work in the resilience and systemic change paradigms rarely draws on educational scholarship, despite the latter's relevance to many of the issues central to those fields. If we are right to argue that modern education has played a key role in producing the ecological and climate crises, it is vital to take up the question in earnest of how it can be transformed.

4. Education as the Practice of Eco-Social-Cultural Change

Educational competencies, capacities and capabilities

The previous sections have situated education within very broad pictures of systemic change: in terms of framing concepts and values, in Section 2, and in terms of processes of resilience, transformation and emergence in Section 3. Here we turn to a question more specific to education itself: that it, what educational practices can help to generate and support eco-social-cultural change along the lines already described?

In short order we will move into descriptions of four educator stances, gathered together from our interviews with a diverse range of critical educators (See Appendix B for a list) and from our review of educational literature, encompassing both formal and, more importantly, non and informal settings. First, however, a quick definitional discussion is needed around the language of competencies, capacities, and capabilities that we will be employing, as these terms are used somewhat indiscriminately and interchangeably in the literature.

Competencies describe knowledge, behaviours, abilities, and skills, and are concerned with 'what to think', and with knowing how to do something.⁹³ Petrie describes this as horizontal development.⁹⁴

Capacities are concerned with 'how to think,' and with mindsets, worldviews, attitudes, and methods and structures of thinking, also known as vertical development.⁹⁵ Capacities can help to grapple with the complexities of the contemporary world and to ask questions like: do we have enough; how much is needed; what is the level of awareness about how mindset affects meaning- and choice-making; awareness of how one is intentionally in relationship with

⁹³ Raed M. Jaradat, Charles B. Keating, and Joseph M. Bradley, "Individual Capacity and Organizational Competency for Systems Thinking," *IEEE Systems Journal* 12, no. 2 (June 2018): 1203–10, <https://doi.org/10.1109/JSYST.2017.2652218>.

⁹⁴ Nick Petrie, "Vertical Leadership Development–Part 1," n.d., 16.

⁹⁵ Jaradat, Keating, and Bradley, "Individual Capacity and Organizational Competency for Systems Thinking"; Petrie, "Vertical Leadership Development–Part 1"; Nick Petrie, "The How-To of Vertical Leadership Development–Part 2," n.d., 1-26.

uncertainty and ambiguity; and the appropriate and discerning use of skills and methods.⁹⁶ Both competencies and capacities can be held at the individual as well as at the organizational levels, and these are interdependent constructions.

Capabilities are dis- or enabling infrastructures, conditions, and processes through which capacities and competencies can be applied or inhibited.⁹⁷ Capabilities intersect with the framing of enabling conditions and barriers. Capabilities consider context, available resources, and the interactions of the whole team to consider ‘how can we get done what we need to do?’ Dynamic capabilities are necessary to generate contextually appropriate responses to emergent, complex challenges.⁹⁸

Perhaps most interesting and important for this exploration is the reciprocal, relational, and dynamic interactions that are generated when these three areas are considered together in response to the complexities of eco-social-cultural change. Lichtenstein and Plowman describe the non-linear and co-generated interactions between individuals, organizations, and the environments that they are in.⁹⁹ The nature of these interactions, and the patterns that they form, can then create competencies and capacities of particular types that can emerge and then be amplified or buffered.

Four educator stances/positionalities

In looking for a way to creatively synthesize a wide range of competencies, capacities and capabilities relevant to eco-social-cultural change, we came to group them into four key stances/positionalities. As will be made more evident in the detailed discussion that follows, these are not wholly distinct from one another, and all can be cultivated and held simultaneously. Nonetheless, they help illuminate some distinctive, mutually complementary orientations to education that seeks to bring about lasting transformation. They include:

- The *community educator* who facilitates relationship-building and collective flourishing (with children, caregivers, knowledge holders, communities, the more-than-human). At the heart of every strong school, NGO, community organization, etc. are positive, supportive, mutually beneficial relationships. These educators are creating *community spaces* where learners are living, growing, responding, and imagining together.
- The *critical educator* who plays the roles of activist (critiquing existing relationships and norms), ally (walking alongside and opening space for voices and practices that have

⁹⁶ Yorks and Nicolaidis, “Toward an Integral Approach for Evolving Mindsets for Generative Learning and Timely Action in the Midst of Ambiguity.”

⁹⁷ Jaradat, Keating, and Bradley, “Individual Capacity and Organizational Competency for Systems Thinking.”

⁹⁸ Yorks and Nicolaidis, “Toward an Integral Approach for Evolving Mindsets for Generative Learning and Timely Action in the Midst of Ambiguity.”

⁹⁹ Benyamin B. Lichtenstein and Donde Ashmos Plowman, “The Leadership of Emergence: A Complex Systems Leadership Theory of Emergence at Successive Organizational Levels,” *The Leadership Quarterly* 20, no. 4 (2009): 617–30, <https://doi.org/10.1016/j.leaqua.2009.04.006>.

been marginalized), and advocate (articulating and advancing alternatives to the status quo). These educators cultivate *critical spaces* that encourage both individual development and group self-reflexive practices to intentionally mitigate colonial and oppressive legacies, respond to ongoing injustice, and leverage the power of diversity to move people out of entrenched habits and assumptions into spaces of growth.

- The *coeur/care educator* who supports and nurtures wellbeing (responding to trauma, depression and oppression, building capacity for self-care and resilience, connecting with the sacred). *Coeur/care* spaces that are rethinking “inclusive environments” are co-designing spaces that consider the diverse needs of members and their families.
- The *change educator* who guides processes of dealing with risk, uncertainty, discomfort and disruption (developing individual and collective strategies to respond to challenges and losses: grieve, adapt, rebuild, transform). And who nurtures creative imaginations and supports transformation, emergence, and resurgence as they appear.

The reader will see how overlapping these categories really are; nonetheless, we see them as having heuristic value. In the fuller discussion below, each stance is accompanied first by a short discussion situating it within our review towards eco-social cultural change, followed by several more competencies, capacities, and capabilities to be considered both pedagogically and curricularly as educators take up the work.

Community educator

Unsurprisingly perhaps, one of the most common threads that appeared in our interviews, literature reviews, and discussions was the concept and importance of community: having it, creating it, retreating into it, finding it, growing it. In many situations, community was an under-considered but almost natural result of the change work people were engaged with. Here folks were drawn together as they sought out different ways of being in the world. Coming together with a shared project of being different from that which is perceived as the mainstream often meant the groups were quite diverse internally. Thus, challenged to honour their heterogeneity. For some this involved careful consideration, a recognizing of the importance of diversity, a conscious gathering of skills, an active engagement with building internal authentic systems, and for others it was almost as if things were becoming communities by default. In many cases community was created through conscious acts of separation. Retreats were taken and boundaries were drawn around a co-housing community, an eco-school, or an Indigenous resurgence project, providing examples of the idea of niches as protected spaces discussed earlier. Often within these spaces members found comfort, belonging, or safety that they were not finding in the more general culture around them.

In some cases, those spaces and the boundaries delineating them were consciously drawn and actively held. We found several examples where particular individuals understood their role as being that of gate-keeper, translator, or protector for/of the community, often at a cost to their own well-being. Interviewees told us how they wanted the space to remain different from the mainstream but also recognized that the community was not, or not yet, viable as a completely separate entity so took it upon themselves to be the necessary go-between

(translating the community's needs, ideas, and values into the language of funders for instance). Some made compromises to the larger culture for the sake of being understood, or even surviving, that were not being made within the community itself. Helping superintendents, for example, understand in empirical and individualized terms the weird language of a more relational and qualitative assessment process. Others girded themselves to deal with the ignorance, aggression, violence, and suspicions of the general culture so that their community didn't have to.

Another interesting insight was how often these communities sought to actively differentiate themselves from another community that they deemed problematic. Both new and old traditions were being re/adopted and re/adapted as ways to re-signify and re-orient members towards different priorities. Educational programs where individuals are encouraged to take different names, nature names, more "authentic" names for the entire time they are in community are explicit acts seeking to encourage experimentation with being different. Moves such as this, over time, also offered different interpretive lenses on the world and supported members to shift identity at the individual and communal/cultural level. Here too we encountered acts of cultural resurgence where ways of being and knowing that have been backgrounded and disavowed by the mainstream, the colonizer, or that which the community seeks to separate itself from are given space and re-affirmation. These historical supports became important frames and figures for some communities as they sought to locate themselves and find their way in response to and in relation to the larger cultural norms. In this regard, it is interesting to note that some communities without these deeper, more cultural, even cosmological, anchors sometimes struggled to maintain their meaningful and hard-fought changes. When it comes to durable, transformative change, it was apparent there is an unending challenge to keep the troubling status quo at bay. If some of the tools do not come from outside the master's house, it is arduous to both dismantle that house and keep the master away.

A third intriguing component of the communities we encountered and the literature explored was an interest in including more diversity; for example, different voices and experiences within the membership. For many this was partially related to questions of justice and the expansion of what the community might become. But it also appeared to stem, often at an intuitive level, from the recognition that community, at least those explicitly interested in change, is not static. It is not something that can, at some point, be reached but that it is actually much more of a process, a verb, rather than an entity, a noun. It is a constant process that requires diverse membership, divergent ideas, challenging voices, trickster energies, to continue to flourish. Community is an ongoing, imperfect, ever learning and incomplete educational project at its very heart.

We note also that people can belong to multiple communities. Colonization, globalization, and modernization, however, have deeply impacted our understanding of *community*. As such, the

concept itself often requires a shift in mindset.¹⁰⁰ At its most basic level, *community* means a group who have something in common, for example, shared culture, common interests, or collective visions.¹⁰¹ Healthy communities are full of reciprocal, mutually beneficial relationships. People feel nourished and this enables them, in turn, to nourish the community.¹⁰² There is a profound need in our society to rekindle our confidence in the efficacy of individuals to co-create, and move away from, the passive consumption of culture. A healthy society begins with believing in the capacity of self-governing individuals to take responsibility for their actions, participate in community building, and collectively resolve complex problems together.¹⁰³ Our work also suggests actively calling into modern notions of individualism which appear to drive people away from, rather than towards, community. Interviewees varied in how deliberately they constructed community norms, worked towards clearly defined group goals, or intentionally promoted the growth-enhancing aspects of their community. They also differed in defining a *sense* of community; for instance, the belief that one is meaningfully participating in a larger collective or movement. “Community in its optimal form is a coherent system that operates with all of its parts working effectively as individual self-contained elements and as a whole”.¹⁰⁴ Positive characteristics of community include cohesion, core values, social support, reciprocity, and working together towards common goals, shared respect and accountability, individual recognition in light of the larger project of the community, a sense of belonging and even trust. Examples of negative aspects are conformity, rigid norms, exclusion, discrimination, and disrespect for diversity.¹⁰⁵

Beyond doubt, humans’ deviation from the natural world and the modernist push towards autonomy has proven devastating not only for the more-than-human but also for our own health and well-being. Mainstream education must reconcile its role in promoting this separation and even move to rectify these disjunctures. An education that recognizes that learning happens in context and that there is a dynamism between changing individuals and changing communities that mutually challenges and mutually abets the learning process. And, interestingly, there are things that are best, and even only known, in and through community, in place, and with the input of the more-than-human. “One of the first imperatives in diverse community settings is to establish an environment where differences are acknowledged respectfully. Once that has occurred, then it is possible to build a foundation for cohesion and cooperation... Feeling welcome is a powerful emotion.”¹⁰⁶

¹⁰⁰ Gregory Cajete, *Indigenous Community: Rekindling the Teachings of the Seventh Fire*. (St.Paul: Living Justice Press, 2015).

¹⁰¹ Geoffrey Nelson and Isaac Prilleltensky, *Community Psychology: In Pursuit of Liberation and Well-Being* (London: Palgrave Macmillan, 2010).

¹⁰² Cajete, *Indigenous Community: Rekindling the Teachings of the Seventh Fire*.

¹⁰³ Nelson and Prilleltensky; Cheryl Charles and Bob Samples, *Coming Home: Community, Creativity, and Consciousness*. (Fawnskin, CA: Personhood Press, 2004).

¹⁰⁴ Charles and Samples, 36.

¹⁰⁵ Nelson and Prilleltensky.

¹⁰⁶ Charles and Samples, 167.

Belonging, inclusion, and shared purpose proved integral to both individual well-being and community vitality. Since we are inherently social beings, communities help to fill our needs for acceptance, connection, and support; to such an extent, that when these needs are not met, people can suffer with isolation, sickness, or psychosocial issues.¹⁰⁷ When a group, school, or community is new, a process for creating a shared vision, based on core values, is especially salient. Members must learn not only the values, skills, and rituals that foster any particular community but the requisite ways of being a community member writ large. Agreement of core values, shared purpose, or regular communication among members help communities' function as a coherent whole. In school communities, there was a sense that the best learning happens when the spaces are safe, diverse, open, and often less teacher and centralized authority directed. Among groups with a strong awareness of community, members are knowledgeable about their commitments, personal contribution, or shared responsibility. There is also a process for evaluating their progress.¹⁰⁸ Whether it is reviewing their definitions of success or failure, determining community building, or assessing if their actions are producing intended outcomes.

Healthy communities are also characterized by equity. There is equitable access to contributing, engaging in dynamic processing of shared values, and respecting differences while remaining open to change. A crucial community building skill is learning how to leverage differences in constructive ways. And, while members are welcome to disagree, inclusion is about maintaining respect.¹⁰⁹ When communities sought to leverage diversity, they encouraged a myriad of voices, signifying everyone had an equitable right to speak and to be heard. This process of finding voice becomes additionally intriguing when the community seeks to include the more than human in similarly equitable ways. Reciprocity, accountability, and acceptance of diversity all enhance trust and must needs look differently when reaching across species. Communities that function effectively, generate opportunities, optimize strengths, and nourish well-being for all. As Charles & Samples state “the first teacher of the value of diversity is the natural world itself. In ecosystems diversity nurtures survival while specialization favors extinction. A diverse ecosystem has inherently more options for survival than do less complex ecosystems. It is unlikely that any natural disaster can stress a diverse ecosystem to the point of extinction. Diversity assures resilience” therefore “diversity tends to be an indicator of health in ecosystems.”¹¹⁰ A strong community nurtures, encourages, and empowers all members to participate. Here we encountered many mechanisms being employed (listed below) and at times the very idea of “voice” being expanded to include the more-than-human. This process often challenged members to explore their biases, privileges, and possibilities, and had an influence on the language and metaphors being employed amongst the members.

¹⁰⁷ Cajete; Nelson and Prilleltensky.

¹⁰⁸ Charles and Samples.

¹⁰⁹ Cajete; Charles and Samples.

¹¹⁰ Charles and Samples, 64.

Examples of some pedagogical competencies, capacities, and capabilities of community educators:

- *Relationship skills.* On-going development of intrapersonal skills (emotional intelligence) and interpersonal skills (social intelligence) to strengthen connection among students/families/communities/place/All My Relations.
- *Place/Nature/Land-based knowledges.* Promotion of ecological consciousness, nature-based connectedness, and place-based awareness.
- *Mindful attending.* Ability to provide open/non-defensive, attuned, undivided, present attention. Utilizing relational tools such as empathy, curiosity, and active listening.
- *Group facilitation.* Supporting individual and collective well-being through co-creating vision, group process, school culture, ongoing group development, and community flourishing.
- *Incorporation of adult learning principles.* Recognition that this work goes beyond just the purview of teaching children. Important to work with adults as well, both as distinct learners but also as parents and caregivers of children.
- *Prioritizing diversity and inclusion.* Engaging in regular practices such as strengthening a sense of belonging, on-going team training, seeking safer/safe enough space, and group dialogue. Active, intentional deconstruction of colonial status quo and other forms of oppression. Offer allyship support for those who are 'translating' between the community and external world.
- *Supporting sacred/spiritual/ceremonial spaces.* Recognizing that community building reaches beyond simply mind and body. Possibly an external or specific care practitioner. Roles may include guiding community care, coping/healing, and celebration.

Critical educator

In establishing a safe, inclusive, and cohesive environment in which culturally, racially, and ethnically diverse people can successfully work together, it is important to acknowledge their unique histories, experiences, and contributions.¹¹¹ It also requires personal and collective skills of criticality to acknowledge and seek responses to socio-historical-political issues, both past and present, impacting people and the more-than-human world. And to do this without perpetuating violence or relying solely on strategies such as confrontation, anger, defensiveness, denial, or guilt.¹¹² Issues facing community members often have deep historical roots, and daily oppression thrives in judgement, silence, and invisibility.¹¹³ This critical

¹¹¹ Charles and Samples; Nelson and Prilleltensky.

¹¹² Paul Kivel, *Uprooting Racism: How White People Can Work for Racial Justice* (Gabriola Island, BC: New Society Publishers, 2017).

¹¹³ Nelson and Prilleltensky.

conversation also extends into human/more-than-human relations with particular reference to modernity's coloniality.¹¹⁴

The bedrock of oppression is power inequity, which is experienced at multiple levels or sites. For example, society has constructed stories, or dominant cultural narratives, about disadvantaged or inferior groups.¹¹⁵ The process of 'othering' or objectifying people and more-than-humans serves to maintain power imbalances. Often these stories help members with more power and privilege to rationalize their role in oppression or position in dominant groups. Listening, acknowledging, and understanding peoples' stories, therefore, is a first step in repairing the damaging narratives that society has created about people 'different from us.' Social change often begins with empowerment; understanding, awareness, and action that addresses unjust psychological, sociopolitical, and structural circumstances.¹¹⁶ Eco-social change must then also consider how to do this across the species divide. What does it mean to listen to, acknowledge, and better understand the stories of the cedar, the wren, and the earthworm? When individuals and collectives reclaim and recreate their history and continue to challenge destructive stories that serve to divide, communities can better understand and appreciate the resistance, resilience, and strengths of their members. Such reflexive and critical awareness is necessary in order for individuals to shift apathy and communities to move towards more just, respectful, and equitable relationships.

Throughout our readings and interviews it became quite apparent that criticality was understood to be an important component of any project for change. Although, the focus for any particular community's criticality could vary widely. Some prioritized a macro-criticality around questions of culture, race, gender, neoliberalism, settler culture, anthropocentrism, etc. Others were drawn to an inward, self-directed process, using various methods to reflect on who one is in the world, who one wishes to be, and the challenges, blockages, limitations, and successes that haunt the divide between the former and the latter. For the purposes of this report though it seems appropriate to consider criticality all the way down.

For many communities we interviewed, particularly those who positioned themselves as opposed to, or aspired to change, mainstream dominant culture, criticality was required. Privileges and injustices were named, problematic assumptions were explored, and diverse voices, ways of being, and doing, were sought out. Often these communities had awareness and language around issues of power, marginalization, colonization, etc. In many cases there were also efforts towards finding ways to not recapitulate those identified problems. An awareness sustained by many, if not all, community members was of potential "blind-spots" and problematic habits deeply ingrained as a result of dominant cultural conditioning. Interestingly, though not surprisingly, the focus of criticality varied across and even within

¹¹⁴ Sean Blenkinsop et al., "Shut-Up and Listen: Implications and Possibilities of Albert Memmi's Characteristics of Colonization upon the 'Natural World,'" *Studies in Philosophy and Education* 36, no. 3 (2017): 349–65.

¹¹⁵ Kivel, *Uprooting Racism: How White People Can Work for Racial Justice*.

¹¹⁶ Nelson and Prilleltensky, *Community Psychology: In Pursuit of Liberation and Well-Being*.

communities. For example, an eco-community, with deep environmental commitments, might have robust language, sets of practices, explicit policies and in-depth awarenesses with regard to the more-than-human world, yet they might be less critical and aware of issues relating to economic privilege, race, and ethnicity. Or an NGO whose central focus was global poverty and the imperialism of capital being critiqued about their gender awareness and advocacy. It should be noted that in spite of a community's concern with and critique of mainstream society, very few communities spoke about naming or positioning themselves as "not the dominant culture". Many considered themselves to be completely different, so used metaphors of abundance or actively sought ways to open different possibilities.

Often, communities were trying to create structurally sanctioned ways to both extend their critical work while at the same time discover their own under-examined areas. Seeking systems of team-building, inviting in outside diversity facilitators, or creating internal policies that might support the community to improve in myriad areas. This suggests two things. First, these communities perceived themselves to be incomplete and ever in process. Ongoing education and educative experiences were deemed essential because of a belief in human possibility, an assumption of fallibility, and a sense that this work is, by nature, never complete. The literature tends to suggest, and in many ways was reinforced in our interviews, that this process of employing the critical to change is not simply to be applied at the group, community, or institutional level. There is an active, vibrant, mutually influencing back and forth between community and individual. Such that change at the community level might cause, inspire, or force change for individuals and those shifts might, in turn, lead to reconceptualization and further change at the community level. In fact, in many cases, we encountered this process as explicitly understood and actively sought out. Second, this creation of systems for ongoing critical self-examination suggests there is a recognized tendency towards complacency, stasis, and stability that creeps into all communities. To offset this tendency to drift, community members created and implemented formal processes in an effort to keep the critical alive and well.

Beyond this process of criticality which tended to focus on larger cultural tropes and tools that any group sought to name, respond to, and be differently from, there was also a trend towards internal, individualized critical reflection that appeared through our explorations. This involved communities and individuals actively evaluating how they were enacting, creating, and building the community in light of their personal commitments. Through self-reflection, they examined their successes and failures to determine whether or not they were "walking their talk". This work also suggests a recognition that intention and action are not mutually synonymous and posits, for many groups, a continuing "standard" that can be applied to their lived practices. In one example, an eco-school that was committed to undoing the anthropocentrism and species elitism of western epistemology, and the public-school system, strove to change their language and pedagogical commitments by including nature as co-teacher. Teachers, staff, and community members held gatherings to explore this work, define their goals, evaluate their practices, and review their progress in light of this professed goal. This process of critical self-reflection with the expressed purpose of "checking oneself and one's community" tended to vary in terms of formality, consistency, and accuracy. Successful communities, however, were

able to incorporate this kind of ongoing criticality in active, official processes and procedures. Note, this tended to require good facilitators. Some communities paid for members to be trained and others sought outside expertise for this challenging work.

When members have a reflexive practice about their power and privilege, they can focus their solidarity energies on leveraging differences, connections, or positions towards positive change. There is strength in difference, which makes the ability to leverage diversity an increasingly essential skill.¹¹⁷ Diverse groups function better when they are differing but harmonious; that is, the focus is not on conformity but leveraging the full talent or contributions of their members. “People with this competence: respect and relate well to people from varied backgrounds; understand diverse worldviews and are sensitive to group differences; see diversity as opportunity, creating an environment where diverse people can thrive; and challenge bias and intolerance.”¹¹⁸ Individuals who are embedded in a network of supportive, authentic, and positive relationships are more likely to participate in political, social, and community life.¹¹⁹ When groups work towards enacting a more just vision while overcoming discrimination, it is essential to understand that *transformation* that works towards ‘positive social change’ for everyone is a dynamic, imperfect, ongoing process. It is essential to be reflexive, actively critical, self-critical, and transparent about one’s actions. In colonial Western society, there is never a “neutral” stance. We live in a society where you can benefit from oppression without being overtly oppressive yourself. Thus, as noted, we also need to be critically aware that in our determination to help or change the world, we can also nonconsciously cause harm through our ‘good intentions’ and blind spots. Communities who engaged in regular individual and group self-reflexive practices, were often the most aware about addressing this directly.

Examples of some pedagogical competencies, capacities, and capabilities of critical educators:

- *Activist/advocacy/allyship*. Anti-oppressive approach to team, community, and more-than-human relationships (seeking collective/mutual flourishing).
- *Decolonizing guidance*. Engage in reflective practices about power and privilege, challenge behavior that excludes others, learn how to take responsibility/ accountability for leveraging strengths. Purposefully construct empowering narratives.
- *Anti-oppressive communication/relational skills*. Practice respectful communication while engaging in courageous or challenging conversations. Personal dedication to increasing skills such as self-regulation, active/attentive/responsive listening, empathy, and emotional attunement. Collective commitment to find common ground, viable solutions, or meaningful ways to move forward.
- *Mindful inclusion*. Deliberate in the generating, holding and shaping of community culture. Co-create *safe-enough* spaces that encourage everyone to meaningfully

¹¹⁷ Kivel, *Uprooting Racism: How White People Can Work for Racial Justice*.

¹¹⁸ D. Goleman, *Working With Emotional Intelligence* (New York: Bantam Books, 1998), 295.

¹¹⁹ Nelson and Prilleltensky, *Community Psychology: In Pursuit of Liberation and Well-Being*.

contribute (recognizing that "safe" does not mean the absence of discomfort nor that, given the politics of Canada today, fully "safe" exists but, instead, means increasing our ability to manage our discomfort, our problematic assumptions, and be courageous/brave with each other). In a timely manner, enforce anti-violence policies, resolve conflicts, and foster relationship repairs.

- *Support ongoing learning.* Provide training, for example, that increases critical awareness regarding the sociohistorical-political issues impacting members and the natural world; anti-/non-violent communication skills; or how to implement critically informed action and transformative change.
- *Embrace feedback.* Evaluate/celebrate success, welcome experimentation/innovation, and increase, invite, and facilitate ability to *fail forward*.

Coeur/Care educator

Coeur/care, as much of our work suggests, is about relationships. About having them, about building them, about learning how to re-establish them when in jeopardy. And the project is not simply about loving oneself, although that is important, but finding and growing relationships with myriad others, human and more-than. There is a great deal of literature that suggests love for self, creating and honouring a relationship within oneself, is part and parcel of this process of growing coeur/care. It is challenging to love when one does not feel worthy of love. Yet, more than just building the relationships that one often sees as fundamental to all educational projects this notion of coeur/care extends into the realm of well-being, mental, physical, social, and emotional. In our interviews, readings, and discussions it became apparent how much psychic dissonance, including trauma, exists in the larger culture and how much work people were doing to support a return to health and well-being, even in the broadest interpretation of the idea. Indigenous scholars we reviewed and interviewed pointed directly at colonization and the ongoing trauma of schooling while at the same time looking towards community, ceremony, traditions, and reconnections to the land as ways into well-being. Eco-educators highlighted multiple compounding issues impacting students such as: lacking a sense of belonging, managing stressful familial situations, feeling alienated from place or people, and experiencing pressure to be someone other than themselves both in the virtual or physical world.

One of the most striking threads that appeared in our explorations, in particular some of the interviews, with regard to coeur/care was how consistently there was a critique of the more westernized, biomedical, individualized, "health as absence of disease" positioning thereof. For some these were examples of a colonial mindset, for others the assumptions were simply wrong and ignored the role of community in well-being and the aim of flourishing in life. The question becomes what happens to ideas of health, well-being, and care if one assumes relationality? If the goal is flourishing and not simply absence of disease, and individual health is inextricably linked to context and community, then where and how might one begin? And, given that these kinds of challenges are becoming a regular part of the education system what skills might be usefully developed by educators who seek to teach from the heart? These questions of health also had implications for change education. The literature suggests the

kind of adjustment implied by eco-social cultural change appears to necessitate a requisite level of well-being. First, individuals and communities need to countenance and entertain, then take on the work. It is difficult to ask for, seek, or work through significant change when individuals are personally struggling. In modern society, community members are enduring multiple challenges such as: striving to be heard, suffering from alienation, constantly on alert in order to protect themselves from systemic injustices, experiencing the mental health repercussions of isolation and lack of connection, mitigating injustice, dealing with trauma at both the individual and cultural levels, avoiding the threat of violence ranging from micro- to macro-aggression, or simply trying to exist.

Intriguingly, it was in response to the challenge of seeking well-being that overlaps appeared with other practices. A great deal of literature states the quality of our relationships significantly impacts our well-being. Reinforcing a connection with the Land and more-than-human through traditions and ceremonies, for instance, generates a felt sense of belonging, meaning, and being cared for. Which not only addresses isolation and alienation but seems to propel many individuals into a mutually reinforcing experience of reciprocity. As they become more mindful, thoughtful, and caring towards others, human and more-than, and their ability to care for all-my-relations grows, they are more likely to experience the positive benefits of significant changes. In turn, they become stronger advocates for increasing well-being and flourishing across the community. In many of these discussions, there was often a clear sense that change itself does not easily happen unless there is conscious, ongoing movement towards caring for, and building care in, students and learning environments. Such that they are in a place where they might countenance change at any level; individual, communal, and particularly cultural.

In Canadian public schools we can see intuitions and even a few practices pointing in this direction. There is a growing demand for mindfulness training, trauma-informed practices, social-emotional learning programs, and mentoring with regard to building relationships. And the pandemic has pushed some school districts to recognize how events in the larger community significantly influence the well-being of students and their caregivers. It behooves schools to pay attention and support educators as they respond to the larger contexts in which their learners live. For some of these schools this has really just been a wake-up call to what has always been present. Yet, at this point, it is clear that much of this work is reactive, despite a rising need to respond more proactively. If we build or support individual well-being, we can also work towards larger scales of change and prevent challenges manifesting in both our students and communities.

One example of this underlying challenge (of teaching skills for survival rather than for flourishing) can be seen in the concept of resilience. Historically, literature claimed that children are born resilient; thus, just like their bones are more flexible and less breakable, so too are their psyches. This led to the misconception that children are better able to handle trauma than adults, therefore, they are less in need of mental health monitoring. Since evidence, both experiential and clinical, contradicts these assumptions and there has been an increased

interest among educators about how to strengthen resilience.¹²⁰ For many, resilience is now understood as a way to build up one's fortitude to better withstand, survive, the challenges faced on a daily basis. Too often this means that resilience training is seen as a tool most applicable to those who appear to be most "at-risk". Indigenous, BIPOC, socio-economically disadvantaged, and gender fluid students are selectively taught resilience as a mechanism to survive 'better' colonial and systemic injustices. Sadly this fails to celebrate the strength these youth already have while missing the point that it might be one of the most important skills required to engage in substantive change. Resiliency is a key part, for instance, of the work involved in staying with and lean-in to difficult conversations or critically reflecting on oneself (positionality, privilege) and otherwise doing the work of positive change. This then would include the larger scale community and society work that involves recognizing and resisting historical and ongoing assumptions, marginalizations, and oppressions that need redress and reconciliation. At the individual and collective levels, it becomes apparent that resilience is a fundamental skill that all learners need regardless of their social location.

Examples of some pedagogical competencies, capacities, and capabilities of coeur/care educators:

- *Promote positive relationships.* Increase knowledge about the impact of positive relationships. For example, educators' self-care/compassion and providing positive feedback, encouragement, or expressing optimism regarding students' abilities, contributions, or achievements. Teach how to respectfully co-exist with the more-than-human community. Connect to larger groups or movements.
- *Decolonial love.* Purposefully deconstruct dominant cultural conditioning including biomedical, individualized notions of well-being. Destructive and disheartening narratives that serve to isolate, alienate, or separate.
- *Advance gratitude education.* Regular exercises, practices, and expressions of gratitude. Promote, encourage, celebrate acts of connection, thoughtfulness, kindness.
- *Strengthening optimism, hope, and resiliency.* Provide a supportive space to share vulnerabilities, overcome or face challenges (e.g., healing pain/trauma), and ask for additional help. Foster a *growth-mindset*; the belief that abilities, intelligences, skills can be developed through effort.
- *Responsive collective care.* Community recognizes and responds to individual/group/family needs for help, support, or intervention.
- *Provide healing/therapeutic support.* Become a trauma-informed class/school/community. Connect members to external services as needed. Build relationships with external community support (e.g., health professionals).

¹²⁰ Kathy Kain and Stephen J. Terrell, *Nurturing Resilience: Helping Clients Move Forward from Developmental Trauma an Integrative Somatic Approach* (Berkeley: North Atlantic Books, 2018); Bruce Perry and Maia Szakavutz, *The Boy Who Was Raised as a Dog: And Other Stories from a Child Psychiatrist's Notebook* (New York: Basic Books, 2006).

Change educator

One of the most obvious, though at times under-spoken, challenges in moving towards an education for eco-social cultural change is that change tends not to be a central mandate for most formal education projects. The role of mass education, and really education in general, has been to bring the next generation into the norms, ways of being, structural systems, even cosmologies of the dominant culture, or the culture that is designing the system, as it currently stands. Or even, as often is the case of Canadian public education, into the culture as it used to exist given that change is so slow. Public education is by its very nature, conservative. Not so much in its political positioning but in its focus on conserving traditions, culture, ways of being. Public education is not usually a site for cultural progressiveness, radicality, or even change activism. And yet, as suggested throughout this report, it is apparent that cultural change in its processes of discovery and mass implementation is a profoundly educational project. It is in this push and pull between the historical aims of public education, its desire to stay the same, and the needs of the planet and questions of justice at large that much of the educational change literature struggles.

At the level of the individual educator there are unbelievable pressures being applied as class-size increases, as recognition and the desire to respond to the diversity of learners grows, and as responsibilities expand. For example, as funding disappears for various mental health programs, the responsibility of meeting these needs are being downloaded to classrooms whether educators are ready for them or not. As growing political diversity and polarization increasingly reveals efforts to maintain a “neutral” stance as problematic, in a positive way, it is also helping to expose an assumed position of neutrality as the incongruous one it has always been. Teachers are being told by some parents that climate change does not exist, that Indigenization is religious education, and that they shouldn’t teach about the Canadian political system since politics has no place in school. One wonders if part of the latter challenge is that many more school children are opting for either the Greens or the NDP than their older citizens ever do. This work has made clear that the role of the teacher is political and that no matter what position one takes in the classroom and with respect to curricular, pedagogy, and content there is no “neutral.” Educators are inscribing ideas, priorities, and orientations to the world, even ways of being, on the lives of their students. Maintaining the status quo re-affirms a commitment to no change and reinscribes systemic injustices and environmental problematics that are, at this point in history, untenable. As such the individual change educator is, by definition, thrust into the position of advocate for the world they would like to see and be a part of, or striving towards allyship to those they deem unjustly marginalized (human and more-than-human), and of being an activist, in some form or another, for all of this.

At the level of the school, the district, the larger system the same challenges exist. These are conservative operations; slow or unwilling to change, and often behind the times and out of step with the uncertain future that is approaching. Here, from our interviews and research, the question becomes one of how to create policies, institutional spaces, lines of communication, cultures of openness, and the educational and fiscal supports such that vibrant, rich possibilities are allowed to emerge and flourish. Our reading of the systemic change literature

noted that often change is understood to occur in clandestine spaces, on the margins, in the cracks between immovable edifices. Thus, advocates for change are pushed to find allies, to look for opportunities from within, and to gird themselves for a fight. This impression is furthered by assumptions of permanent scarcity, change costs money after all, and of pushing some Sisyphusian boulder up an ever-retreating slope. These problematic metaphors were questioned and critiqued by many of our interviewees who see them as undermining the abundance and emergence of possible change and as continuing to position the status quo, and by extension its funding arms, in central and necessary positions of power. Whereas many of the change organizations we engaged with, first, clearly enunciated this challenge and, then, sought ways to have joy, possibility, abundance, emergence, and independence be the compost out of which their change might arise. Here, intriguingly, the arrival of the pandemic was useful and informative. We witnessed both substantive changes, previously thought impossible, over short periods of time and noted how quickly systems, institutions, and individuals act to repress or limit adjustments for reasons of fear, power and, likely, deep ambivalence to change.

Examples of some pedagogical competencies, capacities, and capabilities of change educators:

- *Trickster wisdom.* Acknowledging the role of nonconformity, unknown, mystery, resisting and questioning the status quo, enjoying the process of trial-and-error, developing comfort with problem-solving and transformative change.
- *Storytelling, collective offering.* Understanding individual/community stories within socio-historical-political context; co-creating counter-narratives about individual/community resilience; reinforcing place-based connections.
- *Encourage innovation.* Possibility offerer and generator. Re-imagining diverse and radically new futures while recognizing our individual and collective capacity to realize positive change. Create a culture of welcoming openness, abundance, emergence. Commit to meaningful, equitable, transformative change.
- *Identity change.* Recognizing that change work means substantive change at the cultural and systemic levels but also at the individual level. Developing the tool set of skills that can better support individual and group transformative change.
- *Risk taking.* Instead of pressuring to conform, leverage diverse talents, ideas, and contributions. Create safe-enough spaces to encourage risk-taking, learning from failures, and responsiveness to changing needs. Promote collective skills, mindsets, and stories about addressing risk, adversity, or change. Allow for different forms of resistance in response to uncertainty.
- *Revitalization wellness strategies.* Provide allyship, support, guidance, and opportunities to rejuvenate individuals and groups who are engaging with and resisting external or larger system challenges and injustices. Collectively share or celebrate successes.

5. Eco-Social-Cultural Change as a Philosophical Challenge

Capacity-building and educational theory

This section is about the kinds of macro-conversations and philosophical decisions educators must engage in if they are going to take educating for eco-social cultural change seriously. This section is really about capacity building at the level of educational theory. Our interviews, discussions, speculative writing, and literature reviews all suggest that in order to make the kinds of changes that will be necessary to actually live within the earth's carrying capacity many of the basic assumptions, the root metaphors, of the modernist Canadian culture will have to change and continue to do so over time as we unravel colonial conditioning. This by implication, given education's historical role of inculcating the next generation into the culture as it exists, means that schooling in Canada needs to carefully evaluate and critique how it has adopted those potentially problematic assumptions as well.

In order to do this in a somewhat organized fashion we are going to employ the three standard categories: epistemology, ontology, and axiology, that philosophers of education tend to go to when doing this kind of work (Part 1 of this Section). However, we are also going to add two further categories: cosmology and psychology (a lovely group of five ologies) to Part 2 (Reckonings) in order to do justice to the outgrowth of the interviews and literature. It has become clear that, at the educational level of cultural change, our foundational stories and our theories about human development must be included, and likely reconsidered, then reconceptualized. We should add that these five categories are rooted in, framed through, a western philosophical lens and, as such, are potentially, even likely, suspect. And yet, our own limitations being clear, we could find nothing else that was better suited here ... and we are still looking. Approach with trepidation is our best advice.

Part 1: The Ologies

A) Epistemology

This is the most obvious discussion when it comes to education since it is about the study of knowledge. What knowledge is, how learning happens, how meaning is made, how knowledge is recognized and assessed, etc.? In our explorations we came across many situations where knowledge was called into question and here we offer several epistemological critiques and responses.

Many researchers and thinkers within the area of philosophy, environment and education along with Indigenous scholars believe that Western modern epistemology is dualistic, reductive, and

intrusive.¹²¹ For example, researchers claim that modern science is implicated in the destruction of the planet because it separates humans from nature,¹²² it is a mechanistic and dominating world view,¹²³ and/or it is shaped by present social, economic, political and technological discourses.¹²⁴ In addition, there is a growing call among scholars of the Global South that social justice has to include the search for cognitive justice. According to this way of thinking, colonialism not only created a 'global political order' but 'also gave rise to a global epistemological order.'¹²⁵

In contrast to the modern scientific way of 'discovering' knowledge in the natural world, Kimmerer writes of Indigenous epistemologies:

Plants answer questions by the way they live, by their responses to change; you just need to learn how to ask. I smile when I hear my colleagues say "I discovered X." That's kind of like Columbus claiming to have discovered America. It was here all along, it's just that he didn't know it. Experiments are not about discovery but about listening and translating the knowledge of other beings.¹²⁶

Donald believes that one of the main issues with western education and modern scientific epistemologies is that they are not reciprocal. Indigenous knowledges often involve visiting the place, engaging with the full community, thanking the creator, asking for blessing for the generations to come, respecting the resources they had been provided to learn from, not

¹²¹ Heesoon Bai, "Reanimating the Universe," in *Fields of Green: Restorying Culture, Environment, and Education*. eds. Marcia McKenzie, Paul Hart, Heesoon Bai, and Bob Jickling (New York: Hampton Press, 2009), 135–51; Thomas Beery and Daniel Wolf-Watz, "Nature to Place: Rethinking the Environmental Connectedness Perspective," *Journal of Environmental Psychology* 40, no. 1 (2014): 198–205; Ruyu Hung, "Educating For and Through Nature: A Merleau-Pontian Approach," *Studies in Philosophy and Education* 27, no. 5 (September 2008): 355–67; Michael Bonnett, "Chapter 7. Nature and Knowing," *Journal of Philosophy of Education* 37, no. 1 (2003): 641–55; Ruthanne Kurth-Schai, "Ecology and Equity: Toward the Rational Reenchantment of Schools and Society," *Educational Theory* 42, no. 1 (1992): 147–63; David Clarke and Jamie McPhie, "Becoming Animate in Education: Immanent Materiality and Outdoor Learning for Sustainability," *Journal of Adventure Education and Outdoor Learning* 14, no. 3 (2014): 198–216; Edgar González-Gaudiano, "Complexity in Environmental Education," *Educational Philosophy and Theory* 33, no. 1 (2001): 153–66; Barry Bamford, "From Environmental Education to Ecopolitics. Affirming Changing Agendas for Teachers.," *Educational Philosophy and Theory* 31, no. 1 (1999): 157–73; Timothy Luke, "Education, Environment and Sustainability: What Are the Issues, Where to Intervene, What Must Be Done?" *Educational Philosophy and Theory* 33, no. 1 (2001): 187–202; Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*; Dwayne Donald, "Forts, Curriculum, and Indigenous Métissage: Imagining Decolonization of Aboriginal Canadian Relations in Educational Contexts," *First Nations Perspectives: The Journal of the Manitoba First Nations Education Resource Centre* 2, no. 1 (2009): 1–24; Linda Tuhiwai Smith, *Indigenous and Decolonizing Studies in Education: Mapping the Long View*, 1st ed. (Oxford: Routledge, 2018).

¹²² González-Gaudiano, "Complexity in Environmental Education."

¹²³ Bamford, "From Environmental Education to Ecopolitics. Affirming Changing Agendas for Teachers."

¹²⁴ Luke, "Education, Environment and Sustainability: What Are the Issues, Where to Intervene, What Must Be Done?"

¹²⁵ Michalinos Zembylas, "The Quest for Cognitive Justice: Towards a Pluriversal Human Rights Education," *Globalisation, Societies, and Education*. 15, no. 4 (2017): 403.

¹²⁶ Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*, 158.

wasting, and remembering the ways in which their lives were deeply connected to the vitality of all other beings.¹²⁷ From this perspective it seems clear that Indigenous epistemology is rooted in reciprocity, ethics, love, and relationality.

In contrast to this, Donald argues that modern western science and its predominant epistemology often only takes. It takes samples from the land to be analyzed in a lab without asking, it takes and dissects the multispecies world without understanding the cultural, spiritual, social and ecological significance of the species as rooted in place, thereby reducing it down to its properties, stripping it of its original power, depersonalizing it, objectifying, analyzing, and shelving it. It assumes an entitled and privileged access to the multi-species world-- that it is there for humans to take from. It also ignores, in parallel to many colonial conversations, the potential right of the natural world to choose to not be known, or to be known in its own chosen ways, to have the right to position itself. One example is the use of radio collars, which are not only intrusive but also tend to adversely affect the wearer. And, their attachment rarely takes into consideration the desires and needs of the caribou, whale, or swan.

John Willinsky writes, “the educational qualities of Western imperialism began with the amateur naturalists gathering specimens and artifacts while recording the lay of the land. . . The themes of discovery, conquest, possession, and dominion are about ways of knowing the world, of surveying, mapping and classifying it in endless theorizing of identity and difference. . . Over the last five centuries, the spectacles of empire were harnessed through what might be termed an exhibitionary pedagogy. The West came to see the world as a lesson in its own achievement.”¹²⁸ And human knowing as a right, no matter the extractive cost.

In response to these critiques of Western epistemologies, some environmental philosophers believe we should conceive of educating for the earth’s carrying capacity, not as a policy, but as a frame of mind. A general mode of engagement with the world as a whole. Here the world is ‘revealed’ through a different way of *being in* the world, a mode of sensibility.¹²⁹ In this way, frame of mind is not simply our attitude towards the environment but the epistemological, ethical, and metaphysical fabric of our being. For Bonnett to educate for sustainability (or to live within the earth’s carrying capacity) requires that our consciousness or being is ‘open, responsive, and responsible’ towards the multi-species world revealing them as they are in themselves, not constituting them as instruments to be used for human needs or objects to be known solely on human terms. Or, in other words, asking permission for knowledge from the multi-species world and carefully and vulnerably listening and translating that knowledge received. Education then, Bonnett believes, should seek to uncover and critique those hidden

¹²⁷ Donald, “Forts, Curriculum, and Indigenous Métissage: Imagining Decolonization of Aboriginal Canadian Relations in Educational Contexts,” 15.

¹²⁸ John Willinsky, *Learning to Divide the World: Education at Empire’s End*. (Minneapolis: University of Minnesota Press, 1998), 17.

¹²⁹ Michael Bonnett, “Chapter 9. Education for Sustainable Development: Sustainability as a Frame of Mind,” *Journal of Philosophy of Education* 37, no. 1 (2003): 683.

motives that constitute nature as instrumental, instead of devising scientific remedies for environmental issues.

The culturally and educationally imposed separation of humans and nature, re-enforced by an understanding of knowledge as being the sole purview of humans, contributes to a general ignorance about the importance of the natural world for human existence. Takano et al. write, “education, especially school education, usually reinforces mainstream culture and value and is considered partly responsible for maintaining the dominant worldviews, causing and maintaining ‘unsustainable living’”.¹³⁰ The idea that mainstream education maintains a dualistic split between nature and self thus, fostering a disregard for the environment, is espoused by several philosophers of education.¹³¹ Recent research has explored the concept of ‘embodiment’ and ‘becoming’ within epistemology in dissolving this contrived nature/self split.

Le Grange suggests, “Deleuze and Guattari’s principles offer alternative possibilities to globalizing definitions of sustainability education that are framed in Western neo-liberal terms, opening up possibilities for among others the inclusion of indigenous knowledges”¹³² and responding to the critique of colonizing cognitive injustice. According to Le Grange, rhizomatic thinking escapes this neo-liberal discourse, and the corporate cooptation of a concept like sustainability, because of its principles of ‘connectivity’, ‘heterogeneity’, ‘multiplicity’, ‘assigning rupture’, ‘cartography’ and ‘decalcomania.’ He argues that Deleuze and Guattari’s notion of the rhizome allows for a dispersal of traditional disciplines that opens up nodes of deterritorialization and ‘lines of flight in which the assemblages of disciplinary knowledge are fragmenting and losing coherence giving rise to transdisciplinary knowledge networks’.¹³³ He maintains that the dispersal and trans-sharing of disciplinary knowledge opens pathways and entry points for the inclusion of indigenous knowledges for example.

For Stables and Scott what needs to be challenged within epistemological discourses is the sciences, social sciences, philosophy, capitalism, deconstructionism, postmodernism—which are all fundamentally motivated by a focus on human welfare and the assumption of human superiority. This implicit anthropocentrism in our theorizing and, as such, in our educational practices has, for the most part, been left completely unexamined in the literature and, if Stables and Scott are correct, might in fact be a crucial next step in an eco-centric/biocentric, non-anthropocentric, more eco-socially just epistemological project.¹³⁴

¹³⁰ Takako Takano, Peter Higgins, and Pat McLaughlin, “Connecting with Place: Implications of Integrating Cultural Values into the School Curriculum in Alaska,” *Environmental Education Research* 15, no. 3 (2009): 344.

¹³¹ Beery and Wolf-Watz, “Nature to Place: Rethinking the Environmental Connectedness Perspective”; Bai, “Reanimating the Universe”; Hung, “Educating For and Through Nature”; Bonnett, “Chapter 7. Nature and Knowing”; Clarke and McPhie, “Becoming Animate in Education: Immanent Materiality and Outdoor Learning for Sustainability.”

¹³² Lesley LeGrange, “Sustainability and Higher Education: From Arborescent to Rhizomatic Thinking,” *Educational Philosophy and Theory* 43, no. 7 (2011): 745.

¹³³ LeGrange, 750.

¹³⁴ Chloe Humphreys and Sean Blenkinsop, “White Paper Concerning Philosophy of Education and Environment,” *Studies in Philosophy and Education* 36, no. 3 (May 2017): 243–64.

B) Ontology

This anchor point of culture has, in the educational theory world, been encountering a lot of discussion recently as educators and philosophers question whether or not assumptions of the existence of autonomous, independent individuals (or objects) are in fact as apparent and as clearly distinguishable as once suggested. Trees are being understood not as independent individuals but as interconnected, vibrant communities. Electrons are wrestling with being identified as particles or waves. Indigenous communities are having their relationalities to Land, each other, and to ancestors recognized legally and experientially in ways that the colonial understanding of ontology finds hard to reconcile itself with. Parallel discussions are arising from myriad fields and communities in part because of how reality is understood, what being is, and what it means to exist. These are structural starting points for so much of what anyone does, knows, encounters, understands.

In our research we have found that the development of a relational ontology is vitally connected to how we educate to live within the earth's carrying capacity. This means that we must come not only to an intellectual but also an embodied way of felt knowing that reveals the world and self as co-relational.¹³⁵ Examples of this co-relational way of being found in the research include the examination of lived experiences and senses,¹³⁶ the science of microbiotas in our guts, the continuing mysteriousness of objects in the world,¹³⁷ the challenges of interspecies kinship,¹³⁸ and the sublimity of galaxies overhead.¹³⁹ The question becomes how do we prioritize co-relational being within education so that knowledge is understood to be shared and that it exists in conjunction with ontology and not as distinct, primary, or instead of?

When exploring the pedagogy of relational ontology many educational theorists use the concept of rhizomatic learning as a way out of reductive, extractive, individualistic, dualistic, recursive, colonial, anthropocentric, linear top-down learning. The philosophical concept of a rhizome was developed by philosopher Deleuze and psychotherapist Guattari.¹⁴⁰ It is an image of what thought is and how it works based on the botanical rhizome which is said to

¹³⁵ Hung, "Educating For and Through Nature"; Bonnett, "Chapter 9. Education for Sustainable Development: Sustainability as a Frame of Mind."

¹³⁶ Abram, *The Spell of the Sensuous: Perception and Language in a More-than-Human World.*; M. Merleau-Ponty, *Phenomenology of Perception*, trans. Colin Smith (Oxford: Routledge & Kegan Paul, 1962); Hung, "Educating For and Through Nature."

¹³⁷ Graham Harman, *Object-Oriented Ontology: A New Theory of Everything* (New Orleans: Pelican, 2018).

¹³⁸ Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham: Duke University Press, 2016).

¹³⁹ Donald, "Forts, Curriculum, and Indigenous Métissage: Imagining Decolonization of Aboriginal Canadian Relations in Educational Contexts"; Martin Heidegger, *Poetry, Language and Thought*, trans. Albert Hofstadter (New York: Harper Collins, 1971).

¹⁴⁰ Gille Deleuze and Félix Guattari, *A Thousand Plateaus Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987).

apprehend multiplicities as opposed to work in linear, tap-root like fashion. It has been more recently understood as a rich metaphor for relational ontology and a style of learning.¹⁴¹

Deleuze and Guattari describe the rhizome as an a-signifying multiplicity; it is in the 'and,' always 'in between.' A rhizome connects any point to any other point; it's ontology is in-between; it is relational not substantive; it is a 'becoming' rather than a 'being'. A rhizome is not a substance that holds its attributes because there is no substance, only relations. The rhizome is mapped, not as a metaphor, but as a setting into work of uncentered growth without foundation or essence; it is a multiplicity and its principle characteristics are connection, heterogeneity, and becoming. It is contradictory to the nature of the multiplicity to engage with it through substantiation or codification; this is to rob it of its creative force and the nature of becoming. The rhizome cannot be pinned down, it is always already something else, always becoming. The rhizome has a relational ontology; it is a multiplicity.¹⁴²

The non-substantive nature of the rhizome renders it unable to be represented or replicated as an instructive code for teaching. Instead, in order to engage with the rhizome, it must be used, not as a metaphor, but as a way of learning.¹⁴³ A deterritorialization is at work with a rhizome that leaves room for experimentation and rhizomatic growth.¹⁴⁴ Perhaps a classic western mistake emphasized in modern Cartesian philosophy, (arguably beginning with Platonic philosophy), was to separate knowledge from being, from bodies, from movement and from the natural world.¹⁴⁵ These divisions are in fact illusory.¹⁴⁶

¹⁴¹ Noel Gough, "Shaking the Tree, Making a Rhizome: Towards a Nomadic Geophilosophy of Science Education," *Educational Philosophy and Theory* 38, no. 5 (2006): 625–45; Noel Gough, "RhizomANTically Becoming-Cyborg: Performing Posthuman Pedagogies," *Educational Philosophy and Theory* 36, no. 3 (2004): 253–65; LeGrange, "Sustainability and Higher Education: From Arborescent to Rhizomatic Thinking"; David Clarke and Jamie McPhie, "From Places to Paths: Learning for Sustainability, Teacher Education and a Philosophy of Becoming," *Environmental Education Research* 22, no. 7 (2016): 1002–24; Jonas Mikaelis, "Becoming-Place: A Rhizomatic Exploration of Friluftsliv in the Swedish School Curriculum," *Curriculum Perspectives* 39, no. 1 (2019): 85–89; Inna Semetsky, "Deleuze's New Image of Thought, or Dewey Revisited.," *Educational Philosophy and Theory* 35, no. 1 (2003): 17–29; Zelia Gregoriou, "Commencing the Rhizome: Towards a Minor Philosophy of Education.," *Educational Philosophy and Theory* 36, no. 3 (2004): 234–51.

¹⁴² Chloe Humphreys, *Between Authenticity and Argument* (Simon Fraser University PhD Dissertation, 2012).

¹⁴³ Semetsky, "Deleuze's New Image of Thought, or Dewey Revisited"; Gregoriou, "Commencing the Rhizome: Towards a Minor Philosophy of Education."

¹⁴⁴ Deleuze and Guattari, *A Thousand Plateaus Capitalism and Schizophrenia*.

¹⁴⁵ Abram, *The Spell of the Sensuous: Perception and Language in a More-than-Human World*; Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (Oxford: Routledge, 2011).

¹⁴⁶ Derek Rasmussen and Tommy Aklukjuk, "'My Father Was Told to Talk to the Environment First Before Anything Else' Arctic Environmental Education in the Language of the Land," In *Fields of Green: Restorying Culture, Environment, and Education*, eds. Marcia McKenzie, Paul Hart, Heesoon Bai, and Bob Jickling (New York: Hampton Press, 2009), 279–92; Blair Stonechild, *The Knowledge Seeker: Embracing Indigenous Spirituality* (Regina: University of Regina Press, 2016).

C) Axiology

This tends to be considered the third key conversation in philosophy of education. The younger sibling, in Western philosophical terms, of epistemology and ontology, it has been a growing subject of debate across all justice conversations. With most findings there is an agreement, at very least, that Western axiological constructs value a particular incarnation of the individual human. That individual is male, of European extraction, able-bodied, fairly slender, middle-aged, heterosexual, at least upper-middle class, educated to a certain level, leans to the right politically, and is most definitely human. Fall outside of any of those categories, and others not named, and you are of less value. We explore a couple, more ecologically based, critiques below. It should also be noted that this valuing of a particular form of individual human also then plays into how that culture values, operates ethically, throughout its functioning and as such systems are created and operated which sustain, prioritize, protect, and promote that “centre” while also actively demoting, repressing, and oppressing that which is seen to be ‘marginal’.

In the research we found several lines of thought within axiology that offer a bit more clarity for our discussion: queer ecology, kinship of being and environmental ethics, and intersectionality.

Russel, questions neo-liberal assumptions of what a better life consists of and challenges the dominant discourse to not subsume queerness within it. He writes that “queer ecopedagogy invites all of us to experience and imagine ways of being and acting that challenge our notion of what constitutes a “‘better’ life, including those that seek more radical change in the world”.¹⁴⁷ “A queer ecopedagogy seeks out the margins in our educational endeavours exploring uniqueness and diversity among ourselves, each other, and the more than human world.”¹⁴⁸

Greta Gaard finds theoretical intersections among the rhetoric of colonialism, the logic of Christian domination and the social constructions of the word natural. She links also ecofeminism with queer theory and adds heterosexuality to the list of oppressors noted by ecofeminist Val Plumwood. “There is a clear and necessary connection between the development of science as the rational control of chaotic natural world and the persecution of women as inherently irrational, erotic and therefore evil creatures”.¹⁴⁹ Gaard points out that appeals to nature have been used to justify the sexual norm even though heterosexuality is not the norm in nature. “The root of ecofeminism is the understanding that the many systems of oppression are mutually reinforcing”.¹⁵⁰ Ecofeminists recognize similarities between human oppression, speciesism and naturism. “The rhetoric and institution of Christianity, coupled with the imperialist drives of militarist nation states, have been used for nearly two thousand years

¹⁴⁷ Joshua Russell, “Whose Better?(Re) Orientating a Queer Ecopedagogy,” *Canadian Journal of Environmental Education* 18, no. 1 (2013): 11–26, 13.

¹⁴⁸ Russell, “Whose Better?(Re) Orientating a Queer Ecopedagogy,” 24.

¹⁴⁹ Gaard, “Toward a Queer Ecofeminism,” *Hypatia* 12, no. 1 (1997): 132.

¹⁵⁰ Gaard, 114.

to portray heterosexuality, racism, classicism and the oppression of the natural as divinely ordained.”¹⁵¹ Here they draw together strands of eco and social justice in pointing out that the liberation of women cannot be realized without the liberation of nature.

Gaard also links ecofeminism with queer theory: the devaluation of the erotic parallels the devaluation of women and nature and the construction of binaries works to reinforce hierarchical thinking: hetero/homosexuality. However Gaard goes further “the problem of oppression based on sexuality is not limited to the heterosexual/queer dualism. . . the larger problem is that of erotophobia of Western culture, a fear of the erotic so strong that only one form of sexuality is overtly allowed.”¹⁵² Finally, Gaard examines how people of color and nature are othered when they were feminized, animalized, eroticized, and queered.

Thus, in this discussion the liberation of the natural environment is connected to the liberation of all humans. And change becomes a question of the eco, the social, and the cultural. In her article “Ecology and equity: Toward the Rational Reenchantment of Schools and Society”, Kurth-Schai connects oppressors across gender, class, and environment. She argues for a moral and philosophical vision that transforms oppositional relationships. Kurth-Schai maintains that a rational re-enchantment is needed to transcend dualistic thought and connect social and environmental oppressions. For Kurth-Schai if there is a continuity between humans and ‘the non-human world’ then ‘subjectivity will not be attributed to humans alone’ and our claim of privileged moral standing is challenged and, consequently, compassion and justice can extend to all living beings.¹⁵³

Fawcett and Johnson explore how artistic practices might offer education an avenue of resistance to transform colonial power: if we want a different ethic we need to tell a different story through art. Fawcett and Johnson imagine pedagogical futures with ethically just relations between coexisting entities, including the increasingly complex mixtures of life/nonlife, cyborg beings. They write, “We are motivated by intersectional analyses examining the links between oppressions and are encouraged by interdisciplinary collaboration, experiential thinking, and the explicit linking of theories to praxis.” They link feminism with Indigenous and phenomenological ontologies. They problematize the notion that humans can “independently and objectively decide what other humans should learn about the multispecies world, whether that is through art, experience, or textbooks.”¹⁵⁴ They maintain that learning includes a) holding onto animal subjectivity, b) attending to human-animal inter dependencies and rejecting species hierarchies, and c) observing multispecies ecological relations, while remaining cognizant of the ways in which transnational capitalism works to impede them.¹⁵⁵

¹⁵¹ Gaard, 122.

¹⁵² Gaard, 118.

¹⁵³ Kurth-Schai, “Ecology and Equity: Toward the Rational Reenchantment of Schools and Society,” 154.

¹⁵⁴ Leesa Fawcett and Morgan Johnson, “Multi-Species Worlds and Relational Pedagogies.,” in *Animals in Environmental Education: Interdisciplinary Approaches to Curriculum and Pedagogy*, eds. Teresa Lloro-Bidart, and Valerie Banschbach (London: Palgrave MacMillan, 2019), 175–93, 179.

¹⁵⁵ Fawcett and Johnson, “Multi-Species Worlds and Relational Pedagogies,” 180.

Another line of thought questions what environmental ethics actually entails through a discussion of kinship. Li, in her essay “On the Nature of Environmental Education: Anthropocentrism versus Non-Anthropocentrism”, begins this project when she undertakes a narrative analysis of Aldo Leopold’s land ethic and Arne Naess’s deep ecology. She unpacks their efforts to recognize the intrinsic value of nature while critiquing this belief as creating a false dichotomy between humans and nature. She claims that “the values of natural objects and processes cannot be independent from human moral reasoning...”¹⁵⁶ And that a framework for environmental ethics should not be distinct from the ethics of human affairs. Bonnett,¹⁵⁷ on the other hand, believes that nature has an intrinsic value independent of humans and this inherency is a ‘self-arising’ that is revealed by humans but not ‘authored’ by them. It seems, according to Bonnett’s understanding, that Li conflates intrinsic value with a human/non-human dualism. Nature can still be interdependent with humans while maintaining an intrinsic value. In his chapter “Towards an Environmental Ethos for Education”, Bonnett identifies three types of relationships of humans to nature: anthropocentric, biocentric, and aesthetic and claims that each of these relationships is inadequate for an environmental ethics. He argues that the anthropocentric view relies on a separation between humans and nature and is essentially oblivious to nature as ‘self-arising’.¹⁵⁸

Other lines of argumentation currently available in environmental ethics include: Plumwood’s¹⁵⁹ move to a more situational understanding where ethics are not overarching principles but are in fact context dependent. Each encounter requires a different ethic. Taylor and Pacini-Ketchabaw,¹⁶⁰ in seeking to undo human species elitism question the ranking system and argue that worms and other faceless species deserve as much moral consideration as the larger more humanlike species. They critique the common assumptions that moral worth is dependent upon how similar species are to humans. In slightly more depth, Hardy¹⁶¹ in her article “Levinas and Environmental Education” uses the philosopher Emmanuel Levinas to make an argument for the importance of the ‘Other’ in environmental ethics. She draws on Levinas’ notion of the ‘Other’, as the ‘irreducible and inassimilable alterity’¹⁶² and compares it to the notion of plurality within environmental ethics. The important modification Hardy stresses is that pluralism must be understood not as tolerance but as difference which is emphasized

¹⁵⁶ Huey Li, “On the Nature of Environmental Education: Anthropocentrism versus Non-Anthropocentrism: The Irrelevant Debate,” *Philosophy of Education Society Yearbook* 1996, no. 1 (1996): 253–56, 256.

¹⁵⁷ Michael Bonnett, “Chapter 4. Retreat from Reality,” *Journal of Philosophy of Education* 37, no. 1 (2003): 593–611; Bonnett, “Chapter 7. Nature and Knowing”; Bonnett, “Chapter 9. Education for Sustainable Development: Sustainability as a Frame of Mind.”

¹⁵⁸ Bonnett, “Chapter 9. Education for Sustainable Development: Sustainability as a Frame of Mind,” 688.

¹⁵⁹ Val Plumwood, *Environmental Culture: The Ecological Crisis of Reason* (Oxford: Routledge, 2002).

¹⁶⁰ Affrica Taylor and Veronica Pacini-Ketchabaw, “Learning with Children, Ants, and Worms in the Anthropocene: Towards a Common World Pedagogy of Multispecies Vulnerability,” *Pedagogy, Culture, and Society* 23, no. 4 (2015): 507–29.

¹⁶¹ Joy Hardy, “Levinas and Environmental Education,” *Educational Philosophy and Theory* 34, no. 1 (2002): 459–76.

¹⁶² Hardy, 461.

not sameness. Hardy believes it is Levinas' notion of the face-to-face that 'exemplifies approaching difference as difference.'¹⁶³

And, more recently, there is a growing research trajectory that builds on the above while adding recent post-humanist and intersectionality insights to the mix. Lloro-Bidart outlines the major tenets of feminist post humanist political ecology; 1) the real-lived experiences of animals and humans exist and are important 2) embodied, emotional, affective ways of knowing need to be fostered because that allows humans to see non humans as persons 3) the political ecological and economic context in which these human/non-human relationships occur has an impact and must therefore be critiqued and adjusted.¹⁶⁴ In so doing, posthumanism challenges human exceptionalism and deconstructs dualisms of mind/body, animal/machine, and idealism/materialism through blurring the lines. It also challenges the capitalist, neoliberalist, and colonial projects that reproduce all binaries, nature-culture in particular. And, most salient to this report, Lloro-Bidart¹⁶⁵ concludes that more-than-humans should be understood to be of the community of knowers.

Part 2: Reckonings

In this section we return to the three + two 'ologies' but with a specific view to the considerations, the challenges, the puzzles that they place before the educator, the educational theorist, the school, the educational system itself if we take these critiques seriously and are genuinely moved to the kind of eco-social cultural change that would allow us to live well and within the Earth's carrying capacity. We have chosen the word *reckoning* because in many ways we understand what comes below as challenges that must be dealt with. Whenever we choose to ignore them, we risk the status quo returning in spite of our best efforts. And we acknowledge they are not easily answered, they demand thoughtful, intentional work and ongoing attention.

A) Epistemological Reckonings

- *Reckoning with cognitive justice*: this critique tends to begin with the question of "whose knowledge"? Anti-colonial theorists and many others maintain there is a culturally specific form of knowledge that takes precedence in Canadian schools. One that is often rationalistic, scientific, European, Christian, etc. and positions itself as superior to all other forms of knowing (e.g. Indigenous, women's, local, craft, cross-cultural, etc.). This prioritized knowledge is tied to notions of success, intelligence, standardized testing, etc.
- *Reckoning with anthropocentrism and human species elitism*: This is similar to the previous critique, but extends beyond the human. It calls into question the idea that only humans are

¹⁶³ Hardy, 472.

¹⁶⁴ Teresa Lloro-Bidart, "A Feminist Posthumanist Political Ecology of Education for Theorizing Human-Animal Relations/Relationships," *Environmental Education Research* 23, no. 1 (2017): 113.

¹⁶⁵ Lloro-Bidart

“knowers” and that knowledge is the sole purview of humans. All other beings, by comparison, operate at an instinctual level. Which suggests they are incapable of understanding their experiences, transferring their ideas or ways of doing things, engaging in communication, organizing themselves in response to stimuli, recognizing their own kith or kin, and so forth. This reckoning also challenges the perception of specific humans as “experts.” Here it is less species elitism and more knowledge elitism, identifying “specialists” of a particular subject and disregarding the contributions and varied ways of knowing of others.

- *Reckoning with individualization and fragmentation:* Building on the prior critique, knowledge is metaphorically understood to be transferred in fragments from one person to another. There is no room for either spontaneous arising of knowing¹⁶⁶ or the presentation of gifts of knowing and imagining from the more-than-human world.¹⁶⁷ Akin to constructing a house, one gathers the pieces of a foundation and builds according to some universal, centralized plan. Then the house becomes a possession of the individual builder and all credit goes to them. Community development literature, however, suggests this construct of an autonomous individual is deeply troublesome. Context, community, and assembled relationships become essential parts of the puzzle, if knowledge is understood to be more interconnected, collaborative, or shared than mainstream education and its fragmented building metaphor assumes.
- *Reckoning with teleology:* Here, the assumption, following a Western philosophical position, is that knowledge is progressive; that is, we start with little and we build towards some idealized form of perfect knowing. There is a fundamental premise of an ever-improving trajectory of knowing, where the learner increases their knowledge, gets smarter, until they become an expert, even all-knowing. This offers a limited and limiting view of knowledge. Here we must reckon with an understanding that knowing can be perceived as ever expansive (i.e. there is no end), interconnected (e.g. it flexes and changes as our connections, encounters, and contexts shift). And knowledge can be available to anyone, no matter their culture, mien, moral orientation. It is not an extractive resource such that humans can know no matter the cost while ignoring the rights of the other to choose to not be known or be known on their own terms.

B) Ontological Reckonings

As above, there are critiques that have implications for education and for cultural change writ large. Some ontological reckonings parallel those discussed in epistemology (e.g. anthropocentrism and species elitism) so we will focus on others.

- *Reckoning of the assumed individual:* The critique here at one level is about the concept of the autonomous individual. The assumption that we are independent and separate beings and can thus operate in the world as such. Yet beneath this discussion is a philosophical

¹⁶⁶ Jan Zwicky, *The Experience of Meaning* (Montreal: McGill-Queen's Press, 2019).

¹⁶⁷ Sheridan and Longboat, “The Haudenosaunee Imagination and the Ecology of the Sacred.”

question relating to subject/object and how best to understand them. The reckoning for our purposes involves, at the very least, an acknowledgement that the detached individual human subject is a misleading and problematic and definitely not the best, or necessarily accurate way, to consider and encounter the world.

- *Reckoning of colonial assumptions with regard to being: Building* on the previous critique this challenge plunges us into the colonial hows and whys of modernist assumptions with regard to subject, object, and the detached autonomous individual. It is clear that not all cultures operate out of the same ontological positioning vis a vis the world (i.e. humans are not clearly separate from all other beings nor are they inherently better-than) and that there has been a tremendous amount of colonial violence done to myriad peoples, cultures, and places as a result. All of which must be reckoned with in this work towards eco-social cultural change.
- *Reckoning with noun-based, objective reality:* This reckoning brings with it the challenge of language and the potentially problematic assumptions carried therein. At one level this is about the metaphors, the examples, the language used in everything we do. Are the beings of the natural world ‘co-teachers’ or ‘equipment’ for human learning? At another it is about re-thinking the language itself. For instance, here in BC there are several Indigenous languages that are more verb-based than noun-based English which brings a more fluid, process-reality to the world. Thus the tree under which I sit is not so much static in its tree-ness but fluid in its treeing.

C) Axiological Reckonings

- *Reckoning with human elitism, particularly in relation to rights and worth:* Are humans of more worth than any other beings on the planet? If so, how much more? Is it ethical to end an entire species in order to build a golf course or stop a raging disease? What rights do more-than-human beings have and how are they enacted and defended? Is it about promoting particular beings to human status or might this involve rethinking rights all together? These are the kinds of questions that become part of this reckoning and that are going to have to have new answers if Canadians are going to actually live within the Earth’s carrying capacity.
- *Reckoning with historical norms and traditions of the ‘teacher’:* This reckoning, as with many, could be ascribed to many of the ologies but here the focal point is on coming into awareness with regard to what it means to be a teacher. What values, ethics, use of power, privileges are implied by that positionality by public education and by those who name themselves ‘teacher’ or ‘educator’? And then, are those actually aligning with the goals, values, ethics, etc. of living within the Earth’s carrying capacity?
- *Reckoning with the constructed norms, ethics, and culture of the school/community:* For example, what are the underlying values, either implicit or explicit, which shape your school/community norms or culture? As relational beings, we are constantly co-creating culture, intentionally or not. Whose values, words, knowledges, voices, stories, etc. are being prioritized? Who is guiding, influencing, or controlling the collective agenda? Who is benefiting the most from that direction? How can we embody our collective respect,

reciprocity, responsibility, accountability? What are our roles, responsibilities, obligations? How are we contributing to a larger purpose, giving back in relationships, or maintaining reciprocal, ongoing relationships? How are we addressing disharmony/restoring harmony? Who do we serve through our work and who are we relationally obligated to consider (e.g., are we approaching student development as though they are autonomous or are we taking their families/communities into consideration)?

D) Cosmological Reckonings

- *Reckoning with foundational stories:* This reckoning is that of wrestling with the very creation stories upon which any culture is built. Stories which both open and foreclose possibilities regarding our relationships to each other and to the planet itself. Realizing the difference it makes when the cultural creation story posits the natural world as a partner in ongoing flourishing or as a resource to be drawn on as desired by a single species.
- *Reckoning with cultural hegemony:* This critique starts with the question of culture; Whose is heard, whose is shared, whose is leaned upon to make decisions. And then moves towards the question of being human in the world. If part of the eco-social justice project is to undo anthropocentrism, human-elitism, white supremacy, patriarchy, and the ongoing binaries that maintain privilege then we are invited, even inspired, into reckoning with the very concepts of the human, of male, of race and ethnicity, and of the foundational stories upon which these constructs are often built.
- *Reckoning with dominant cultural social norms and narratives.* This involves critically examining constructed, damaging individual/collective narratives or shared stories that define and strain relationships and serve to label, stigmatize, other, control, dominate, objectify, pathologize, etc. certain groups, communities, or the more-than-human world. Co-creating foundational and empowering narratives that promote respect, inclusion, equity, well-being, reciprocity, relationality, and responsibility.

E) Psychological Reckonings

- *Reckoning with the concept of health:* One challenge that was clearly enunciated in many of our interviews was that often health was understood as *the absence of disease* which thus places the healthcare system in permanently reactive location. Rather than being proactive and preventative, thinking about well-being as a more wholistic, community-based, and ongoing project that needs constant monitoring, healthcare tends to wait until something has gone noticeably wrong.
- *Reckoning with the autonomous individual:* Western psychology and the Canadian public education system tends to position the independent autonomous adult (or citizen) as the developmental or educational goal. The reckoning herein then is whether or not that is really what is sought? If not, then there will be work that has to be done to undo both the vision, narratives, and the developmental assumptions that tend in that direction. If part of eco-social cultural change is to aim for a more relational way of being in the world, then we

can no longer use the tools that promote self-focused, individualistic autonomy, especially at the cost of our/others/more-than-human well-being.

- *Reckoning with trauma and loss (cultural and relational)*: Again, it is apparent from our work that there is a great deal of suffering throughout Canadian culture. Its sources are myriad; isolation, colonial structures/myths, micro & macro violences, structural racism, etc. It also became clear that it is difficult to move towards eco-social cultural change when so many are hurting so deeply. Even though oppression disproportionately affects certain social groups, it still impacts everyone. For example, ending systemic discrimination and remedying historical trauma and loss, would benefit both human and more-than-human populations.
- *Reckoning with disempowerment*. This critique names demoralizing social/educational conditioning as culturally created and psychologically present. Thus, acknowledging and recognizing that fact and that as social creatures, we thrive when leveraging diversity and utilizing strengths such as our capacity to care, cooperate, and collaborate. Realizing our ability to co-create mutually beneficial relationships, collective flourishing, and positive transformative change.

6. Implications and Conclusions

We began this report with a number of foundational premises, which together point to the need to fundamentally reconceive the purposes, processes and structures of education in order to support the development of a human civilization capable of living within the Earth's carrying capacity. The research and conceptual work reported in the various subsequent sections trace some of the implications of this approach, and show how it is supported by rich bodies of scholarship and practice. The Appendices map further strands of evidence and insight on which we drew.

Drawing implications and conclusions from this wide-ranging exploration is a task that we have not attempted in this report, for lack of both space and time. Indeed, because we have taken "education" to include formal, non-formal and informal settings and processes, implications vary considerably depending on audience and context. We do see possibilities for action even within the mainstream school system that may help to create more protected spaces for experiments in eco-social-cultural innovation, and we see much value in finding new ways for educators, organizations and communities to share successful stories and practices that are inspired by or aligned with the general approach outlined here. In the coming months, we will be building an interactive website to support ongoing knowledge mobilization work stemming from this project, and working together on several writing projects that bring aspects of the knowledge synthesis to diverse audiences – academic and policy-oriented, practice- and community-focused, including families and children. For further information on this work, to follow up on particular strands of interest, and to contribute themselves, we invite readers to visit the site coralroot.ca.

While this section marks the end of our report, it also signals a beginning.

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Appendix A: Examples of our Speculative Fiction

Frame for the Exercise

Setting:

What is the setting that will allow characters to address issue (eco-social flourishing)?

What is the foundation?

What are the “rules” of this world? Physical, social, political setting; features of time, environment, science and tech, magic, superpowers, Power, other creatures and beings, transportation, dys/utopia, what planet (earth, other planet, colonized new world) reproduction?

What is the background framework for this society, world?

What are the assumptions that can be made for this society – history, social structures, view life and death?

Conflict:

This is how we pull pieces together. Place characters into setting, bring setting to life. Visionary fiction changes from the bottom up not top down. Who seeks change? Who seeks to prevent that change? Are there others in the world seeking different kinds of change? What role does the natural world play? What role do other humans, machines, etc play? How does the need for change become clear? How will the change happen? Who’s making those changes happen, how do they know it

Things to think about for character:

Who is the central character, or group of characters? Tell us what you want about your character = name, age, history, abilities, gender, etc. Exploring the world through the eyes of this character. How is the character in relation to the conflict. How does your character contribute?

Sample 1 from Chloe Humphreys

Brownie Locks

-a story written for Sidney and Julian.

On a warm fall day as the orange leaves were drifting to the ground from the tall maple trees, Brownie Locks went for a waddle in the woods.

He happened upon a large green hedge that made an arch over a path. In the middle of the arc there was a sign that read “Everyone Welcome! Come in and play!”

So Brownie Locks toddled in. And he found a bunch of chickens pulling out croquet mallets from a large bag.

“Can I play?” Brownie Locks asked.

“Yes of course you can!” The littlest chicken clucked.

And handed him a blue mallet. And all the chickens gathered around with their mallets. There were red mallets, and blue mallets, and green mallets, and all the colours of the rainbow.

“ I don’t want the blue mallet.” Brownie Locks complained.

But the other chickens were having so much fun they didn’t hear him.

“I don’t want the blue mallet!” He said even louder.

This time two of the chickens heard him, and turned to stare at him. They didn’t know what to say. None of them had ever complained before about what colour they got. They had always felt so grateful to have a mallet at all. So they continued to play their game, being careful of the beautiful green moss beneath their feet. (Sometimes they even bent down so close to the moss it looked like they were listening to it.)

But Brownie Locks was too upset to play the game so he sat down on the ground and cried instead.

When the game was finished, the chickens were all very hungry so they decided to go into the woods to pick some mushrooms for mushroom pie. They asked Brownie Locks if he would like to join.

“Okay “ he mumbled, wiping the tears off of his dark brown feathers.

He picked up his basket and followed the chickens out into the woods to look for mushrooms. But the chickens were so much faster at finding the mushrooms than he was! When they found a mushroom, they all pecked and scratched and clucked, until their baskets were full.

But Brownie Locks only found one small red mushroom.

He leaned up against a giant maple tree, and cried.

“What’s wrong?” The littlest chicken asked him.

“I only found one mushroom!” He said.

“Oh” said the littlest chicken. “Well one mushroom is all you need.”

“No it’s not!” Brownie Locks said as he flapped his wing.

Again, the other chickens did not know what to do. They had never met someone who didn't appreciate finding a mushroom, *and* insisted on having more.

"Maybe the other mushrooms did not want to be found by you", offered the littlest chicken. "Sometimes they hide until a chicken is ready to receive the gift of the mushroom".

Brownie Locks thought that was a ridiculous idea. "How can a mushroom hide? And how can a mushroom make a decision?" He asked.

"Well " said the littlest chicken, who was by far the most patient of them all. "A long time ago, people didn't think chickens had feelings and didn't think we could make decisions. And they would keep us in cages and steal our eggs, until they realized that we *could* make decisions and that they *should* ask us for our eggs."

Brownie locks still didn't understand. "Why would people think chickens weren't capable of making decisions?" He asked.

But the chickens were all flapping and flying towards home at this point.

Still grumbling, Brownie Locks coggled after them

When he arrived at the home the chickens were clucking away and baking a big mushroom pie.

When they had finished baking the pie, they divided it up. Being nice chickens, they gave Brownie Locks the biggest piece because he was their guest.

Brownie Locks had never tried mushroom pie before, so he took a careful peck.

"Petoey! Blech!" He said. "That tastes disgusting!"

The chickens all stopped eating momentarily and stared at him. Their beaks half open. No one had ever said that about their delicious mushroom pie before.

"Don't yuck on someone else's yum" said the biggest chicken, who was getting tired of Brownie Locks, by this time.

"Maybe you are not ready for mushroom pie" said the littlest chicken. "They can taste awful to someone who is not ready to eat them."

"How could you be ready to eat a mushroom pie?" asked Brownie Locks.

But by this time all the chickens were tucking into their cozy moss beds up in the cedar trees.

And so Brownie Locks followed the setting sun home.

When he got back to his roost, he told his two papas about his day.

“And why did they say I am not ready?” he asked his papas. “I think the chickens are being nonsensical”.

“Well” said one of his papas. “I don’t have an answer but did you bring your mushroom home?”

He did. And he showed his papas the mushroom. “Hmmm” said his papa. “Maybe we should try asking the mushroom your question.”

Brownie Locks thought his papa was acting nonsensical like the other chickens, but he did what he was told. Brownie Locks got eye to eye with the mushroom.

“Mushroom” he said in his kindest voice. “What does it mean to be ready to eat you?”

And all of a sudden the mushroom did not look like a mushroom anymore but the tastiest strawberry Brownie Locks had ever seen.

And he pecked away at it until it was all gone. And it tasted delicious.

And then he felt very sleepy.

So he curled up in his bunk and fell asleep.

While he slept, he had some wild dreams. And in his dreams was a land where people ruled the earth and treated chickens terribly.

Then there was a giant flood and the entire earth was covered in water. And after the rain, the sun came out and created millions and millions of sparkling rainbows. Rainbows over mountain tops, and under bridges, and hanging from tree branches, and in between the strands of a spiders’ webs. Rainbows everywhere. The rainbows even filled the bodies of the people so they too glowed all the colours of the rainbows. Each colour of the rainbow water healed the specific ailment and pain of each human. After they were healed, the humans were able to hear the chickens communicate. And the people realized the terrible mistakes they had made about how cruelly they had treated all the plants, animals, and rocks on the earth. And so they changed their ways and learned to ask permission and listen for answers.

And the colour blue was for Brownie Locks. The blue shone into his whole body and healed his pain. And then he heard a soft sweet singing voice, and he looked all over the woods for another chicken, before he realized it was coming from the mushroom that he had found earlier that day. And then he could hear more mushrooms speaking in soft mellifluousness voices all over the woods, and then he could hear the trees and then the plants and then rocks all talking and singing!

When he woke up the next morning. He felt so good. And so light. And so full of love. He was so excited to go back to the chickens whom he had met the day before. He asked his papas if he could go. And they both agreed that if was going to go, he needed to bring a gift. So Brownie Locks decided he would bring them his paint set and they could paint. And his paints set had all the colours of the rainbow.

When he returned back to entrance of the chicken's home, he saw that the sign had been taken down.

So he called timidly.

And a chicken peeked around the corner.

"Yes?" the chicken said.

"Why is your sign down?" Brownie Locks asked.

"Because" answered one of the chickens. "We learned yesterday that not everyone likes to play and eat what we like. So maybe we shouldn't invite *everyone*."

Brownie Locks was heartbroken. "But I love what you play and eat. And I would love another chance to play. And look I brought my paints!" He told them.

The chicken's face lit up when he saw the paints and let Brownie Locks in. Brownie Locks got out his paints and they laughed and clucked and painted all afternoon. And Brownie Locks painted a beautiful rainbow on a sign that read:

"Everyone welcome! Come in and play!"

Sample 2 from David Chang

The shoot sparkles with glints of white, nodding slightly in the afternoon sun. Under the green canopy, Lily can make out a shade of violet, washing into pools of magenta and smoky purple. She watches from behind the bole, hands on the damp bark, fingers curled over a swath of moss. The bole itself is a shade of orange and burnt copper.

She had been observing these saplings since her synesthesia suddenly grew strong last year, two weeks into the season of lament, when the entire village underwent a period of mourning — physical aches, rashes, and mental distress, and nightmares due to wildfires that ravaged the central coast. Last year's season was particularly hard. One night, she found herself adrift in outer space, her body alight, her skin scorching. The horror of the enfolding flames and the cold indifference of the outer darkness pierced her lungs and she screamed in terror, but nothing escaped her mouth except an eruption of embers.

She woke from that dream breathless and petrified, but the sight of the pines swaying in the moonlight soothed her panic. The pines themselves glowed in a shade aqua-marine, like the crystalline waters that lap the shores of a tropical island. Under the pallid moon, the pine's colours appeared brighter and more vivid than they had before. Since that evening, she noticed the intensity of the hues, each shade reaching out, curling around her eyes, seeping into her pores. The conifers wore a stately red, the horsetails, an audacious orange. It was then that she felt the changes in the verdure's experiences. Every time a wind brushed against the grass, they leapt from a deep perse to a bright amber. She wandered for hours and days, watching the shifts in the moods of the botanical multitudes. She whispered to the nettles and watched them blush. She climbed the arching maples and felt them pulse in shades of ochre.

The land itself was awash in colour – the grassland appeared a jubilant crimson, the marshes bleeding into a palette of saffron and tangerine.

This afternoon, she has trained her eye on a sapling that had wgered a spot beside an old Douglas Fir. She had observed a rangale of deer on this side of the mountain, and today she resolved to watch the sapling as a deer grazes its tender leaves. She has been here for most of the afternoon. The striated shadows of the conifers fall in bars along the forest floor. She passes the time by watching lines of ants on the bole, placing dried leaves in the path of a beetle.

Then, a ripple of violet across her field of view. She peers over the bole and sees a fawn nearing the sapling, ginger in its steps, her jaws circling. *Here goes.* Lily steadies her gaze, the sapling remains in white glitter. The fawn inches closer.

Boo!

Lily yelps. A flash of red, and the forest fades into gray. The fawn bolts into the bracken. Ivy laughs.

Your face! Priceless, she says giggling.

You scared me.

I didn't even touch you!

Still, you scared away the fawn. I waited all afternoon for it.

Why?

I wanted to see what the sapling feels when it is eaten.

But we know what they feel when they are eaten.

I wanted to see its colours.

Ivy shrugs and reaches for Lily's hands. They walk through bars of light in crepuscular columns drawn across the forest. Ivy reaches out and grazes her fingertips on the sword ferns.

Hey, feel this one, she says.

Lily trains her gaze and falls into a swirl of fluorescent pink.

It's just about ready to burst with spores. There's heat coming off the tips, Ivy says.

That would be rash. The conditions aren't right yet, Lily says, her vision awash with pink.

She's adventurous. Once she initiates, the rest will follow. By then, it'll be alright.

I think she'd be wise to wait out a few more nights, make sure the dew doesn't return.

Look at you, always the cautious one. You'd think all those colours would make you more

daring.

I told you. Their colours don't correspond to our emotions. Brighter isn't always better.

They enter the switchback on the west-side of the mountain and descend to a valley of spruce and maple, the forest breaking before pastures that roll onto a wide floodplain by a river that snakes around the distant conifers before disappearing into the shadow of the snow-capped mountains. Ivy skips a step and hums a tune.

I wonder if the visitors have arrived, Lily says.

They got here this morning.

You're shitting me. Why didn't you tell me?

That's why I came to get you.

You could've come sooner

And pry you away from watching a deer eat its dinner? God forbid.

They were supposed to be here five days ago.

They got stuck in Rizbelak. Flooding. Had to fly in.

What do they want? Did they say?

Marigold is speaking with them now. The village is preparing a reception as we speak.

Reception? Will there be fried taro?

I harvested them myself before coming out to fetch you.

Lily beams and pokes Ivy in the ribs. They enter the village gates just after sunset, passing the gardens and the nurturers seated in prayer, the vines draping over their bare shoulders. Mr. Ishigawa, riding in a horse-drawn cart, sidles up to the girls.

So you found her, he says.

It took a while, Ivy says.

Good, because both of you are expected at the table. Hop in, I'll give you a lift.

The girls clamber into the wooden box, pushing aside a pile of tubers, a rake and shovel. They set down on a stack of hay and lean close to Ishigawa, one face above each of his shoulders. Ishigawa flicks the reins. The horse trots forward, its head bobbing.

What are they like? Lily asks

I haven't met them, but Marigold and I had a brief word before the conference. She said they are serious people, here on a mission.

Will everything change now that they are here?

Don't know. We'll see.

The cart rolls past ceremony house, smoke rising from a stack, rounds of choral song and the steady beat of a drum seep from the half-open windows. Three children and a dog run past the cart, chasing a strayed soccer ball. At the center of town, they pass under the silver arch, a poly-solar array that rises two hundred feet at its zenith. At the feet of the arch are two gardens connected by an oval pool dotted with Lilies. Ivy and Lily's father, who designed the installation, wanted light to blend with water and saw the lilies as the moderation between the fluid and the solid. Beneath the garden, the structure connects to a grid of geo-thermal pipes that run under the village.

Two blocks west, they pass the learning garden, a swath of experimental forest with a sampling of young Alder, Aspen, Oak, Maple, Spruce, and Douglas-Fir. Towards the back of the woods stand the newest additions: two *Sequoia Sempervirens* from California, the descendants of the ancient redwoods that were logged two decades ago. Amidst the vertical trunks of the Douglas-Firs float half a dozen ovular capsules of various sizes, *learning bubbles*, where students conduct botanical experiments and hone their access to the subjective experience of trees. Today, a group of students have gathered at the foot of a Douglas Fir, where a teacher reads a selection of poems by Cold Mountain:

*Light wind in a hidden pine –
Listen close – the sound is sweeter still. . .
For ten years I have not returned
I have forgotten the way by which I came*

Lily read the poem last year and thought about old Han Shan, writing his verses on rock faces, quivering in the cold. The ferns could have kept him warm if he knew how to bio-link himself, she had thought. Once the mind contacts the forest's hardiness, the brain can shift its regulatory processes, lowering body temperature slightly to conserve energy while heightening the sensation of warmth by ramping up activity in the parietal lobe. If old Han Shan knew the trick, he might have earned a different moniker. But *Hot Mountain* is not nearly as poetic as *Cold Mountain*, so it was for the good of posterity that Han Shan shivered through the frigid nights.

Today there are about a dozen students gathered in a circle. They come and go as they please. There are no regular school hours, so learning takes place at all hours. There is always someone doing something in at least a few of the capsules. Yesterday, Lily presented a report on the thermal sensitivity of lenticels on White Cherry trees. Sloban, her tutor, was impressed but questioned her about the effect of light on the thermal readings. She was not able to produce

a convincing answer. Her observations of the lenticels consistently yielded a steady shade of blue, punctuated by amber dots of various hues, depending on the temperature of the day. She calibrated things readings with the digital thermometer and confirmed her data. The dots did not change even in the intense light of noon. Light must have some effect on the Cherry's perception of temperature, Sloban conjectured. How else would they know the difference between a clear winter day and a cool afternoon in spring? Puzzled and frustrated, Lily decided to put the project aside for a few days, hoping the question would sprout its own answer.

The cart turns left at the town square, a cobble stoned space lined on four sides by young poplars. At the center of the square is an obelisk, dark and sheer like obsidian, rising to a point. At the base of the obelisk, an inscription in 15 languages, each a translation of a dictum in script: *Each End a Beginning*. Today, a group of elderly residents are seated on mats, their attention rivetted by the chess pieces laid out on boards of bamboo. At the far end of the square, an ensemble of four musicians: a guitar, a fiddle, a drum, and a stand-up bass. Deep in conference, the players conspire an enterprise that would soon erupt in a flurry of notes.

Ishigawa slows the cart at the entrance of the main hall, where Marigold is holding a reception for the visitors.

Come by tomorrow and give me a dose of the gossip, Ishigawa says.

Will do, Ivy says, hopping out of the cart.

The girls scramble up the wooden staircase, pull off their boots, and enter the hall. A long cedar table rests at the center of the sprawling space, votive candles illuminate the length of the table. Torch fires throw blotches of amber and twisting shadows onto the walls. Marigold, a stately woman whose face is enshrined by thick locks of gray, sits on one side of the table in her ceremonial garb, pins points of candlelight shimmer in the dark pools of her eyes.

Lily and Ivy, I'm glad you're here, Marigold says.

The visitors turn and smile to the girls. One is a middle aged man, bearded and slim. The other, a middle-aged woman with cropped gray hair.

Delighted, the man says.

Pleased to meet you, the woman says.

Welcome, I'm Ivy.

I'm Lily.

Marigold was just talking about the two of you, the woman says.

Marigold points to two seats beside her. Lily and Ivy sit down. Marigold distributes two ceramic cups, reaches for the pot of Spruce tea and fills the cups.

First time drinking Spruce? Lily asks.

First time for me certainly, the man said.

How is it?

Not much taste, but certainly fragrant.

Lily smiles. Marigold reaches for a plate of dried figs and candied raisons. Ivy grabs a fistful of raisons. Marigold shakes her head.

Save some for our guests, Marigold whispers.

Lily, I hear you have a special kinship with plants, the woman asks.

Yes, I see what they feel.

You see their feelings?

Yes.

Like synesthesia?

Not quite. While others can physically sense what they feel, somehow I register their experiences in colours.

And what do they feel?

It depends. A happy Douglas Fir is always a light shade of brown. But Cedars are pink when they are happy, like in the rainy season when everything is soggy. An arbutus growing on the edge of a windy cliff tends to be purple. Purple is grit. But it's a different story with the undergrowth. For ferns, purple signals distress.

So you are able to associate the colour with their emotions? The man asks.

Yes, but I'm still trying to refine the distinctions and associations.

How do you know that a fern is actually feeling distress?

We've done controlled experiments. I've participated in double-blind tests where I had to identify the experiences of several ferns, some transplanted from healthy forests and others from clear-cut forests, where the soil is parched and the undergrowth is scorched by sun. The clear-cut ferns are always purple.

How 'bout the forests around here? The woman asks. How do they feel?

They're content most of the time.

Most of the time?

Wildfire season sends them into mourning.

There haven't been any wildfires here, have there?

No, but all lands are connected. Even a wildfire on another continent can affect the forests here, Marigold says. We spend five months each year in mourning. The start of the fires signal a season of lamentation and pain.

That's one of the reasons we're here, the man says. As you know, Tim Harper, the one who left this village three years ago, came to us for help. He said that the season of mourning was too much for him. He wanted out and begged for medical attention.

Tim was an exceptional case, Marigold said. He felt it more than anyone, and we couldn't help him.

So you know about the burns on his skin.

Marigold remembers. Tim's arms blackened to a crisp, the palsied fingers red and glowing, eyes blood shot, lips cracking and peeling with ash. The shamans sheltered Tim in a cave to shield him from the distant inferno. They smothered him in aloe and balms of sage, said prayers, bathed him with icy water from the nearby creek. All remedies failed. For three weeks, he groaned in agony. Tim survived that season of mourning, but resolved not to go through another. Bound from head to foot, his dim eyes gazing through a slot in his headscarf, he left the village on the eve of autumn equinox. He would find either a cure or death, but he would not return.

We did everything we could to help him, but he was far gone, Marigold said.

He asked us to reverse his genetic condition. We isolated a few genes that were the cause of his biosynthesis, but all our modelling told us that we couldn't manipulate the genes without causing other complications to his system, the man said.

We selected a few targets for gene therapy, but we knew that the treatment would render him paralyzed. He would be conscious, spared from the ravages of wildfires, but he would spend the rest of his days in a bed. I guess that was a choice he didn't want to make.

So he killed himself, Marigold says.

Yes.

They were silent for a moment. The man began again.

You can see how this incident sparked a vigorous debate. The UN considers your people's welfare a humanitarian priority. People can't understand that there's a whole group of you who are determined to live this way. Since Tim's death, we've developed several more experimental procedures that can reverse a Biosynth's genetic code.

And that's why you're here. To fix us.

We've been sent as envoys to begin the conversation.

More food is brought to the table. Creamed mushrooms. Grilled turnips. Heaping bowls of salad. Pitchers of blueberry wine. Lily eyes the heaping bowl of fried taro. The hall is growing lively with chatter as residents file in. Children are chasing each other in circles. Marigold surveys the room. Her eyes convey the weight of something imponderable.

As you can see, we're quite happy here.

I have no doubt that you have a vibrant community.

It's your physical well-being that we're concerned about, the woman says.

Tell us about the season of mourning, says the man.

It starts just after summer solstice. We have ceremonies that mark the beginning of the season. Usually, things are fine for the first few weeks. Then, as the dry spell sets in, we start to feel it. For some, it's a headache that lasts for weeks; for others, it's rashes or spells of fever and nausea. Many experience depression and anxiety.

How do people cope?

We store food and medicine well in advance. Biotypicals who aren't affected play a vital role in maintaining the function of the village during the season of mourning. Shamans hold weekly ceremonies so that we can explore and investigate the pain. There are sweat lodges, purification rituals and talking circles. There are periods of fasting and prayer. We have herbs to help us peer deeper into our spirits in the season mourning. With the help of shamans, some people venture into uncharted territory using psychedelics.

Sounds like you have a shared religion, the woman says.

We encourage faith. We nourish shared values. But there is no creed, no orthodoxy.

What are those shared values?

Everyone who comes of age must articulate the values in their own words.

How do *you* articulate them?

Solidarity with all life.

The hall is packed. The residents are setting plates, throwing the visitors curious glances. Halsey, a slim black woman in a maroon poncho, slides her hand onto Marigold's shoulder. It's time, she says.

Okay. Let's eat, Marigold says to the visitors.

A bell sounds and the chatter fades. Marigold rises. The visitors rise also.

Thank you all for coming, and thank you for this delectable meal. We are delighted to have Dr. Charles Shelton and Dr. Claudia Ramos with us. They come to us from New York, and will be our guests over the next few days. Please make them feel welcome.

The hall rings with applause. Marigold smiles and raises her hands. The residents join hands with their nearest neighbors.

We give thanks for this food, the work of many hands, and the gift of many forms of life. May we savour the present and live joyfully, knowing that we shall soon rest in the soil as an offering to the land. Marigold lowers her hands and puts both her palms on her heart. Enjoy your meal, she says. The residents form a cue on each side of the cedar table. Potatoes flop onto plates, sauces land over slices of bread. There are sporadic bursts of laughter.

The community is lovely, Claudia says.

How are decisions made? Is there a governing body? Charles asks.

We have a governing council who meets regularly to discuss administrative matters. Big decisions that affect everyone in town are decided in communal meetings, Marigold answers.

How do you get five hundred people to decide on something?

We have a consensus-based process of decision making. If a minority of residents are opposed to a proposal, we work with them to find an alternative that is acceptable, but everyone also understands that opposition is not a veto. Usually, people are able to find something that is at least tolerable. Further, the forest almost always holds a deciding vote.

The forest? You mean the forest has a say? Charles asks.

Yes, all collective decision must consider these three factors: Land, community, person. Usually, if we consider the well-being of the forest, the choices become clear.

You mean, you *consult* the forest?

Yes.

And the forest has an answer?

Not an ideational answer, but the forest has preferences and inclinations.

How do you discern the forest's inclinations?

That's where Lily comes in. Ann, one of our senior shamans, returned to the soil last winter. She was the interpreter of the forest's dreams. Before she passed, she named Lily as her successor. Now, it's Lily's turn to serve as the interpreter of dreams.

But I'm not ready yet, Lily says.

She's never ready. . . for anything, Ivy says, eyes rolling.

Shut up, twerp

Shit for brains.

Charles chuckles and leans toward Lily. What does the forest want?

Mostly to be exactly as it is, relatively undisturbed. It wants space to be.

You mean it wants to be left alone?

Not exactly, the forest likes humans. But there can't be too many. They forest also likes wild boars, but there also can't be too many of them. Too much activity disturbs the sacred silence. We tread lightly when we're in the woods. Heavy machinery and noise grates on the forest.

That's why you use draft horses instead of tractors?

Yes.

Marigold adds: Machines break down. Parts are hard to obtain. Once a machine reaches the end of its useful life, it is mostly an unsightly pile of metal corroding in the rain. Livestock provide valuable muscle power; their feces become manure, and at the end of their lives we honour them by consuming their bodies. The bones are returned to the soil. There is no refuse.

What principles guide your use of technology?

Every tool has a specific utility in aiding a type of work. A good technology offers expedience in the performance of a task. Once the task is done, the tool can be put aside. Any technology that transforms the user, subsumes the user's attention and instills unintended habits is an insidious technology.

Three residents come by and gesture to the spread. Marigold invites Charles and Claudia to fill their plates.

Enjoy yourselves tonight. Talk to the residents. I have arranged another meeting for you tomorrow. Lily will meet you at the learning garden after sunrise. Then, you can spend some time with Raj, our resident counsellor and scholar. He'll be able to answer some of your questions.

Charles and Claudia thank Marigold, rise from the table and move down the line, filling their plates. Claudia reaches for bread and catches the gaze of doll-faced child nestled in the arms of a young woman.

Your child is adorable, Claudia says

Thank you, her name is Eva, the woman says.

Eva. She's precious.

Thank you.

How old is she?

We think she is around 9 months.

I'm sorry, *around* 9 months?

We adopted her. She's only been living with us for the last 3 months. The circumstances of her birth aren't clear, but we know she was born on the central coast around 9 months ago.

Is she a Biosynth or a Biotypical?

Her mother was a Biosynth. We don't know anything about her father.

Was?

Her whereabouts is unclear, but she went to the refugee camp to escape persecution. That's where she came in contact with the adoption agency. Her life was threatened by bands of marauders and the state police, and she was in no position to take care of Eva. We don't know what happened to her after the agency took custody of Eva. Biosynths don't last long on their own, and the local authorities turn a blind eye to lynchings.

That's terrible.

At least Eva is with us now. We want to give her a happy life.

The town has kept a steady population over the last twenty years. I see kids around. How do they manage this?

We have ongoing discussions about the town population. There is a simple census conducted every year. Council puts forward projections for population fluctuations, and we all keep an eye on how many more people we can add to the village, whether we are approaching a limit based on the projections.

And this works? People actually follow the rules?

It's not like a rule that we must follow. It's more a part of everyday life. We are all involved in producing food, so we are always thinking about how many people we have to feed. We need to divert water, so we are always measuring the cisterns and monitoring the wells. We can also feel it when the forest is stressed when we take too much. So we all know that how we plan our families has a bearing on the entire community.

Claudia listens, and hesitates before starting again. Say that one household wants to have a child, and some other residents also want to have a child. They can't both have children without exceeding the population limits set by council. Who gets to decide who will have a baby?

It's part of a communal discussion. Those residents will meet with council and they would try to reach consensus on who gets to have children. There are lots of considerations. For example, those who don't already have children get priority over those who already have children.

And if they can't reach consensus?

Then they might both have children, but the number of allowable additions will decrease for next year. Those who exceed this year's allowable additions are taking away next year's allowance.

What's to keep people from exceeding the limits every year and passing on the deficit to future years?

We all feel it in our blood and bones when more wood is chopped down to build more houses, when we try to coax more food and nutrients from the land. The community feels it. On top of that, we feel the effects of unbridled population growth outside our community. It's like a ringing in our ears. Not always audible, but it is there. As the world population grows, that noise gets louder. So in some way, we know that unchecked growth is detrimental.

But it sounds like a gross infringement on personal rights and freedoms. I would not want anyone to tell me whether or not I'm allowed to have a baby.

What you see as a matter of personal liberty, we see as a matter of collective responsibility. Our mutual dependency on the land, on each other, instill a sense of cohesion in matters like family planning. We depend on the provisions of the land, which is generous but not

infinite. So naturally, we discuss as a collective body the number of mouths we have to feed, the number of people we can add to this population.

Why did you decide to adopt?

Adoption is the norm, biological births are the exception.

Why is that?

For two reasons. When Biosynths reproduce with one another, their offspring tend to inherit syntheses that are stronger, and more unpredictable than their parents. This can cause lots of problems for the offspring. Not a lot of them make it to adulthood.

Was Tim Harper the son of two Biosynths?

Yes. Tim had a tough life, and it only got worse as he got older

What's the other reason for adoption?

The world population keeps growing. Though the rate of growth has leveled off in recent years, there's still an insatiable demand on the land and waters. Even though we are a unique community, we are not cut off from the wider world. We feel the effects of population growth.

Hence the adoption.

Yes. And there are many who choose not to bear children, nor to adopt children. But these residents still play an important role in raising children as care-givers, as teachers, as mentors. We are not all parents, but we all help raise children.

As they say, it takes a village. Claudia says.

Eva extends her arms and yawns. Her mother rocks the child in a swaying motion.

I'm going to set her in her stroller.

It was great to meet you, Claudia says.

Likewise.

* * *

The morning light seeps through a stretch of altocumulus strewn across the eastern sky like rocks by a river bank. The forest silent except the chatter of Juncos and Towhees, Flickers flashing in flight. Claudia and Charles arrive at the garden at 6:30am, still groggy having risen only 20 minutes prior. No one is in the garden. They stroll amongst the raised beds, marvel at the profusion of green, the vigorous vines pouring from wooden trellises, the squashes and potatoes bursting from the raised beds.

Good morning, Lily says.

Claudia is startled. She hadn't seen Lily, seated by a swath of reeds, legs crossed in meditation. I didn't see you. I thought you haven't arrived yet, Claudia says.

I've been here for a while, Lily smiles.

What are you doing?

Tuning in.

You're feeling the vegetables?

I'm feeding them.

How do you feed them?

I contact them with my mind, just paying attention.

And that feeds them?

Yes, they like the connection. It helps them grow.

And what do they feel right now at this moment?

They're waking up, mostly just content.

And how do you feel when you connect with them?

Same. Contentment.

You feel what they feel?

It's more that the feeling is shared. There's no need to separate what I feel and what they feel.

Would you say they are happy?

What do you mean by happy?

As in feeling good.

I don't know if they feel good, but they are at ease even in winter when they wither away.

Do they know you? Do they recognize individual people?

Yes they do. But you have to connect often, just like any relationship. It takes time to develop a rapport. I've been coming here regularly for a year now.

So these vegetables know you?

I think so. They greet me with a shade of yellow when I walk through the gate. It was a more a shade of red when I first started coming here.

What does yellow mean?

For this garden, it's the colour of friendship.

Charles is 6 feet away, pointing to a raised bed.

Look at these tomatoes. How do you get tomatoes in April?

Those are hybrids. We also have hybrid squashes and cucumbers that produce year round. Lily hops from her seat, walks to a tangle of tomato vines, reaches deep into the bush and plucks a tomato the size of her fist.

Try one, she says.

Charles bites into the tomato. A string of juice jets from the tomato, pulp and seed pour onto Charles' lips.

God, that's sweet, he says, wiping his face with a sleeve.

Lily hands Claudia a tomato. She takes a bite and her eyes widen.

Amazing. Almost like peach or apricot.

Glad you like it, Lily says.

Raj walks through the garden gate. Slim, a crop of gray around his temples, intense hazel eyes in the hollows under his brow.

You must be Raj, Claudia says.

And you are Claudia and Charles, Raj says.

I was just giving them a tour of the garden, Lily says.

It's extraordinary, Charles says.

What do you feed the vegetables? Claudia asks.

Compost mixed with bit of manure. Sometimes a bit of seaweed, if we have them, to condition the soil. And Lots of attention and love, Raj says smiling.

And by love and attention, you mean prayer and contemplation, Claudia says.

You could call it that. Here, we just call it love and attention. What's the difference, right?

The four of them walk through the garden. Raj briefs the visitors on the philosophy of the garden, how the vegetables are hybridized with native plants from the forest. They exit the garden by its west entrance. Raj takes the visitor to the power station. They climb down a hatch and inspect the fibre wiring, the harnesses for the solar arrays, the geothermal tubes behind tempered glass lit by purple LEDs. Charles is intrigued by the quantum computer, the size of a Rubik's cube, suspended and rotating inside a glass case glowing in a halo of blue light. Emerging from the hatch, the morning sun intense on their faces, the party ambles to the water garden. Lily reaches into the water, a cloud of fish part in a circle as her fingers break the surface. She produces a handful of gelatinous weeds and expound on their nutritional value. Charles and Claudia are surprised and slightly dismayed when she pulls out a slimy strand and slurps one into her mouth.

I prefer them raw, she says, savouring the look of dismay on the visitor's faces.
After the water garden, the party stops at the square. With one hand leaning against the obelisk, Charles is asking Raj about time.

No one wears a watch. I haven't seen a clock anywhere, Charles says.

We still have those devices, but it's not essential to how we live.

How do you keep track of time?

What properties of time can be tracked and measured? Raj says, chuckling.

There are durations that can be meted out, things that last for a while. There are days and weeks, months and years. These are quantities that can be measured.

There's regularity. There's duration. But the measurement is arbitrary. We don't conflate measurability with quantifiability. Time is not quantifiable. Not something that we *have*.

How do you schedule things? How do you make events coincide?

An event occurs at the confluence of conditions. It's not the outcome of orchestration on the part of one or many.

In other words, things happen when they happen.

More or less, yes.

How does anything manage to function? How do you make things happen promptly as a society if you don't share a sense of time?

We do share a sense of time, just not in the way that you think of time.

I'm lost.

Let me explain it this way. You think of time as a succession of moments. A *seriatim*. Because you divide time into blocks one after another, you think of time as something to manage, to assign to tasks here and there. Time becomes an object of administration. We don't think of it that way. For us, the present is eternal, and there's nothing to grab hold of. Nothing amenable to design. In this space of eternity there is the ever-changing parade of events and situations. Time doesn't change, the phenomenal world changes. We attend to the events in front of us, and that is all.

But each event has a duration. That duration is an inherent property of the event.

It's the other way around. The event is the property of duration.

Charles is visibly puzzled. He presses further.

Do you have enough time to do what you need to do?

Enough and *not enough* are products of quantification. Because we don't quantify time, *enough* and *not enough* are irrelevant. But if I had to use your metaphor, I'd say we always have as much time as we need. Not a minute extra, not a minute short.

Charles throws up his hands in laughter. You got me, my friend, I haven't the slightest clue what you are talking about. Raj pauses thoughtfully.

Do you play music?

I played the alto sax in high school, but I haven't picked it up since.

You might know something about this then. For a musician, time is not something outside. It's something the musician inhabits. It's a feel. Something actuated from the inside out.

But even musicians count beats and measures.

They count beats to calibrate tempo. They count measures to locate a passage. But each note lives in the present. The musician lives in the fluid now. There are beats, but no quantity. There is a count, but nothing adds up.

Charles remains unmoved. I'll have to mull that over a bit, he says.

Don't mull over it. It's not anything you can grasp through thinking. It's hard enough to talk about it. Pick up your saxophone again and you'll understand.

In the afternoon, they sit atop of mesa overlooking the town. Raj had stopped by the bakery and bought sandwiches, dried fruits, cheese, and a bottle of cider. They ate lunch and talked about the culture of the village.

Raj started his career as a researcher in a biotech company. After two decades, the relentless work culture wore him down. The internal politics of the company was dispiriting, the pressure to compete intolerable. He had inured himself to a cocktail of anti-depressants but still felt the air coagulate around him, bogging him down. The unbroken monotony of life became unbearable. He came home one day, sat down at the table, looked into the thick haze of a summer day, his apartment gleaming in slabs of cold marble, the concrete walls, the pixilated windows. He poured himself a glass of single malt scotch, set down a syringe and a vial of Dexamorphine, smuggled from the lab. He was ready. Not a sliver of longing for the dreariness of his meager existence, not a hint of reticence to escape the tangled mess of a world that for all its fulminations has forgotten joy and peace. Oblivion held for him no terror, but appeared a placid alternative to the colorless existence around him. He sipped his scotch, relieved that it was all about to end. He surveyed the cityscape, taking in the sight of the towering edifices. He ranged his sight on a boil of green in vivid colour, defiant amid a sea of gray. It was a lonely oak tree, sitting atop a rooftop garden, grand and austere in its loneliness.

Meet the sun again, the tree seemed to say. That's all you ever need to do.

Raj recounts the story with stoicism. He points to a corner of the village.

I took some acorns from that tree and planted them in the learning garden, he says. If I live another thirty years, I still won't see them become adolescents, but I'm glad they're there. Every end is a beginning.

So you left the city and came here? Claudia asks.

Not before spending some time with the Dakota on the plains. Then, I lived in a Buddhist monastery in California for two years before coming here.

Did you learn for the first time that you're a Biosynth when you heard the oak? Charles asks.

I'm not a Biosynth.

How did you hear the tree?

We can all hear on some level. Most people need to cultivate the sensitivity. I heard that tree because I had exhausted all my conditioned defences. Gave it all up. That's when I could sense the tree.

And you've found happiness here? Claudia asks.

Raj smiles. I don't think much about happiness. I don't think it's significant in the larger scheme of things.

They walk down the backside of the mesa, hike through swaths of salal, banks of bracken breaking over bare rock, carpets of moss over dew-soaked soil.

One thing that I've been thinking about, Charles said. The season of mourning must be hard. Four to five months of physical and mental agony. How can anyone live that way?

The pain is difficult, but it's real. Comfort and ignorance are easy, but they are part of a vast artifice.

I don't see what good it does. Why suffer needlessly?

Pain is a reliable guide. It shows us the work we still need to do, the things we don't want to see, the realities that we don't want to countenance.

They come to a bend in an arroyo. Raj is silent beside the green waters. Charles starts again.

There's nothing to gain from suffering this way. You say that pain helps people grow, but there's nothing by way of tangible improvement. The village isn't better off having gone through

thirty-five seasons of mourning. But people are in suffering, some of them die. It's completely unnecessary.

The pain is difficult, but it moves us closer to the cycles of the land. Suffering and pleasure are not opposites, but the oscillations of the same vital principle. Creation and destruction are bound in each other. This is a lesson that we continue to learn, and we deepen our insights without end. We have to return to it again and again.

But I don't need to go through months of agony to learn what you just said, much less suffer that every year.

You may have registered what I said. That's knowledge. The real task is to realize something from the marrow of your bones, to realize what you cannot know.

On the trail back to the village, the party stops to watch a pair of big-horn sheep on the crest of a grassy hill, scouts surveying the outer parts of their territory. Mesmerized, Charles and Claudia watch in silence as the sheep flap their ears, turn their faces, and disappear over the crest. The party continues toward the village, through cathedral columns of Douglas Fir, the dappled light on the trail.

The village shares this beautiful land ethic, and a wonderful view of life. Wouldn't it be important to share this, so more people know about it? Shouldn't more cities and societies be striving toward the values that you hold? Claudia asks.

Raj pauses, the furl in his brow indicative of a pending response. You're right, I think these views should be shared widely. At the same time, I feel some ambivalence about broadcasting a way of life. *More* is a word that should always be put in brackets. The very idea of *more* warrants circumspection, especially in matters that we consider beneficial.

What do you mean?

More people living the way we do, *more* people adopting our way of life.

What's wrong with that?

Certain ways of living don't accord with larger scales. Scaling up a good thing can destroy that good thing. Problems of scale rarely present themselves as problems of scale — they infiltrate a system through other means, through forms of thinking that result in problems of scale. For instance, if efficiency is valued *per se*, then people will coax more products out of every unit of labour and material. The resulting surplus becomes subject to more productive cycles, as people design ways to make use of the abundance. So, the logic of productivity is applied again. Productivity rationalizes itself and thrives on its own logic. Before long, we have a problem of scale — which is usually the mismatch between the optimal found in what is small, and the maximal found in the big.

Give me an example, Charles says.

Suppose we reach great efficiency in producing corn. The productivity itself is a stunning achievement, but if the supply exceeds demand, then we will need more storage facilities to store the surplus. If there is an abundance of corn, each husk is less valuable, so the storage facilities are built to store goods that have less value. If the corn is due to expire before they can be consumed, we'll need to develop other ways of making use of the corn. We'll have to use the starches to make various sugars. We might use the husks and process them into durable biopolymers. In other words, the surplus becomes the material inputs for another round of productivity. This profusion of products must go in search of demand. So we might consume more corn-based sugars, or more corn-based plastics. This glut of corn-products does not much improve the lives of residents. Rather, it feeds the machinery of production.

So what do we do about this?

In my view, the question is not about how to scale up or scale down, but to look at the more fundamental forms of thinking that ensnare us into problems of scale. That's what I mean when I suggest some caution around the idea of *more*.

You're talking about the production of materials, I'm thinking about the broader dissemination of ideas, Claudia says.

Perhaps ideas are different. Raj pauses. Though I would be suspicious of the processes that remain entrenched as ideas are widely adopted, the way structures of production are strengthened with each improvement in efficiency. If ideas and values are adopted more widely, there are risks of uniformity and conformity that can creep alongside every great idea.

They enter the town, worn from the hike. Raj and Lily walk the visitors to the guest house and wish them a good evening. It's late afternoon, and Charles and Claudia retire to their beds for a nap. An hour later, they meet in the dining room where a sumptuous spread awaits them.

Two days later, Marigold shares tea with the visitors at the ceremonial hall. Charles and Claudia have been busy jotting notes, writing dispatches, sitting in on lessons at the learning garden, participating in meditation sessions. The previous night they debated how to present the proposal to Marigold, whether the proposal is itself appropriate given all they had learned.

So, you've seen our way of life. What do you think so far?

It's a beautiful way to live. The community is wonderful, Claudia says, her voice trailing. But?

We're seeing the polished side of a unique community, Charles says. What happens a month from now when the season of mourning begins? Will there be more deaths? More refugees coming to us for help?

We know that there are some 2nd generation of Biosynths who display extreme symptoms from their link with plantae. For them at least, a remedy should be available, so nobody goes through what Tim Harper went through, Claudia says.

Marigold sighs. A Biotypical looks at a Biosynth and pities the suffering that we go through. For you, this as an affliction. It's not. The season of mourning is generative and vital to the life that we see all around us. Without it, we are severed from a vital energy of the world. The sacredness of life includes pain and suffering.

All kinds suffering? The kind of suffering that Tim Harper endured? Third and fourth degree burns every year?

Marigold has no reply, her silence signals concession. Charles reaches into his knapsack and produces a metal case the size of two fists. He unclips the carbon latches, the case hisses. He shows Marigold the contents: Three vials of blue liquid and three nasal dispensers set in foam.

This is the gene-therapy that we produced after we analyzed Tim's genome. We have found a way to reverse the Biosynthetic condition. Three nasal injections over the course of 3 weeks. That's all. No side-effects. Give it to a person who experiences the worst symptoms. It's the only way to spare them the ravages, Charles explains.

If you need more doses, you can have them, Claudia says.

And in exchange?

Consider a trade program with the Republic. We can send you students and observers, you can share your culture, your values, what you've learned from plants. The world needs to hear what you have to say.

But in agreeing to the exchange, we will also lose our Biosynthetic capacity, Marigold says.

How you distribute and apply the antidote is up to you. Not everyone needs to get it.

But the creation of an antidote indicates that our condition is something malignant, something to be cured. We were not a disease until you created a cure.

We are not imposing the therapy on you. It's an option. What you decide is entirely up to you.

Silence in the hall. Marigold feels a sharp pain in her abdomen and winces. Outside the hall, cool in the spring breeze and weeks before the start of the season, a flake of ash blown from a distant wildfire descends onto a blade of grass, tumbles along the edge and falters to the damp, windswept soil.

Sample 3 from Lindsay Cole

M slowly opened her eyes as the seawater drained from the Wave capsule. She took a deep breath of air into her lungs, her first in many hours, and flexed her wrists and ankles. Easing out of connected Wave Circle time and back into her own skin bounded body best not be rushed. She stood and changed out of her Wave suit into her land clothes, deep in embodiment. The Circle of Intertidal States were gathered to sense into the individual and collective experiences of their changing communities, where land life was being replaced by people, communities, and cultures learning to be in intimate relationship with the sea. Through the Wave capsule and suits they could focus and channel the current, tides, light, and chemistry of the sea to attune with one another across great physical distance. The gathering was continuing to unfold in its time and way, and M was sensing that some significant shifts in their collective north star were in the fathoms. She was Tuvalu's designated Circle keeper, chosen by her community some years ago for this responsibility. It was important that she stay in and with and not rush, yet she had that unmistakable feeling of being on the edge of something big, and was feeling a current tugging on her.

The tide was out at the moment, and she was able to land walk most of the way home from the Place of Gatherings surrounded by turquoise waters and sunlight. She walked through a neighbourhood of tetherhomes, an architectural design inspired by the strong holdfasts, flexible stems and floating fronds of kelp forests. Wave time was more fluid than land time, and a younger iteration of M was rippling through her consciousness as she adjusted after her time in Circle. Her forty-year ago self was at her first international meeting on behalf of her community. It was the international climate change summit of what was then called the United Nations, hosted in Copenhagen. Her home country of Tuvalu had only just joined the United Nations in the last decade, and there was pride and deep responsibility in holding a seat at this big table. There was a great deal of hope for this meeting, and also a great deal of pressure. M and many others like her were hoping that the time had finally come when the world's governments would commit to legally binding action on climate change. At the time, her country was already starting to feel the effects of a changing climate. Two days before the summit ended, her country's representative had made an impassioned speech about how small island developing states were going to entirely lose their homes, lands, and histories. It was a speech that moved people around the world, and in the room. But it wasn't enough to make a real difference in that moment, and the meeting ended in yet another failure to act.

After the negotiations ended, and the representatives from Tuvalu were sharing a meal with their friends and neighbours from Kiribati, the Solomon Islands, and Vanuatu before everyone headed home, M couldn't help but raise her voice. She knew that as the youngest person there, and as a young woman, she was taking a big risk by saying anything as she was expected to respectfully listen and learn. But she was angry, and grieving this significant loss.

She was invited to join this meeting because the government leaders thought it would be nice to say that they had taken a young woman on this trip with them, having the ‘future generation’ represented, and because she was active in her school and community. She wouldn’t sit back and let them make her a symbol in this way, so she decided in that moment of anger and loss to try and do something with the opportunity of being in this room. She had been watching the leaders of these small islands negotiate using terms set by countries that were in the pocket of the fossil fuel industry since she was a teenager, and she could see how they were trapped in a system that ensured continued failure. It was time to change the game.

“What if we stopped showing up to these pointless international meetings, where the rich and powerful governments record our faces and voices, wring their hands, make their sound bytes, and then continue taking money and advice from the companies that are destroying the earth and change nothing!?”

The room went quiet, and M’s courage began to retreat into anxiety, and then shame. Time seemed to stand still. What would her family say when they heard that she had treated the honour of representing her country with such disdain, and spoken to her elders in this way? Then someone cleared their throat, and said quietly but clearly “She is right. I have been accompanying my husband to these meetings all over the world for years, and they keep saying the same things, and doing nothing. My daughter P feels the same way. It is time to change our strategy, and start listening to our young ones and making room for them to lead us.” And with those words, the well respected wife of the President of Kiribati had set the next decades of M’s life into motion.

She reached the end of the dry path, and inflated her shoes and extended her pole so that she could water walk the rest of the way home. She lived at the Funafuti Float School with her biokin daughter N, her daughter’s family partner P, and the seven nibbling children and youth that were their current family nest. M was the elder of this nest at the moment, although family life was somewhat fluid in Tuvalu as people came and went with the tides of community responsibilities. All were cared for regardless of their direct biological connections, with elders and youngers holding past and future wisdoms, and those in the middle taking their turns at the heavy lifting of keeping everyone nourished in all ways, according to their talents and abilities.

She arrived home to meal preparations and lively banter. The youngest nibblings were cleaning and preparing a variety of seaweeds harvested from the garden, and some of the older ones were pulling up the traps that they used to collect the abundant arthropods that had made homes in the reef after the coral bleached. Her daughter was cutting seawater adapted fruit harvested from the aquaponic house. When the meal was ready they each filled their bowls, and then sat together on the float edge with their legs dangling into the sea. She sat down beside D, the eldest nibbling, and P’s biokin. D was into their young adulthood, in their final preparations before entering into active community service. Their current caregivers deeply loved this thoughtful and quiet member of their family nest, but were concerned that they were still unclear about their community calling, and that this was starting to weigh heavy on D’s wellness. M loved spending slow times with D, and shared some of the embodiment happening in Circle with the Intertidal States through the water moving between their legs and

feet. D picked up the potency of the moment right away, and also caught the wave of M's thinking about her younger self.

“What was it like then, when the lands were disappearing and the people responsible weren't doing anything to change that?” M cycled back to this earlier time, staying connected to D through the water. She could feel D's pull of curiosity.

After the failure of Copenhagen, M began to meet other young people from what were called the Small Island Developing States. Although their cultures and languages were different, they found that they had much in common. While they respected the work of their elders, they wanted to begin work on a parallel track. So they continued to travel the world for the international climate conferences, but with a different agenda. They sought out the scientists working on climate change adaptation, and the people, companies, and countries ready to pay reparations for taking an unequal share and causing such harm. This group of young leaders trained in the skills that they would need for a climate changed future and became healers of the relationships between land, water and people, inventors, sea farmers, and re-built skills in collaboration. When the Bahamas decided to leave the constitutional monarchy behind, others followed suit, liberating them to practice new forms of their old ways of governance. As the seas rose this new Circle of Intertidal States emerged, supporting one another in adapting to their changing world and agreeing to systems of governance that were collaborative, and founded in the idea that people and the sea can flourish together. There was struggle and hardship as the old ways of competition, exploitation, colonialism, and power died within their communities. But overall they adapted, together. When the United Nations system finally collapsed under its own weight, the Circle was ready with their new ways of staying connected to one another. The powerful and populated countries of the world, the ones that thought they were too big to fail, or decided to reap as much money from the earth as they could, fell hard. Borders closed, goods producing countries closed up shop. Seas rose quickly at times, the storms and fires came, and few were spared. Even those that had built infrastructure that they thought would protect them. The great reckoning had come.

M stopped. The skin of her legs vibrated with the depth of D's heartbreak. She cycled back to today's Circle.

Sample 4 from Mark Fettes

Eighth Generation

The sewage plant was where Vine received the first hint of her Wild Talent.

Everyone ended up spending time at the sewage plant, some time in their ninth or tenth year — just as everyone spent some time on an urban farm, and at a 4R, and at a Diatopia. Learning in these years was all about cycles and transformation. Vine especially enjoyed the Integrity dances designed for these years — she loved the feeling of changing shape, both her own shape and the shapes she made with others. The field stays were OK, but they didn't offer that same promise of endless renewal, endless possibility.

On this particular day, Vine had been assigned to shadow one of the sewage workers who had greeted them on the first day of the field stay, but had not been seen since then, presumably because they were busy with the sewage. In the meantime Vine had learned a lot about shit. It was more interesting than she had expected.

“Basically, it belongs in the earth,” she had explained the night before to her friend Cinquefoil, who hadn’t done sewage yet. They were talking over the Net, of course. Vine had the standard access allocated to ten-year-olds, which let her talk with friends and share pictures, but not much else. The reasons for this were covered every year in Discourse Hygiene, a popular class because of the cautionary tales it offered from the early 21st century. Vine knew that a few of her friends chafed at the restrictions, but having been duly horrified at the suffering inflicted by dyscomm plagues of the past, she was grateful for such precautions.

“So I don’t get it – why does it end up in these giant ponds then?” Cinquefoil had wanted to know.

“It’s a trade-off for getting people to live close together,” Vine had explained. “Putting it in water makes collection easy. But then the tricky bit is getting it out of the water and back into the ground. Tomorrow I’m supposed to learn more about that.”

Now it was tomorrow, and Vine’s shadowee turned out to be a brown-skinned, stockily built nonbinary person whose badge identified kin as Shui Long. Kis primary languages were Cantonese, English, and Secwepemctsin, with Korean as a secondary. Vine was learning Korean as well, but she knew she’d still have trouble with the scientific register, so they ended up in English.

“I’m a Freshwater Protector,” ki told Vine. “Most of the time I live in a town far up the river from here. It’s an agricultural region, so I work closely with the Soil Protectors and a bunch of people connected with meadowland ecology, as well as the farmers. We are always learning new things about kinship relationships up there... like everywhere, I guess.”

Vine nodded. It was something that came up a lot at school – the immense amount of learning and relearning that was going on, as Integrity principles spread through human communities following the collapse of industrial capitalism.

“Is that where you learned Secwepemctsin?” she asked. Her field stay in a Diatopia had awakened her interest in languages – she had English, Punjabi and Skwxwumesh snichim as her primaries, and she had her eye open for a secondary Indigenous language, when she could fit it in.

“I grew up on Secwepemc territory,” Shui Long explained. “That was back in the Fire Years. My birth dad died in one of the fires when I was just a few years old, fighting to save the town. A lot of other Integrity and Secwepemc people were there on the fire line with him. That was a kind of turning point. People started really listening to the Elders after that, including the local foresters and ranchers and the handful of scientists we had at the time – people who spent a lot of time out on the land. My Mom met my stepdad in those meetings – he’s from the Nation. They helped start the first Diatopia in our town, and that’s basically where I grew up.”

“So do you like it when you have to come here?” Vine wondered.

“And work with sewage?” Shui Long laughed. “It’s OK. It’s part of what we have to understand as Water Protectors. Of course I miss the river. But it’s still here, really. Come here – let me show you.”

Vine followed kin down a gangway and through a door into what was obviously a laboratory. Impressively complicated, shiny instruments lined benches with movable stools. Shui Long beckoned Vine to the end of the room, which was furnished like a kind of lounge, with places where you could stand or sit or lie. An array of VR headsets in different sizes hung on the wall.

“Have you used one of these before?”

Vine hesitated. “I’ve seen neareals before – is this like that?”

“Yes, except that it’s not story-based. It projects your awareness into an environment that is basically a simplified version of reality in elastic time. In this case we’re interested in what is going on in water at the level of single-cell organisms and bacteria, where things happen much faster than we are used to, so the system slows things down to match our perceptive capacities.”

Vine was impressed. “Cool!”

“Yes, it’s helped transform our understanding of microbial ecology. It will likely be one of the environments you encounter on Talent Day.”

Talent Day fell on the day after one’s 11th birthday. Vine knew it was a big deal, but she hadn’t paid it much attention until now. However, Shui Long’s evident willingness to talk was too good a chance to miss.

“Can you explain Talent Day to me? I missed the class where they talked about it last year, and it’s all kind of mixed up for me. How are we supposed to figure out what our Talent is?”

If Shui Long was surprised at the question, ki hid it well. Vine thought she detected a glint of enthusiasm in kis eyes.

“You’ll spend the day in a series of VR environments. It will be a bit like an adventure game. You might find yourself in the deep ocean, swimming with squid, hunting for prey. You might find yourself a young sapling in the forest, feeling and tasting the life in the forest floor and in the helper trees around you. You might be a hawk circling above a glacier-fed stream high in the mountains. Whatever role and place you encounter, the system will be recording your responses. There are no wrong ways to behave – you should just let yourself feel and react in the way that seems most natural.

“As the day goes on, the system will adjust the scenarios to match your strongest potential for connection – the ways your own deepest nature resonates with other wild beings. When the session ends, you’ll be given a description of the closest matches. There is always more than one option provided, to honour your capacity for conscious choice. When you choose, that becomes your Wild Talent, likely for the rest of your life.”

Vine was intrigued. “So is that how you became a Water Protector?”

“That was how it started.” Shui Long’s voice held a hint of dreaminess. “On Talent Day I discovered I have a strong kinship with anadromous fish, especially salmon. By the afternoon the system was immersing me in their whole life cycle, and it turned out I’m especially good at relating to them as alevins – that’s like the childhood stage, before they swim down to salt water and become smolt. So I ended up choosing Alevin as my Wild Talent.”

“Wow.” Vine considered this for a moment. “So how did you get your job? Is that automatic, once you’ve found your Talent?”

Shui Long shook his head. “No – having a Talent is not the same as choosing a career. I have a friend who is another Alevin, but he’s a baker. He comes up every year to work with us the same way that I come down to work with sewage. It’s about balance. You’ll learn more about that after Talent Day.”

Vine found a headset and glove controls that were clearly designed for someone her age; they fitted snugly. At Shui Long’s advice, she fitted herself into a kneeling chair that made it easy to move and turn her upper body in every direction while staying firmly anchored to the floor.

“Water immersion can be disorienting when you start out,” Shui Long warned. “Daily life doesn’t prepare us for free movement in three dimensions. If you start feeling disoriented or nauseous, just pull out – it’s no big deal. We can work you up to it gradually, if need be.”

Darkness descended around Vine. She could still hear Shui Long, though, who was speaking through his own headset.

“I’ll be with you. The system can synch the two of us as long as we don’t get in each other’s way.”

Vine’s visual field flicked on. She found herself apparently swimming along a tunnel through water that was a shade of light green, but otherwise clean. The only visible object was a kind of schematic, metallic human figure – spherical head, cylindrical body, tubular jointed arms and legs – gliding along beside her.

“Our own images are deliberately artificial-looking,” Shui Long’s voice explained. “We want don’t want to mistake ourselves for the beings we’re studying. And this is the route that we planned for newcomers. It brings you in slowly.”

The tunnel bent downwards, and suddenly it seemed to Vine that they were falling. Inadvertently she closed her eyes and clenched her hands in the gloves, and the movement stopped.

“Very good!” approved Shui Long. “You’ve just slowed subjective time to a standstill. Our suits are synched so that I don’t lose you.”

Vine opened her eyes. She was suspended over a drop into a murky pit.

“Before we go further, we need to shrink ourselves. That’s a function of the left-hand glove. Tap your palm.”

Vine did so. The murky pit seemed to recede into the distance, as the walls around her expanded. A blue scale appeared in the left of her vision, showing her apparent size.

“A millimetre will do to start with,” Shui Long suggested.

Duly shrunk, Vine gradually unclenched her right hand, and they started to drop again. In half a minute, the surface below them loomed up, and Vine could now see that it was water filled with a complex mix of colours, textures and shapes, jiggling and swirling slowly.

“Let’s go check out that rotifer colony there.” Shui Long extended one tubular arm to point off to the right, where Vine could dimly make out translucent, radially symmetrical forms with a tail at one end and a fringed mouth at the other. There came in several shapes and sizes, rather like a collection of stray dogs, and appeared to be primarily interested in stuffing whatever they could catch into their dimly visible digestive systems.

“Rotifers are animals like we are,” Shui Long explained. “They’re about the biggest creatures that can thrive in sewage. Really interesting, but there’s a lot we still don’t know about them.”

Vine watched in fascination. She could see that the different rotifers had different hunting (or should that be foraging?) strategies. “What do they eat?”

“All kinds of stuff. Protozoa. Algae. Dead bacteria and other bits of organic matter. They Hoover it all in.”

Vine frowned. She could tell already that the rotifers — some of them, at least — were being pickier than that. But before she could ask more questions, Shui Long gestured again.

“Let’s shrink down another ten-fold. That’s when things get really interesting.”

Obediently, Vine tapped her left palm again. The nearest rotifer swelled and stretched until it loomed high above her head, reminding her of a baobab tree she had seen in a botanical garden, except that this one reached menacingly out towards her, cilia flickering. Hastily Vine slowed the time scale back down again and moved away through water grown suddenly resistant, like treacle.

“They can’t sense us — we are only virtually present,” Shui Long reassured her. “They’re hunting for their usual prey. Here, look...”

An egg-shaped creature came swimming by, propelling itself by long whiplike tendrils attached to its front end. The rotifer bent in its direction, but too late — the small being had already zigzagged beyond reach.

“That was a ciliated protozoan,” Shui Long explained. “Look — they’re everywhere.”

Indeed they were. When Vine looked around she was reminded of a dance party. Protozoans of a dozen different varieties, some egg-shaped, some long and skinny, some sticky-armed like sea stars, were flocking through the turbid water. As she and Shui Long drifted among them, she saw that the turbidity was itself alive, a mass of small round and oval objects whizzing hither and thither, joining up and splitting apart with bewildering speed, even to her slowed-down perceptions.

“Are those... bacteria?” Vine asked in wonderment.

“That’s right — they’re the work horses of sewage treatment. Little chemical factories. We are close to the limits of the VR here, both in size and time scale. Bacteria live right on the edge between organic chemistry and cellular life. We really have no idea what it’s like to be a bacterium — but without them, no ecosystem on Earth could function.”

In the Integrity dances, Vine had learned not to overthink what she was doing, but to let her body respond instinctively to the music and the movement of the bodies around her. As she got better at it, it felt increasingly like stepping from one world of perception to another, somewhat like shifting from English to Skwxwumesh snichim, but even more so. She tried it now. Rather than focusing on the individual organisms in her field of view, she let their drift and whirl penetrate inwards, to a lightless realm of wordless intuition. And immediately she realized: I need to *feel* this.

“Can the VR do touch?” she asked.

“We have a multisensory suit, but it would be much too big for you,” said Shui Long. “And to be honest, I don’t think anyone has used it at this level of resolution. The field stays are meant to be an introduction... using the suit would be way beyond that.”

Vine was disappointed. “What about sound?”

“Ah... interesting that you ask! We do have a guy on the Balance staff who’s a sound engineer in his main career. He’s been playing around with ways of translating VR movement into sound. It’s not really my thing, but there’s an app he uploaded recently for us to try out. Let me see...”

There was a pause. Vine tried sending her imagination out into the whirling crowd of beings around her, feeling their hunger, their stickiness, their boundedness, their urge to multiply.

Suddenly she was hearing something other than her own voice, or that of Shui Long. At first it sounded semi-random, like an orchestra warming up, a collection of tones and textures and phrases piled on top of each other, hopelessly confused. As Vine listened and watched, however, some distinct threads became clear. A protozoan swimming by was accompanied by a cello minor scale. A filament of round bacteria strung together was a flute glissando. The hungry rotifer off in the distance was a menacing snare drum. Gradually, she felt her body responding; to her delight, the soundtrack picked it up as a clarinet solo. This was it! She could be part of the dance.

Flinging her arms wide (blues arpeggio!), Vine let the music take her...

Weeks later, back at home on Secwepemc territory, Shui Long tried describing what ki had witnessed to an Elder.

“This kid... it was like she *belonged* there. When I saw her dancing with all those microbes, I realized I’ve always been like an outsider in their world. The same as when the first white fur traders and settlers arrived here, just looking for profit, for what was good for them.”

The Elder nodded, and sat in silence. Shui Long checked his urge to say more, and waited, patiently.

“We’ve always known the spirit world is right there beside us, all the time,” the Elder said.

They sat in silence a while longer, thinking. Finally the Elder spoke again.

“Our teachings speak of the seventh generation in two ways. One, as the generation we need to hold in our hearts and minds with every action we take. That teaching, as you know, reminds us to live in respect with all our relations, past and present and stretching long into the future.

“The other teaching is of the seventh fire. The generation of the seventh fire must make a choice of how to live. This was your generation, Shui Long.

“The prophecies do not tell us of what comes next. This is what we are discovering now, through the eyes and voices of the young. And through the miracle of technology used to help us see, not through the lens of our hunger for material wealth, but through our longing for relationship.

“I am grateful for this story you have brought me. It gladdens my heart. When I greet the new day, tomorrow and henceforth, I will have even more to thank the Creator for.

“Here in this time of mourning and renewal, I will thank her for showing us new paths of learning, on the journey towards right relationship, even at the level of beings so small we cannot see them with the naked eye.

“I will thank her for the teachings of the eighth generation.”

Appendix B: List of Interviewees

Cheryl Cameron: Director of Organizing, Dogwood Initiative

Nadya Chaney: Arts-based facilitator

Travis Clyne: Resident, Yarrow Eco-Village, Chilliwack, BC

Michael Hale: Resident and Co-Founder of Yarrow Eco-Village, Chilliwack, BC

Virginia Johnson: Squamish Nations Indigenous Education

Kau'i Keliipio: Professor at SFU (Indigenous Education)

Rod Marining: Director of Sea Shepherd Society, Co-Founder of GreenPeace

Asia Mathews: Professor at Quest University (math)

Chael McArthur: Director of Sea-to-Sky Outdoor School

Amy Parent: Professor SFU (Indigenous Education)

Carolyn Roberts: Professor SFU (Indigenous Education)

Diane Roussin: Winnipeg Boldness Project

Cheryl Rose: then with Getting to Maybe program at the Banff Centre (now retired-ish)

Eva Pomeroy: Presencing Institute + Concordia University

Gary Slutkin: Director and Founder of the Cure Violence Project (No Interview, just online research)

Blair Stonechild: Professor at First Nations University (Indigenous History)

Tim Turner: Founder and former director of Sea-to-Sky Outdoor School