BEARING

Issue 03 The Society for the Diffusion of Useful Knowledge March 2019

Joseph Tisiga, *Trespassers Menaced by Psychosis*, 2017. Watercolour on paper. COURTESY THE ARTIST AND PARISIAN LAUNDRY.

bear (v.)
Old English *beran* "**to carry, bring; bring forth, give birth to, produce; to endure without resistance; to support, hold up, sustain; to wear**" (class IV strong verb; past tense *bær*, past participle *boren*). From PIE root ***bher-** "**carry a burden, bring,**" also "give birth" (though only English and German strongly retain this sense, and Russian has *beremennaya* "pregnant").

Many senses are from "**move onward by pressure.**" Meaning "**sustain without sinking**" is from 1520s; to *bear (something) in mind* is from 1530s. To *bear down*, "**proceed forcefully toward**" (especially in nautical use) is from 1716. To *bear up* is from 1650s as "**be firm, have fortitude.**"

The Society for the Diffusion of Useful Knowledge is a serial broadsheet publication produced by the Blackwood Gallery, University of Toronto Mississauga, as part of *The Work of Wind: Air, Land, Sea*, a site-specific exhibition, public program, and publication series designed to expand perspectives on climate change through artistic practices, cultural inquiry, and political mobilization.

The Work of Wind: Air, Land, Sea

Exhibition: 14–23 September 2018
Books: Fall 2018, Fall 2019, Spring 2020
Public Programs: June 2018–September 2019
Broadsheet Series: June 2018–September 2019

The Work of Wind: Air, Land, Sea aims to foster a deeper public awareness of the complex entanglements of ecologies of excess, environmental legacies of colonialism, the financialization of weather, contemporary catastrophism, politics of sustainability, climate justice, and hopeful resilience. It sets out to develop durable visual-cultural literacies and invites publics to create new encounters in the common struggle for a future. The project flows across the city of Mississauga and is distributed locally, nationally, and internationally through a three-volume book series co-published with K. Verlag and *The Society for the Diffusion of Useful Knowledge*, an innovative public program and publishing platform.

***The Society for the Diffusion of Useful Knowledge* (SDUK)**

In order to productively collide with the present crisis, we recognize that ideas cannot be constrained by disciplines. *The Society for the Diffusion of Useful Knowledge* (SDUK) composes and circulates an ecology of knowledge based on the relationship and antagonism of "useful" ideas. The name of this innovative platform is borrowed from a non-profit society founded in London in 1826, focused on publishing inexpensive texts such as the widely read *Penny Magazine* and *The Library of Useful Knowledge*, and aimed at spreading important world knowledge to anyone seeking to self-educate. Both continuing and troubling the origins of the society, the Blackwood Gallery's SDUK platform circulates research, ideas, and debates from a range of exigent discourses and practices, including those among the visual arts, environmental humanities, public policy, political economy, sustainable design, science and technology studies, extinction studies, and the major scientific and cultural debate of a generation—the Anthropocene.

The **SDUK** broadsheet series brings together contributors from diverse fields in the sciences and humanities, students and faculty from across the University of Toronto Mississauga, community organizations and activists, policy makers and policy agitators, artist researchers and speculative thinkers, all to advance new forms of literacy around climate change discourse.

The Work of Wind: Air, Land, Sea
Curated by Christine Shaw
Presented by the Blackwood Gallery in partnership with the University of Toronto Mississauga, the City of Mississauga, and K. Verlag.
2018–2019

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IBC (Indian Brand Corporation): Dystopic Autonomy

Joseph Tisiga

Joseph Tisiga's series of watercolours references the Kaska Dena folk legend of Dzohdié', who killed a giant man-eating worm with a bow and arrows he saw in a dream (made for him by his grandmother). Reinterpreting the legend in paved car lots, public parks, cramped dioramas, and spray painted on cinderblock walls (see cover and p. 12), Tisiga's work hinges on the corruptible histories that inform his identity by confronting a distinctly alive and nonhuman force that is out there in the world. Astroturf makes an appearance. Transmissions of proxy occur. And the casualties of heuristics are revealed.

Reframing and parodying familiar tropes of colonial iconography under the banner of the fictional "Indian Brand Corporation," *IBC: Dystopic Autonomy* moves between depictions of scenes from the Dzohdié' legend and illustrations of the banal social apparatus that structure human relationships with the state, the built environment, and colonial extraction economies, troubling the fragile boundaries between human and nonhuman beings. Pulling entire landscapes into surreal moments of alienation, magic, and the mundane, Tisiga confronts colonial painting traditions (and their treatment of Indigenous lands and bodies) with deep narrative complexity, dreaming mythologies that reveal strange, new, and unconventional ways of relating.

How to Read this Broadsheet

This SDUK broadsheet is the first to follow *The Work of Wind: Air, Land, Sea*, a ten-day contemporary art festival engaging with climate change, environmental crisis, and resilience which took place in Mississauga's Southdown Industrial Area in September 2018. Taking **BEARING** as its theme, this issue turns our attention to alienation, affect, anxiety, and questions of responsibility and resilience. For curious readers of all persuasions—those new to the project and those who have been following its year-long unfurling—here are some places to begin:

If you are wondering **how can we enact responsibility to humans and nonhumans in bleak political and ecological times**, contributions by Alexis Shotwell and Joy Xiang provide productive starting points. Investigating kinship systems and relations that oppose regimes of whiteness, Shotwell's essay (p. 8) highlights the urgency of anti-racist work in both environmental and social contexts, while Xiang (p. 21) explores how we might reevaluate pollution by better understanding the web of human relations that support its dispersal.

Those with an interest in economics may be wondering **how fossil fuels structure our relationships to finance, media, and biodiversity**. D.T. Cochrane's recurring column examines the concept of "growth" by exploring what is left unaccounted for (p. 20), while an essay by Jeff Diamanti highlights how media shape our blindness to ongoing fossil-fuel reliance (p. 16), and an artist project by Marina Roy (p. 4) urges a reconsideration of the earth's carrying capacity.

If this feels overwhelming, some might ask, **how can we render visible the complexity of forces that shape our world?** Imagining a chronology dating back to before the formation of our solar system, Jacquelyn Ross's poem *A Brief History of Feeling* (p. 14) illustrates the impulses, tensions, cruelties, and moments of tenderness that have characterized cosmic time to the present. Malala Andrialavidrazana's collage *Airline Routes and Distances* (p. 18) assembles a partial history of knowledge, globalization, colonialism, mythology, militarism, cartography, and natural resource extraction, told through the imagery of atlases, bank notes, stamps, and album covers.

For those who wish to explore climate change's effects beyond the local level, an urgent question is: **Who bears the effects of climate change? What does it look like to bear this weight?** Amy Balkin's *A People's Archive of Sinking and Melting* (p. 24) is an attempt to capture the varied objects and artifacts that represent the rapid shifts we are seeing in environments around the world. Meanwhile, in watercolours that articulate complex tensions between land, settler and Indigenous identities, alienation, iconographic traditions, and forms of power (political, mythological, capital), Joseph Tisiga builds surreal spaces that respond to social and environmental urgencies (cover and p. 12).

Those reading with policy in mind may wonder **how systems of leadership and government can direct public action on climate justice**. Sara Hughes (p. 22) outlines the capacity municipalities have in responding to climate change, while the third column in a regular series from Mississauga's Climate Change Project describes local approaches the city has taken (p. 23). Appealing to the federal government, an open letter from leading climate scientists urges greater and more decisive action in response to the 2018 Intergovernmental Panel on Climate Change report (p. 7).

Finally, as in each broadsheet, we include profiles of local organizations and initiatives dedicated to working on issues of climate change and environmental justice in the GTHA (p. 26), and a glossary of terms (p. 28) designed to clarify—but also to complicate, question, and upend—common assumptions about the language we use to describe our current epoch.

PHILIPPINE
TARSIER—
BITUMEN INTO
PINK LATEX

PERSIAN FOWL TICK
BITUMEN INTO WHITE
+ PINK LATEX

Carrying Capacity

Marina Roy

Georges Bataille spoke of art as squandered energy—a gift to the world—without instrumental purpose, counter to the type of productivity that, aimed at amassing profit, commodifies all life forms (and forms of life) today. Making art can be a social transgression and an ethical reaction to the capitalization of life by corporate sovereignty—turning the planet into a machine, pumping out nihilistic surplus via creaturely suffering. Under this logic, economic growth is bound up with material extraction, territorial expansion, and exploitative labour.

The sun gives freely of its energy. Combined with the atmospheric/climactic conditions on Earth, it has given rise to a vast range of life forms being thrown into existence, and dying off. An abundance of energy has been channelled into and through living and dead biomass, along complex chemical chains: anaerobic organisms, bacteria, fungi, plants, animals, and humans interpenetrating, consuming one another, sustaining one another, in symbiosis. Geological deposits of organic matter—pockets of extinct decaying life forms trapped in the earth's crust—have been converted into fossil fuels under extreme pressures over hundreds of millions of years, in particular coal, natural gas, and oil. These are highly concentrated forms of energy, which, when burned by billions of humans, have made possible a high degree of productivity, comfort, and luxury (although by no means equally across the globe).

These vast pockets and wells of energy, concentrated here and there within the earth's crust, have been burned in a little over a century, in the name of human ingenuity and "progress," largely consumed to heat dwellings, power machinery, and transport commodities and humans—cutting across high seas, blazing across the sky, and cruising down asphalt strips—magnificent feats of space-time compression.[1]

Concerned by the high rates of species extinction and decreasing livability due to the cumulative effect of risky industrial practices and exorbitant energy expenditure, ecologically conscious citizens have warned of the limited "carrying capacity" of the earth.[2] If the rate of extraction, consumption, and waste production continues to accelerate, or even continues along at the same rate, who will survive the disasters of climate change? How much displacement, poverty, suffering, and death will result from runaway capitalism, as we crest that wave, and descend from that irreversible tipping point? As the world closes in on itself, mineral and fossil fuel extraction become reasons for military intervention, powerful nations vying for advantage through any excuse they can muster—civilization-versus-barbarism arguments unfurl in the scramble to secure scarce resources.

If the conspiracy theories, lies, and indifference continue, if business carries on as usual, tar-coloured silhouettes will be all that is left of our vibrant land, sea, and aerial creatures… at least for those fortunate enough to be crushed between sedimentary rock—as future fossils. Ubiquitous will be the traces of petrochemicals that, at the end, have infused every aspect of our lives, outliving all that fleshy matter—and releasing various ghostly forms, the result of so much profane, instrumental suffering, living on in or as humus, traumatized matter passed down the chain. Will the final indignity of historical memory, whether natural or cultural, be a general eclipse of this once diverse life within endless tendrils of microplastic, subsisting, entwining itself into ever new alien life forms?

Previous spread: Marina Roy, *Your Kingdom to Command* (details), 2016. Latex paint and bitumen on plywood, 80 x 25ft mural.

1 David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Cambridge, MA: Blackwell, 1990).

2 Allan Stoekl, *Bataille's Peak: Energy, Religion, and Postsustainability* (Minneapolis: University of Minnesota Press, 2007), 37.

Open Letter to the Federal Government

W.R. Peltier, D.W. Schindler, John P. Smol, and David Suzuki

Dear Prime Minister Trudeau, Leaders of the Opposition, and Provincial and Territorial Premiers:

We, four of Canada's most senior environmental scientists, believe it is our duty to urge you and other political leaders to take seriously the findings of the recent IPCC report on climate warming, and its implications for Canada. The report indicates that detrimental effects of climate change are already occurring, and will worsen much more quickly than believed in the past.

The new report compares in some detail the impacts of the two alternate targets proposed by the Paris Accord, limiting increases in average global warming to 1.5 or 2°C. The impacts of 2°C of warming would be much more severe than only 1.5°C of warming, with devastating increases in extreme weather, and long-term changes to the oceans, the forests, the arctic, to biological diversity, and to the economies that support human populations. It is noteworthy that Earth has already warmed by an average of 1°C as a result of human activity, and the 1.5 degree threshold will be reached by 2040, under current emissions.

It is noteworthy that large northern land masses have warmed much faster than these global averages. Much of Canada has already warmed by 1.5°C, and temperatures are continuing to rise. In order to minimize damage to Canada's society, ecology and economy, strong action must be taken in the next few years. There is no time for the "transitional economies" that some have touted to pacify fossil fuel interests by investing in still more fossil fuel infrastructure. We need to devote all available resources to develop alternative energy sources now.

The vast majority of earth and environmental scientists in all countries now agree that climate warming, accelerated by human emission of greenhouse gases like CO_2 and methane, is amplifying weather events, making hurricanes more powerful, and droughts and floods more extreme. In addition, it is melting glaciers, acidifying the oceans, promoting sea-level rise, causing increased incidence and intensity of forest fires, and making detrimental changes to biological habitats, including those of commercially important species.

We have already seen many of the changes predicted by earlier IPCC reports. Changes that have affected Canada include forest fires of increasing number, size and intensity, as in Alberta in 2016 and British Columbia in 2017 and 2018. These have devastated Fort McMurray, crippled the forest-based economy, tripled the annual emissions of greenhouse gases from the province of BC, and produced severe human health effects via poor air quality that has been worse than in industrial China for many weeks each year. We have also seen more extreme weather, with increased prairie drought, as in the early years of the new millennium, and more extreme floods, such as in Canmore, High River, and Calgary in 2013. Increasing greenhouse gases are predicted to cause such events to become even more extreme.

Warming and acidifying oceans that border Canada are producing fewer salmon, and warming is enhancing blooms of harmful algae in lakes. Melting ice and permafrost are making transportation and building more difficult and costly in Canada's North, and jeopardizing the livelihoods of Indigenous peoples. Farther south, more intense hurricanes, droughts, and storms are occurring, just as the IPCC predicted in earlier reports.

The new IPCC report was a massive undertaking, comprising three years of work by more than 130 authors, synthesizing over 6,000 scientific references and fielding over 42,000 comments during the extensive peer review process. It is not a scam invented by a few, as some climate change deniers would like us to believe. The science is as sound as that upon which nuclear power and space travel are based, and studies that show that tobacco causes lung disease. To ignore the IPCC's report is to ignore the warnings of thousands of scientists and jeopardize our country, our way of life, and the biodiversity of life on our planet. Some have claimed that we must wait for other countries with larger greenhouse gas emissions to commit first to reductions. This is contrary to Canada's tradition of global leadership. Canada led the world with the first science-based policies to control the inputs of phosphorus that cause algal blooms in the Great Lakes and other freshwaters. The rest of the world quickly followed our lead. Canada was also the first country to reduce the emissions that caused acid rain. The US and Europe again followed our leadership, saving thousands of lakes and forests. Neither of these actions had negative effects on the economy, despite claims to the contrary by vested interests, and both caused significant recoveries of affected resources. Canada led protecting the stratospheric ozone layer by hosting the Montreal Protocol, with benefits for ecosystems and for human health. In short, the world looks to Canada for leadership, because of our reputation for sound, science-based environmental policy. Following the Paris Accord, Canada made strong statements in favor of the 1.5-degree warming target. We cannot fail to do what we are asking other countries to do. We must not fail to lead in curbing global warming.

As the effects of climate warming unfold, the overall effect on the economy and the environment will be as devastating as a slow-moving international war. We must treat the threat to Canada with this in mind. In any functioning democracy, it is customary for political parties to set aside their differences at such times in order to address a threat that jeopardizes the future of its citizens. This is such a time, and we call on federal and provincial leaders to cooperate in reducing emissions of greenhouse gases with the greatest possible haste. A crisis of this magnitude transcends political bickering and demands a full commitment from all citizens and all industries.

We must not be afraid to confront the truth. Action to reduce greenhouse gases must be taken now, or the effects of climate change will prevent us from securing the future that we want for our descendants.

Sincerely,

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Canadian Scientist and Broadcaster

Claiming Bad Kin:
Solidarity from Complicit Locations

Alexis Shotwell

Christina Sharpe's piece "Lose Your Kin," which came out shortly after the election of Donald Trump, invites white people to refuse white kinship. She writes, "One must be willing to say this is abhorrent. One must be willing to be more than uncomfortable. One must be willing to be on the outside. One must refuse to repair a familial rift on the bodies cast out as not kin."[1] She is right, I think, to argue that "[k]inship relations structure the nation. Capitulation to their current configurations is the continued enfleshment of that ghost [of slavery]."[2] In asking what it means to resist the continued enfleshment of the ghosts and present hauntings of slavery, eugenic projects, the violence of borders, racial distributions of environmental devastation, capitalism, and colonialism, I pivot to wonder if refusing to capitulate to current configurations might require white settlers to acknowledge our social and political entanglement with them.

What could it mean for those who benefit from oppression—white people, and settlers more generally—to claim kin with oppressors? If we are complicit in the pain of this suffering world, how might we take responsibility for our bad kin? I started thinking about these questions while hearing conversations over the past several years about people who claim various sorts of Indigenous identities without being able to trace their family history to the lived, community experience of indigeneity. I have attended especially to Kim TallBear and Audra Simpson's articulations of the understanding that it does not only matter what we claim about who we are; it also matters who claims *us* as kin.

White nationalists claim me, as a white person, as kin. Though they may not know me personally and though they would likely despair of my politics, they are working for a world in which I and white people like me hold citizenship, reproduce "the white race," and are safe and flourishing. I have started to wonder what would happen if I claimed them back.

Here I explore modes of relationality that might allow us to understand the histories we inherit and the webs of connection that shape the social situations within which we exist. I argue for a specific form of responding to whiteness that involves white settlers claiming rather than disavowing our connection to white supremacist people and social relations. I see at least three different roles we white people can take up in claiming our kin: as friends, comrades, and enemies.

"Settlers make terrible kin"

Kyle Powys Whyte has cogently argued that ecological catastrophe is only a "new" experience for settlers: "Indigenous peoples of Turtle Island have already passed through human-caused ecological catastrophe at least once in their history."[3] In 2017, on a panel about the concept of "threat," Kim TallBear talked about what it means to exist in the wake of a threat already manifest—to have already experienced attempted genocide and world-destruction, and to still continue. "Settlers," she said in that talk, "make terrible kin." There is a vast literature on kinship relations, much of it emanating from what Vine Deloria Jr. ironically named "Anthropologists and Other Friends" who discuss the kinship relations of their objects of study.[4] In the academic circles I move in, there has been a return to talking about kin relations as "making kin not population."[5] Making kin, in this formulation, names a kind of relationality not based on biological markers or lineal descent, which are often seen as given and immutable, but instead on a chosen and ongoing process. These conceptions of kinship resonate with some Indigenous conceptions of relationality and being in relation as an ontological stance, densely situated in the specific, ongoing, collective lifeworlds of Indigenous people, and manifest in specific relationships to land and place, as well as in mobile social-material ecologies.

I believe we should reject any attempt to translate or transport specific Indigenous kin practices into settler contexts. Holding in view an understanding of colonialism as a structure rather than an event, settlers make terrible kin not because of who particular people are, but because settler colonialism is a structure based on betraying relationality, both historically and in the present. Settlership is formed in and through anti-Black racism and enslavement as a key piece of capitalism; it is formed in and through militarized border protectionism that simultaneously steals land and determines by force who will be allowed to cross into it. It is an artifact of whiteness to behave as though Black, Indigenous, and migrant struggles are in conflict with one another, and so it is worth attending to coalitional work, as when Black Lives Matter supported the opposition to the Dakota Access Pipeline at Standing Rock, or when Indigenous activists oppose travel bans and welcome migrants.[6]

Métis feminist scholar Zoe Todd's work on kinship is generative. Beginning from Leroy Little Bear's reflections on the very narrow range of ideal conditions that humans need to live, Todd critically engages the context of an oil spill in the North Saskatchewan River. She considers not only the river and the critters that live in it, the rocks and plants it touches, but also the remnants of dinosaur denizens now manifest as petro-fuel or fossils, as *kin*. She writes about the human parts of this web, "my multigenerational urban Métis family found ways to situate ourselves with care in relation to more-than-human beings in the heart of the prairie metropolis where we found ourselves."[7] Reading Todd reminds me again about the dense, multi-layered history of being with kin over the long term. And learning from the work of people like Colleen Cardinal[8]—who addresses the Sixties Scoop, in which Indigenous children were stolen from their families and adopted by settlers—I reflect on how the experience of displacement, discontinuity, and fragmentation has also come to be part of Indigenous experience; continuity of residence is not a condition of kinmaking under conditions of settler colonialism. Similarly, reflecting on what it would mean to include "petro progeny" as kin, understanding the conditions under which oil spills kill other beings, also kin, Todd concludes her piece with an invitation: "I hope that I can encourage settler Canadians to understand that tending to the reciprocal relationality we hold with fish and other more-than-human beings is integral to supporting the 'narrow conditions of existence' in this place."[9]

As Whyte writes, "Indigenous peoples are drawing on their own intellectual traditions in preparing for climate change. They are calling on settler nations like the US to finally live up to moral and just expectations for diplomacy and reciprocal responsibility by taking care of shared environments, including the climate system. But non-Indigenous leaders in the US and Canada will never be in the position to do right by Indigenous peoples until they acknowledge climate change as the unprecedentedly old ecological crisis that it is."[10] Not being able to tend to kin relations in the same way that Indigenous people do does not mean that settlers cannot tend to kin relations at all. On the contrary, if we care for the world, *tending to reciprocal relationality* is necessary work, perhaps especially for those of us structurally situated as settlers in relations of betrayal and broken promises. But if we are structurally situated as people defined by failures of relational reciprocity, what should we do?

Differential inheritance, differential responsibilities

Reckoning with reciprocal relationality includes understanding the histories that place us where we are, the relations that we inherit, as well as the webs of relations that benefit us in the present. As TallBear has argued, "White Americans make claims to Native American genetic ancestry and identity in ways that mirror the kinds of claims that whites have made to other forms of Native American patrimony—whether land, resources, remains, or cultural artifacts."[11] Making knowledge claims usually carries a material reason for knowing one thing rather than another, a reason that truth matters. As both TallBear and Circe Sturm have examined, white people's attempts to "race-shift" towards indigeneity carry a moral valence for them as well, in which it is somehow more virtuous to (attempt to) choose to be native than to acknowledge or affirm whiteness.

All of us inherit history; the life we enter into is a product of what has come before us. We inherit the life experiences of our ancestors as well as the material conditions in which those experiences unfolded. That inheritance sets the conditions for our individual lives. And all of us experience benefit or harm from the social relations currently constituting our lives. Differential inheritances mean that we do not enter the world with equal life chances; social relations of oppression mean that we receive harm (or help) simply because of how we are socially placed. We aren't personally responsible for the social relations and material conditions that came before us or that we enter in to, but we can become responsible for what we do in response to those conditions. Thinking again about whiteness, we can mark the ways that it functions in the histories we inherit to unjustly benefit people designated white. We can mark the ways that we who are white benefit from racism in the present, whether or not we want to.

As George Lipsitz says:

> Whiteness has a cash value: it accounts for advantages that come to individuals through profits made from housing secured in discriminatory markets, through the unequal educations allocated to children of different races, through insider networks that channel employment opportunities to the relatives and friends of those who have profited most from present and past racial discrimination, and especially through intergenerational transfers of inherited wealth that pass on the spoils of discrimination to succeeding generations.[12]

In this sense, whiteness accrues to white people in our inheritance of the past, as well as our benefit in the present. Some of this is due to racism—both overt and structural—oriented toward securing a future for whiteness; this is why David Lane's so-called "14 words" are so often evoked by white supremacists: "We must secure the existence of our people and a future for white children." This present commitment to the well-being of white people and to the eugenic project of white children marks something about white people's inheritance, our present, and the imagined future that whiteness secures for its children.

I see the task, then, as one of situating ourselves in relation to whiteness in ways that do not disavow or evade its past and present, while simultaneously working toward a future in which more beings than just white children have any kind of future at all.

I have been thinking a lot about Canadian colonialism and its entanglement with capitalism and border militarism, so let me illustrate what I mean using Canada as an example. As James Daschuk's book *Clearing the Plains: Disease, Politics of Starvation and the Loss of Aboriginal Life* illustrates, profit has been a major motor for the Canadian colonial project. The primary player in early capitalist colonialism was the Hudson's Bay Company, which for the majority of its life in the colonies was a fur-trading business (with later ventures into department stores in the nineteenth century, and oil and gas in the twentieth). But pathways for extracting fur for profit were also disease vectors, transmitting smallpox and tuberculosis westward and northward. And the fur trade also contributed to ecological devastation and famine, as buffalo herds were hunted to near extinction to produce the pemmican that would feed fur hunters and traders in the north.

The collapse of beavers in the west likely contributed to drought conditions, which contributed to the collapse of buffalo herds, which in turn undermined Indigenous subsistence capacities. Simultaneously, the government confined people to

reserves if they wanted to access the food and medicine promised to them in treaty agreements. The prime minister at the time, John A. Macdonald, commenting on the government's policy towards plains people, said in the House of Commons "We cannot allow them to die for want of food… [We] are doing all that we can, by refusing food until the Indians are on the verge of starvation, to reduce the expense."[13] In practice, this meant that representatives of the Canadian state kept food in storehouses on reserves while people went hungry, fed them rancid pork and flour, and kept rations at below-subsistence levels. Made vulnerable by starvation, people frequently succumbed to sicknesses.

None of this was done just to be mean. Macdonald and his henchmen starved the Indigenous people of the plains to make money for themselves (as investors in the companies supplying tainted food to reserves) and to open the plains for settlement by mostly European immigrants. My immigrant ancestors directly benefited from the starvation of plains Indians and preferential immigration policies aimed at bringing in Europeans; great-great grandmother Eliza Ritchie moved to Winnipeg to join her brothers and parents, who had moved there from Nova Scotia. My family biography is not extraordinary; it is a genealogy of settlers just trying to make a life, often fleeing starvation in their own homelands (it is likely that my great grandmother's family left Ireland because of the Great Famine of the 1840s). Ordinary settlers just trying to make a life lived their lives because of the immiseration and death of ordinary Indigenous people, because of the systematic and planned betrayal of treaty agreements and land theft, and for a few settlers to extract money from the people and places they invaded. I, and the many other descendants of ordinary settlers, inherit this history.

Canada remains a state engaged in an ongoing colonial project of attempting to dispossess Indigenous people of places, resources, and culture. It is a resource-extraction economy where wealth continues to be pipelined, primarily from the oil fields of the north and the west to the south and east. And Canada continues to ignore its treaty obligations with what frequently seems like the flattest contempt—despite promising a turn to "nation-to-nation" relations, our current prime minister has, for example, flouted agreements with, among many others, Treaty 8 First Nations in relation to the development of the Site C dam project, including the Prophet River and West Moberly First Nations. As I write, Canada is actively violating Wet'suwet'en sovereignty in pursuit of TransCanada's Coastal GasLink pipeline. The Canadian government continues to fight against paying for dental and medical care for First Nations children; it continues to fail to provide clean drinking water to more than 150 reserves; continues to fail to meet its obligations for Indigenous education. Canada just spent half a billion dollars celebrating its 150th anniversary. White nationalist Canadians buttress the government's colonial project with a growing anti-immigrant, anti-Islam, anti-Black popular project. Over the last year there has been an upswing in overt, militarized, white supremacist organizing across the Canadian context, from Soldiers of Odin patrols to Quebec's La Meute. I, and everyone else living on stolen native land, benefit from these social relations that distribute harm and death.

So we have differential inheritances, and the material effects of what we receive bequeath differential responsibilities. And while Indigenous people and Black people and people of color are related to white settlers, the inheritances and social relations that constitute those connections are different. Those relations have been and are systematically set up to refuse, harm, and kill people not rendered white and to break their relations with their ancestors, places, and people. The ethical and political imperative to claim bad kin also falls solely on the people—white settlers—who benefit from white supremacist actions, policies, and inheritances. As with all political imperatives, this is a hypothetical one. Whiteness is an inheritance we cannot disavow or divest from, only reckon with. The question, both for individuals and collectives, is how we will reckon with it.

Collecting our people and treason to whiteness

I have been returning to Mab Segrest's formulation of race treason, especially in her book *Memoir of a Race Traitor*. Reflecting on going to visit her sick father, who had been a key organizer in North Carolina for segregation and someone who figured for Segrest everything wrong with her family, she writes, "When had my 'racist daddy' contracted to himself—to one aging man—from the balloon into which I had inflated him: a caricature of everything in the culture that I hated, my archetypical white person, whom I could never convert because I could never accept, the him of me? No Black friend had ever asked me not to love my daddy."[14] The context for this quote is a sustained personal and political reflection on decades of organizing, Segrest's lifelong work to confront and transform whiteness and the harm it does. She discusses the historical creation of white identity in the seventeenth century, saying: "The implications are profound: If we white folks were constructed by history, we can, over time and as a people, unconstruct ourselves. The Klan knows this possibility and recognizes those whites who disavow this history as […] *race traitors* […]. How, then, to move masses of white people to become traitors to the concept of race?"[15]

Unless we're talking about people who are in the position to be literal traitors, such as whistleblowers who use their inside knowledge to disclose information, this evocation of race treason has always seemed primarily rhetorical to me. It is useful to understand the traitor as an individual in relation to a collective situation, in relation to a formation that they, at least in part, want to destroy. Individual treason is only possible because of how someone is placed in relation to a collective situation (like the state, or, perhaps, whiteness). But what race treason actually means needs to be more explicitly developed and worked through.

So I would like to close by exploring other possible roles, perhaps less metaphoric than a relationship of treason: friendship, comradeship, and direct opposition.

Aristotle saw friendship as a practice of virtue through which we develop excellence and share it with others. It is a kind of individual orientation only possible to manifest in the context of a relationship. Confronting the racist uncle, calling in, supporting people targeted by social relations of racism and colonialism—these can all be seen as part of the work of friendship. For Aristotle, friendship requires duration and commitment. The friendship of resisting racism could involve helping one another to become excellent, situationally, acknowledging the dense histories and presents that place us as needing to do some work on the world in order to practice virtue ourselves.

In practice this might look like what Ngọc Loan Trần calls "calling in,"[16] a departure from "calling out," where the project is to identify, often publically, what someone has done wrong. Calling in is a practice that can only happen when there is some basis of solidarity. Sometimes people of colour, Black people, and Indigenous people offer this kind of friendship to white settlers, through calling us out or calling us in on issues of race and colonization; these practices of friendship are incredibly generous, especially in light of how resistant, whitesplainey, angry, or defensive we white people get when people tell us we've done something racist. In arguing for taking the role of a friend who opposes racism, among other social relations of oppression, I look toward how calling one another in should be primarily a practice for white people and settlers to take up with one another. This kind of friendship can be a way of claiming kin with the parts of ourselves and our world that we want to designate as "bad" and reject, including actual people.

Such work is intimate, and it is likely there are not many people we can practice this kind of friendship with. But work on the world is always collective, and moving beyond our individual family and friend relations will be the only way we make any actual change to this world. I suggest that *comradeship* is a useable framework for thinking about how we might work against whiteness and for a world in which many worlds can flourish. Comradeship names collective formations organized around future-oriented solidarities or extant shared social conditions; it assumes that we all have a stake in the transformation at hand. It implies actively supporting existing struggle without abdicating responsibility for understanding which work to engage in, and why. Frequently the kind of work that people like Segrest describe involves taking the lead of people directly affected by social relations of harm, recognizing that the resources white people have to offer to resistance are not our own, even as we use them.

In practicing political friendship or comradeship, the question of race treason can be a usable heuristic in tuning our political goals. It can be a tool for asking oneself: In this specific situation in all its complexity, which side of the line am I going to stand on? Am I going to participate in something that consolidates or loosens whiteness's hold on the world? What might be the effects, strategic value, and dangers involved in claiming kin through practices of friendship or comradeship in rejecting whiteness while perceiving how it claims us?

In holding friendship and comradeship as relational practices we can take up, then, a conception of treason to whiteness can offer normative guidance. If we understand whiteness as the systematic denial of being in relation, in particular to Black and Indigenous people, we can ask what being in right relations, relations of reciprocity, could mean or look like. White treason is a way to claim kin. We can only be treasonous to something we claim, or that claims us. And so a final way to claim our bad kin is *direct opposition* to the white supremacism that benefits us. Direct opposition includes policy work, documenting systemic racism, legal defense, copwatching, and using our position as white settlers to redirect resources away from whiteness. It includes putting our bodies between torch-bearing white boys in MAGA hats and the people they target, shouting down Soldiers of Odin when they claim to be protecting a community, refusing to let known Proud Boys disrupt a book reading about the history of opposing fascism, showing up to the Unist'ot'en camp when asked to stand between land defenders and the RCMP. Direct opposition to white supremacy is safer for white people than anyone else, and it is also, crucially, claiming a relationship. People opposing immigration, Indigenous sovereignty, and Black self-determination do these things to defend what they think of as the white race. We white people who benefit from their work—all of us, whether or not we think we want to—can claim our relation to them through fighting them.

Sharpe offers us this injunction in "Lose Your Kin": "Refuse reconciliation to ongoing brutality. Refuse to feast on the corpse of others. Rend the fabric of the kinship narrative. Imagine otherwise. Remake the world. Some of us have never had any other choice."[17] I have tried to argue here that only through actively beginning from our understanding of our complicity in ongoing brutality can white settlers participate in the project of remaking the world. Any solidarity relation we can take up will have to start from our understanding of who is claiming us as kin, and from a commitment to pulling back on the ties that bind us to kinship relations of expropriation and violence. Perhaps we can make better kin out of what we inherit, and be of some benefit to this good world. Perhaps we can transform our relations. I hope so.[18]

1 Christina Sharpe, "Lose Your Kin," *The New Inquiry*, 16 November 2016, https://thenewinquiry.com/lose-your-kin.

2 Ibid.

3 Kyle Powys Whyte, "Climate Change: An Unprecedentedly Old Catastrophe," *The Society for the Diffusion of Useful Knowledge* 1 (June 2018), 8.

4 Vine Deloria Jr., *Custer Died for Your Sins* (New York: Macmillan, 1969), 78–101.

5 See Adele Clarke and Donna Haraway, *Making Kin Not Population: Reconceiving Generations* (Chicago: Prickly Paradigm Press, 2018).

6 Lenard Monkman, "No Ban on Stolen Land,' Say Indigenous Activists in U.S.," *CBC News*, 2 February 2017, https://www.cbc.ca/news/indigenous/indigenous-activists-immigration-ban-1.3960814.

7 Zoe Todd, "Fish, Kin and Hope: Tending to Water Violations in *amiskwaciwâskahikan* and Treaty Six Territory," *Afterall* 43, no. 1 (2017): 97.

8 See Colleen Cardinal, *Ohpikiihaakan-ohpihmeh (Raised somewhere else)* (Winnipeg: Roseway, 2018).

9 Todd, "Fish, Kin and Hope," 99.

10 Whyte, "Climate Change," 9.

11 Kim TallBear, *Native American DNA: Tribal Belonging and the False Promise of Genetic Science* (Minneapolis: University of Minnesota Press, 2013), 136.

12 George Lipsitz, *The Possessive Investment in Whiteness: How White People Profit from Identity Politics* (Philadelphia: Temple University Press, 2006), vii.

13 James W. Daschuk, *Clearing the Plains: Disease, Politics of Starvation and the Loss of Aboriginal Life* (Regina: University of Regina Press, 2013), 123.

14 Mab Segrest, *Memoir of a Race Traitor* (Cambridge: South End Press, 1994), 173.

15 Ibid., 195.

16 Ngọc Loan Trần, "Calling IN: A Less Disposable Way of Holding Each Other Accountable," https://www.humanityinaction.org/files/567-N.Trn-CallingIN.pdf.

17 Sharpe, "Lose Your Kin."

18 Conversations with my friend and comrade Angus McGuire (http://www.beclouded.net/) have helped this piece in every way, and I thank him for thinking about whiteness with me. All mistakes are mine.

Joseph Tisiga, *Cheapened by Scarcity*, 2017. Watercolour on paper. COURTESY THE ARTIST AND PARISIAN LAUNDRY.

Joseph Tisiga, *Self-care by Self Determined Design*, 2017. Watercolour on paper. COURTESY THE ARTIST AND PARISIAN LAUNDRY.

Joseph Tisiga, *Quiet and Undesired Space*, 2017. Watercolour on paper. COURTESY THE ARTIST AND PARISIAN LAUNDRY.

Joseph Tisiga, *Deceivingly Uncomplicated Task*, 2017. Watercolour on paper. COURTESY THE ARTIST AND PARISIAN LAUNDRY.

A Brief History of Feeling

Jacquelyn Ross

ECSTASY
500 billion years ago—the dark touches itself in the dark and experiences something like ecstasy. Except that ecstasy isn't a feeling yet—the sensation is just kind of sharp and warm. Afterwards, the dark feels happy and breathless. Afterwards, the dark feels lonely.

HUNGER
4.6 billion years ago—a depressive speck of dust eats everything in the refrigerator until it is planet-sized and still wanting more. It wants and wants and vibrates around the universe, eating up everything that it can, except for those few things that are not filling enough to be worthwhile—those empty shards, those hollow briefcases, those other moons and almost-moons and stars.

CURIOSITY
3.7 billion years ago—a bolt of lightning strikes a rock and cracks it clean open, like an axe into a durian, like a tender karate chop into a walnut. Inside, there is something stringy and green that needs to be pried from its shell in order to be properly examined. Luckily, this activity of trying to get at the thing inside makes for challenging and deeply satisfying work. Luckily, it goes on for eternity.

ATTRACTION
Two billion years ago—two organisms kiss, and need no oxygen, none at all.

JUBILATION
400 million years ago—what is jubilation but the possibility of loving everything and at the same time?

INEQUALITY
250 million years ago—a thousand baby ferns poke out of the dirt all at the same time and battle for access to sunlight and the right to grow. They are told they are all equal and exactly the same and that no one has an unfair advantage over the other, but it is obvious that some of them have extra long arms, while others have louder personalities, or more loving parents.

FORSAKENNESS
120 million years ago—the very first and most beautiful flower in the world lies wilting at one hundred thousand metres above sea level, having been plucked by an invisible force and thrown into the snow. The feeling: futility, and the first expression of waste.

PERSISTENCE
50 million years ago—a hundred earthworms work around the clock without pay to manufacture a popular tourist beach. They work collaboratively with the clams and the tide. They work optimistically with heavy stones. They work energetically even when the task seems too great. Because if the depressive speck can eat everything in the refrigerator, and the bolt of lightning can dissect whatever's stringy and green, then surely some earthworms can make it through a hillside, after which point they are promised a commission.

SPONTANEITY
14 million years ago—a barnacle kisses a donkey and takes her from behind.

GENEROSITY
4.59 million years ago—two organisms, still kissing, stumble in their reverie upon a stranger smoking out in the cold. The stranger wears a fleece coat and leans drunkenly into the wind; the stranger is the first stranger they've ever seen. They approach him with trepidation and small offerings of pine cones. They offer him coffee, even though their home is very small.

LOVE
3 million and one years ago—a woman holds her newborn in the dark, and feels enormous love for the thing she herself made, but cannot, at that moment, see.

RAGE
200,000 years ago—a man picks up a rock and throws it through the window of the world.

WONDER
10,000 years ago—the last ice is just about to melt, and a mother calls her daughter calls her uncle calls her cousin, and everyone gathers around a metal bowl. They fill it with warm water, and close their eyes. One of them sings into it; another does a little exorcism dance; another sends wreaths of daisies floating. Afterwards, they open their eyes to find the bowl gloriously empty. There is applause. They are sent off into their respective corners to contemplate the miracle, while the mother flushes the toilet.

ANGST
6,309 years ago—a boy refuses, like the donkey, to be made go. He's going through a period of intense individualization, the people say, in hushed voices, of the boy who no longer speaks and only looks forlornly across the sand. He's going through a period of necessary rebellion. The boy strokes the hair of the donkey, the only one who understands him, and questions the moon and the almost-moon and the stars. The people assemble a giant clock on the hillside, and wait for the cloud to pass.

REJECTION
5,000 years ago—the familiar dark rubs itself against the peak of a pyramid, edging towards that old friend, ecstasy. In the final seconds before orgasm, the dark pauses expertly to play out the pyramid's anticipation, but feels a painful rejection when the pyramid remains silent.

VANITY
2,500 years ago—a civilization pines over poetry and fine pottery, and this is the expression of the original lust. Need society always be so vain? We trample rainforests, dig up water from impossible places, collect rooms of gold. We trade old poems for shinier, more class-confirming ones. We trade perfectly good pots for other ones that illustrate a greater mastery of fire.

SKEPTICISM
2,000 and some years ago—I'm told the heavens crack open and an impossible grace runs all over the plate. It's messy and ideological, gets all over stuff. It makes the masses both more tender and more violent. It attempts to qualify the end.

MELODRAMA
1,200 years ago—a princess in a castle, surrounded by servants and rooms, agrees to throw a party to meet her eligible bachelors. A great many invitations, all printed in gold ink, are sent out across the land; troubadours are booked; cornucopias stuffed with figs and ham. When the day finally arrives, however, the princess is in a mood. She refuses to bathe. She orders platters of grapes to her room. She glares with vengeance at the sea—and this mood is a thing she cannot, or else, refuses to, explain.

SENSELESSNESS
800 years ago—the newborn, once so loved by its mother, is now a man. One day the loved man is conscripted to go to war, and the whole way there he thinks, What a senseless thing, how horrific, that I should go and take another man's head, and that if I don't, that that man'll have mine! He goes, but keeps his eyes closed the entire time. He takes blind jabs at enemies, holding the sword in his left hand. He walks backwards towards the firing line. He refuses to partake in a violence that is anything less than random, because randomness is the only thing keeping him from cruelty.

IGNORANCE
470 years ago—the stranger is outside the house again, this time cursing wildly about the coming end. We do not invite him in. Instead, we call him a heretic, a lunatic, a fruitcake. We close the blinds. We turn on the TV. He makes a grand mess of the lawn with his pacing, all his mindless chatter about worlds and spheres.

ALIENATION
250 years ago—a great sadness presses itself against the belly of the city. It burps black smoke and sneezes fog that makes it difficult to see your neighbours. The woman goes to work before sunrise, and returns at three; her husband goes to work at three, and returns just after sunrise. Rabid dogs all over the street, mixed in with the good ones. The bread there goes stale within the hour.

LIBERATION
50 years ago—the good people assemble, en masse, by the pond. They raise words on sticks and stomp their feet. They call out those in high towers of power. Everybody makes love and defends their right to make it. A man kisses a man and takes him from behind.

HUMILIATION
35 years ago—in a bathroom stall, the sudden impossibility of owning anything, music so loud you no longer recognize your body, no longer know the right way to be aroused. Years and minutes spent in the stench of perspiration, in the violation that moves glitter around on your cheeks, glitter whose only purpose is to render sadly illuminated, those tough balls of want, your psychic disintegration—touch, like a burrowing tapeworm; toilet, like an open clam.

ANXIETY
17 years ago—we hold hands on the porch at midnight and make a wish for the new millennium, for money, health, family, success, vacations, mindfulness, luck, sex, affection, grace, tenderness, compatibility, ambition, time, beauty, gratitude, memory, fallibility, courage, faith, clarity, good fortune, mobility, strength, confidence, motivation, humility, respect, creativity, inspiration, grounding, and speed, oh speed because we may not even live tomorrow and we are running out of time.

CONFUSION
10 years ago—I walk into the room and feel at once too young and too old. I take a seat at the bar and grunt like an old man, swing my legs from the stool like a young one. Someone behind me calls me Baby, and I think, either I really am somebody's infant again or else I must be somebody's prostitute, an old dog available to anyone looking for company. I'm so jaded I don't know anymore which one I am, or which version of myself I prefer to be.

OPTIMISM
A year ago—imagine, the angle of the light, just right. You have enough money. Your heart is bursting. You throw all your old work into the dumpster and start anew beside a bowl of ripe mango, because suddenly you have too many good ideas. You run into the yard and mow the lawn. You mow your neighbour's lawn, too, because you are kind. You write letters to your friends proposing epic adventures. You pick all the clothes up off the floor.

PESSIMISM
Last week—we're told we've narrowly avoided death. Being blown up on the subway. Or drowning in the Mediterranean Sea. We have no rights. We are not safe. We have no bodies, and no intellectual or emotional future. We collect empty cans from the ditch on the side of the road. We are con artists and poultry workers and gamblers and undertakers. Truth is a word we've heard used, but don't use. Scarcity is a word we use.

REGRET
Yesterday—I watch as a long-legged spider wobbles into a styrofoam cup, and stays there a while, before wobbling away. I crush it with a magazine on its way to the window, and scrape its thin body off into the trash can.

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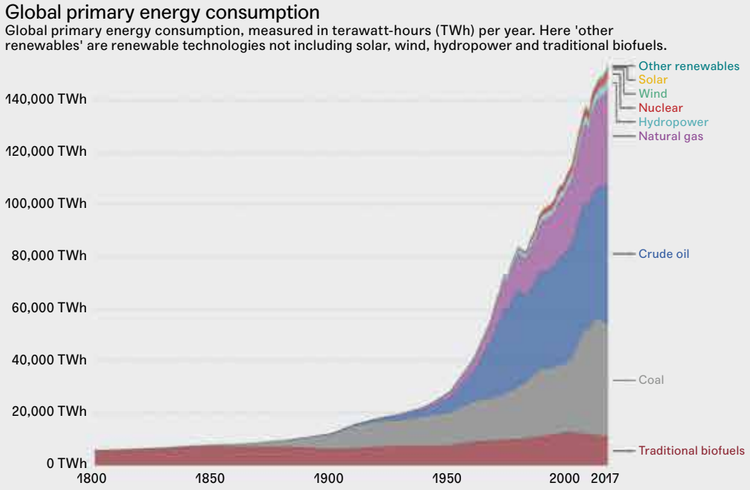
Energy-Bearing Media

Jeff Diamanti

The typical story of long-term growth posits the steam engine as the predecessor to the microprocessor, and the information economy as a stage of development towards which industrial economies tend. Why then does it look like our energy problems will last well into this century? According to recent estimates from the International Energy Agency, the world will need upwards of 30 percent more energy in 2030 than in 2017 in order to maintain positive, global growth.[1] Compare this to the surge in energy from fossil fuels that underwrites the story of twentieth-century modernization. Already in heavy use in the first half of the century, by 1950 oil would become the dominant source—both qualitatively and quantitatively—of advanced industrial development, but would somewhat paradoxically generate the conditions for a parallel dependence on coal and natural gas to keep up with the electrical needs of an oil-based economy. The cultural and economic sequence named as the "postindustrial" is thus underwritten by a proliferation, rather than retreat from, fossil fuels. My argument here is that this increase in energy-bearing media renders the practical and tangible force of fossil fuels both ready to hand and out of sight, even as the cultural imaginary of cloud computing turns information and communications technologies into a kind of *dispositif* of environmental futurity. As well, this dependence on fossil fuels is a paradox because it exposes the material entanglement of deindustrialization with territories of extraction and the historicity of hydrocarbons, in turn focalizing what Jonathan Sterne calls the *techné* of communication into a mode of feeling out (and therefore repurposing) energy-bearing media.[2]

Let me put this another way: In Robert Ayres groundbreaking 2013 analysis, energy explains one of the most difficult puzzles associated with economic growth after 1945. Upwards of twelve percent of growth in the twentieth century remains unexplained so long as energy is considered an independent variable in economic growth. Neutral on the category of energy, the math simply won't add up. Which is another way of saying that the macroeconomic metrics of capital deepening (the increasing investment that typifies every sector of the economy over time to maintain growth) and labour productivity do not account for the economy's dependence on steadily drawing more and more power from natural sources—which we might term energy deepening. When Ayres internalized energy in their measures of growth, continuous global growth became fully



"Global primary energy consumption" as plotted by Our World in Data based on data from Vaclav Smil, *Energy Transitions: Global and National Perspectives* (2017) and BP Statistical Review of World Energy (2017).

explained, despite falling labour inputs (due mainly to automation) at the macroeconomic scale.[3]

But adding energy back into the quantitative map of economic growth does more than solve a math problem. It also suggests a qualitative structure to the energetic character of capitalism's path dependency following the introduction of fossil fuels into the production process. The real insight offered by Ayres's demonstration was that continuing economic growth under conditions of capitalism depend upon a logic of productivity first introduced to the world during the industrial revolution—that, in short, this introduction of fossil fuels into the dialectic of labour and capital bound future rates to a similar structure. It was hard for most economists to think energy back into the picture because it was all too often figured as a material input (a cost that would appear under the heading "capital") rather than a force structuring growth more generally.

To the extent that this path dependency, or what Harvard economist Dale Jorgenson calls "the role of energy in productivity growth," is about overcoming limits to profitability by expanding and intensifying the flow of energy across all sectors of the economy, we can also point to the recursive relay between natural, social, and economic environments: the settings, in other words, through which energy inter-implicates different environments.[4] The relay will be an evolving range of technologies and techniques that call attention to energy—media that render energy from coal, oil, and natural gas into work, information, and environment.

Hence, Ayres and Jorgenson see in twentieth-century fossil fuels the shape of a solution to a problem of econometric representation, which in turn helps them put energy at the heart of economic growth. Certainly this moves past the conventional understanding of fossil fuels as mere input into a system otherwise conceived as independent from them. Implicit in the concept of energy deepening, though, are two contradictions: one, that fossil fuels, among other things, help capital shed labour—I'll explain in a moment why increased computational capacity extends this problem; and two, that more energy will often appear like a solution to the contradictions caused by energy deepening. Unlike other energy transitions in human history, the system built around fossil fuels generates a loop where, to use the phrasing from historians M. Jean-Claude Debeir, Jean-Paul Deléage, and Daniel Hémery, "the solution to its energy problems" is sought "almost exclusively in deepening the logic of producing energy from these fuels."[5] The energy system built around the twentieth-century intensification of fossil fuel extraction, in other words, engenders an epistemological impasse where solutions to social contradictions of a world saturated in oil are sought in the technological increase of the energy available from fossil fuels.

Examples of ways around this impasse include the tendency towards building larger cities and enhancing the infrastructure that connects them to combat slow economic growth; the search for fuel reserves that bring the "energy return on energy investment" (EROEI) closer and closer to parity; using a carbon tax to finance (or purchase) a transnational pipeline; greening the business environment by moving the corporate office onto the cloud; and becoming more and more agriculturally dependent on petrochemical fertilizers, the efficiency of which makes any switch to organic fertilizers demographically homicidal. Once pegged to a certain set of soft and hard infrastructures of growth, fossil fuels generate something of a feedback loop that complicates (if not precludes) any future energy transition.

Implicit too in both Ayres and Jorgenson's attempts to refigure energy as a structuring force of economic growth (as opposed to a mere internal variable to be counted on the balance sheet of capital) is that energy surges through all manner of technologies, social relations, and historical tendencies in ways that are difficult to quantify. It is this expanded force of energy over the shape and tendencies of the present that requires a media theory of energy, since fossil fuels do not hover in some ethereal void above history—though their emissions certainly have a way of hovering—but are rather distributed into the world through concrete technologies, practices, and habits. Both as an *environment* of media, and a mediation of the biophysical environment, what fossil-fueled path dependency amidst deindustrialization requires is an account then of "energy-bearing media."

Implicit in this schematization of fossil fuels is the idea that the environment of media, to use Marshall McLuhan's phrasing, is a measure of that medium's recursive relationship to the energy system that makes it go. Yet to the extent that it's in the capacity of energy to organize an environment that we'll see its impact on cultural history, it's also true that we'll hardly ever see it at the level of content. When we do—say in an encounter with an oil rig or a coal shaft—we are not necessarily in on some secret about how energy works across media. This is why thinking energy-bearing media means rethinking the *setting* of different media in relation to the material and social history of energy deepening. McLuhan's axiom is that "each new age creates an environment whose content is the preceding age," and that while you can see content (belatedly), you cannot see environment. With energy-bearing media, the axis begins to look reversed: the setting generated by fossil fuels contains a history in more ways than one—millennia of compact matter, centuries of colonial violence, and decades of technological development—but its orientation is towards the future as growth and development, as well as global warming. Indeed, energy does funny things to media.

On the other end of the postindustrial sequence that begins in the 1960s, the media system we call the (data storage) cloud, and the world of information and communication technologies (ICTs) that rely on it, form the infrastructure of global culture and commerce. In the recent turn to materiality in media, communications, and environmental studies, researchers and activists have found new ways to see the connections between electronic clouds and climate change. The connection here between the infrastructure of cloud-based computing and deindustrialized labour is the energy content modulating both. For instance, according to the U.S. Department of Commerce, per-worker consumption of electricity increased 232 percent between 1950 and 1984.[6] Per worker, the postindustrial is far more energy intensive than the industrial, not just because it relies on a global logistics and supply chain that has been overwhelmingly dependent on cheap fossil fuels, but because the very environment of postindustrial production and consumption is lit up like a Clark Griswald Christmas display. Cloud-based computing is enormously resource-intensive, from the ground up through assembly, distribution, maintenance, and operation, yet amidst the computational sublime of the cloud is the global division of labour as such: from the hyperexploitation of miners and service workers in extractive industries to the hyperattention required of postindustrial work. Every four years the cloud's energy requirements double, and with it the lion's share of postindustrial profit: In Q4 2015, Amazon Web Services generated 7.88 billion USD in revenue, up 69 percent from the same quarter the year before, and its hardware is only one collection in a rapidly expanding sea of data-storage providers, such as EMC (now Dell), IBM, Microsoft Azure, and quickly rising Google.[7]

Today the ubiquity of media—which as we just saw was a result of, as well as the condition for, the ubiquity of an industrialized energy system—is starting to refigure the forms and flows of labour that keep profit rates competitive. One can plot, in other words, a loop of labour up through what Benjamin Bratton calls "The Stack": the layered reality of hard and soft infrastructures that connects earth, cloud, city, address, interface, and user.[8] Figured vertically or horizontally—from subsoil up to the atmospheric waves, or from the gentrified core of the new economy across to the special economic zones of the global economy—the layers that make up the stack pull together the social and environmental contradictions of energy-bearing media. Industrial work generated one set of experiences in relation to the machine and the factory, and these persist of course at certain levels of the stack. Meanwhile, postindustrial work means something fundamentally different. But what precisely does this new environment of cloud-based commerce mean for the experience of work? Using Thomas Whalen's 2000 term "cognisphere" to describe this new work environment, N. Katherine Hayles emphasizes that "human awareness comprises the tip of a huge pyramid of data flows, most of which occur between machines."[9] This parceling out of human input into a flow of information and energy that, at scale, operates independently of any one user or group of users in many ways literalizes the theory of a decentered subject foretold by leading postmodernist theorists, such as Gilles Deleuze, Felix Guattari, and Judith Butler. As a feature of cloud-based computation and commerce, however, the experience of decentered subjectivity is entirely bound up with the global infrastructure of fossil fuels—in other words, if I may be so bold, experience of the cloud is as close to an experience of our global energy system as filling up your car with a tank of gas.

Why then is it so hard to see fossil fuels in our daily habits and habitats, and to see labour in the computational processes and energy intensity of postindustrial society? The ubiquity of polymers in consumer products and electronic components is one side of the more general shape-giving quality of oil, which extends invisibly across the habits and attachments of modern petrocultures. Oil's plasticity is thus both the quality that sets it free to reign over the material world—to get lodged in it and to change its landscape indelibly—and the one that alters the world of social relations by shaping and accelerating a kind of materiality appropriate to global citizenship. This uniquely historical quality of energy is impossible to grasp without a long view of energy-bearing media that locates energy flows between media and environment.

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2 Jonathan Sterne, "Communication as Techné," in *Communication as… Perspectives on Theory*, eds. Gregory J. Shepherd, Jeffrey St. John, and Ted Striphas (London: Sage Publications, 2006), 93.

3 Robert Ayres et al., "The Underestimated Contribution of Energy to Economic Growth," *Structural Change and Economic Dynamics* 27 (2013): https://doi.org/10.1016/j.strueco.2013.07.004.

4 "The data support the hypothesis that electrification and productivity growth are interrelated. Somewhat surprisingly, the data also show that the utilization of nonelectrical energy and productivity growth are even more strongly interrelated." Dale Jorgenson, "The Role of Energy in Productivity Growth, "*The American Economic Review* 74, no. 2 (May 1984): 29.

5 M. Jean-Claude Debeir, Jean-Paul Deléage, and Daniel Hémery, *In the Servitude of Power* (London: ZED Books, 1991), 12–13.

6 Bernard C. Beaudreau, *Making Markets and Making Money* (London: iUniverse, 2004), 100.

7 Louis Columbus, "Roundup Of Cloud Computing Forecasts And Market Estimates, 2016," *Forbes*, 13 March 2016, http://www.forbes.com/sites/louiscolumbus/2016/03/13/roundup-of-cloud-computing-forecasts-and-market-estimates-2016/#3cc4e5c74b07.

8 Benjamin Bratton, *The Stack: On Software and Sovereignty* (Cambridge: MIT Press, 2016).

9 N. Katherine Hayles, "Unfinished Work: From Cyborg to Cognisphere," *Theory Culture Society* 23, no. 7–8 (2006): 161.

Following spread: Malala Andrialavidrazana, *Figures 1928, Airline routes and distances*, 2018. UltraChrome pigment print on Hahnemühle Cotton Rag.
COURTESY THE ARTIST.


North Pole
South Pole
ROCKET

What is Growth?

D.T. Cochrane

"Global economic growth 'now in free fall'."[1]

The phrase quoted in this somewhat paradoxical *Globe & Mail* headline comes from a Merrill-Lynch strategist. The dire claim, however, is not one of economic contraction, but of *slowing* growth. Within dominant economic discourse, it is dogma that growth is good, and that slowing growth is bad. The influence of economists on governments is most evident when politicians espouse growth as a goal. However, from our vantage within the anthropogenic climate and ecological crisis, the idea of growth as desirable must be challenged.

From one perspective, growth is the mere quantification of the idea of progress, and to understand this we must consider both the statistical expression of "The Economy" and the material transformations accompanying the numbers. Timothy Mitchell argues that The Economy, as an affective object, first emerged in the 1930s.[2] He notes that it was cobbled together from practical and theoretical entities with longer histories—including the idea of growth.

Economic growth is now a synonym for improvement, and it has become inherently normative. But improvement is always a subjectively assessed outcome: Is a new state preferable to the prior state? Growth means bigger or more, which can be assessed objectively: Is the child heavier this month than last month? Did this field produce more rice this year than last year? Are the workers manufacturing more widgets per week this month than last month?

One of the most substantial moments in the construction of The Economy was the invention of national accounting, the first manifestation of which was the calculation of the United States' national income. The concept of national income is primarily credited to Simon Kuznets, who issued a report to Congress in 1934 on the U.S. national income for 1929–32.[3] Year-to-year changes in national income allowed him to express the widespread suffering we now know as the Great Depression. National accounting measures are now widely deployed to assess rates of economic growth.

Epistemic breaks are rarely—if ever—clean, crisp demarcations. Instead, we can trace parts and varieties of what become dominant institutions, ideas, or practices. For decades, before Kuznets developed national accounting, when economists mentioned growth, they primarily meant increases in industrial productivity due to changes in systems of production; this meaning was one of the threads woven into The Economy.

Change in gross domestic product (GDP) is the dominant method for measuring growth. In a prior column, I noted the construction of *real* GDP, which is designed to measure The Economy, whereas *nominal* GDP is the relatively straightforward addition of value added, denominated by the national currency. However, this is subject to changes in prices, which, according to economists, can occlude actual changes in economic activity. Real GDP is thus intended to remove the effects of price changes, part of a longstanding effort by economists to theoretically and analytically separate money from those social processes deemed "economic." And for the economists, statisticians, bureaucrats, politicians, and pundits who deploy real GDP figures, they are shorthand for general well-being.

Real GDP is now calculated for every country on Earth, which makes possible the calculation of a World GDP. Not content to identify growth since the invention of national accounting, figures have been calculated going back to 1 CE, and earlier.[4] Such calculations solidify the conjoined ideas of The Economy as a timeless object and growth as a timeless process. They also tell a tale of long-term economic stagnation until the late 1700s; since then, apart from relatively short—though painful—periods of decline or stagnation, economies have grown dramatically.

The late-1700s take-off points to the material and energetic actualities of the growth expressed by retroactively calculated GDP. The image of growth expresses the mass intensification of burning fossil fuels, which also created the atmospheric conditions for our current climate crisis. Humans have continuously developed technologies that made available more and more energy for our use—fire, domesticated animals, waterwheels, windmills, etc.—and each increase in the energy available contributed to population increases and cascades of socio-material transformation. Between 100 BCE and 1800 CE, per capita energy capture increased by an estimated 23 percent. Then over the next 200 years, the per capita energy capture of wealthy Western countries increased over 500 percent.[5]

The Earth, as a material object, is fixed. All economic activity involves some degree of remixing and reordering of that fixed material. As humans harnessed more and more energy, we were able to mobilize and transform the Earth's materials in new ways at an astounding pace. Consider the invention of the Haber-Bosch process, which takes nitrogen from the atmosphere to produce ammonia, drastically increasing the artificial fertilizer available for growing crops, thus increasing yields; food costs subsequently fell and populations increased.[6] In effect, humans harnessed energy that allowed us to turn atmospheric nitrogen into more humans.

However, the most profound and consequential transformation of materials has been the extraction and combustion of fossil fuels—the key to all other transformations, as it made available the energy required to perform them. Fossil fuels powered over two centuries of growth, producing more commodities and circulating them to ever more people. By accounting for the production and distribution of these commodities, we could tally up the value being generated as purely positive. However, we now know that the emissions produced from burning fossil fuels were generating other, atmospheric transformations that were not being measured and accounted for.[7] In economic parlance, they were externalized.

As noted above, the construction of "real" measures is intended to remove the effects of price changes as part of an effort to separate money out from The Economy. However, it is money and prices that connect the statistical expression of The Economy and the accompanying material transformation. Transformations are assessed by the money they attract.

Money flows toward externalizing transformations, and accountings of the monetary flows are aggregated into GDP. Growth expresses a preference for the new state over the previous one, but participation in the assessment process is not evenly distributed.[8] As such, growth disproportionately expresses the preferences of the wealthy, who depend on widespread ignorance of unaccounted costs both unintentional and willful. The existential threat of the climate crisis, as well as other environmental disasters unfolding both slowly and rapidly, thus call into question all past growth. At whose expense did our economies grow?

Part three of a serial column on the fundamental concepts of commerce and exchange as driving forces that propel climate change.

Issue 01: What is the Economy?
Issue 02: What is the Market?
Issue 03: What is Growth?
Issue 04: What is Innovation?
Issue 05: What is a Price?
Issue 06: What is Value?

1 Scott Barlow, "Global Economic Growth 'Now in Free Fall'," *The Globe and Mail*, 3 January 2019.

2 Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley, CA: University of California Press, 2002).

3 Simon Kuznets. "National Income, 1929-32," National Bureau of Economic Research, 1934, https://www.nber.org/chapters/c2258.pdf.

4 "Maddison Project Database 2018," https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-project-database-2018. Bradford J. Delong has gone even further, constructing real GDP figures for the entire world back to 1,000,000 BCE (https://delong.typepad.com/print/20061012_LRWGDP.pdf).

5 See Ian Morris, *The Measure of Civilization: How Social Development Decides the Fate of Nations* (Princeton, NJ: Princeton University Press, 2013).

6 See Vaclav Smil, *Enriching the Earth: Fritz Haber, Carl Bosch, and the Transformation of World Food Production* (Cambridge, MA: MIT, 2001).

7 Unfortunately, for reasons of space, I've had to exclude the processes of colonialism, which were also complicit in the growth of Western economies. For more on the entangled relationship of environmental destruction and colonialism, see Heather Davis and Zoe Todd, "Decolonizing the Anthropocene" in the *Grafting* issue of this broadsheet.

8 Jonathan Nitzan and Shimshon Bichler, *Capital as Power: A Study of Order and Creorder* (London: Routledge, 2009), http://bnarchives.yorku.ca/259.

This, Too, Will Contaminate

Joy Xiang

In the early 2000s, after years of raising concerns, residents and other stakeholders in and surrounding Mississauga's Clarkson neighbourhood succeeded in drawing provincial attention to the area's poor air quality. Clarkson's industrial zone, with several large and looming factories adjacent to residential housing and public parks, remained the most visible polluter in the eyes of locals, despite companies' attempts to soften and conceal their toxic impressions through tall fences and strategic landscaping. After 22 months of air pollution monitoring, the Clarkson Airshed Study report was published in 2007. While the visibility of heavy industry structured the community's assumptions about toxicity, the report demonstrated that in fact vehicle emissions from the nearby QEW highway and truck transport accounted for the majority of particulate pollution.[1] Industries should certainly be held accountable for their environmental transgressions, but sometimes (as in this case) the most obvious cues of pollution may be faulty if not considered within wider patterns, similar to how the visible and invisible stakes of climate change cannot fully be signified with any single image, like a smokestack, tailings pond, or emaciated polar bear. Industry forms part of a dominant human-made and -enforced system where populations depend on materials like cement and refined oil for the necessities of living and working. If the factory is not here, then where?

Personal and public anxiety about the contamination of the commons (shared natural resources like air, soil, and water) must not be limited to hyper-localized, "not in my backyard" sentiments that reflect a fear of the permeable border of the body and its vulnerability. What would it mean to consider being polluted as a kind of empathy or collusion *with* others and the environment, necessarily in mutiny against the global forces of capital that instead push us to compete for the prize of being the least toxified?[2] What does it look like to actively conspire as the polluted, treating pollution as a commons and not a punishment, against that which solidifies environmental inequalities? The marginalized and under-classed within and between nations disproportionately experience the toxic byproducts of development and resource extraction, beyond lived and witnessed knowledge; as the landmark 2017 Lancet Commission reported, 92 percent of pollution-related deaths occurred in low-income and rapidly industrializing countries.[3] The transmutation of nature from raw materials into goods considered useful for humans also produces harmful substances at a rate faster than they can be consumed by existing natural systems—this pollution, a displacement of responsibility, takes without giving back the same potential for life.

There is no "ideal" level of pollution (although economic cost-benefit analyses have been made).[4] All pollution is toxic, and the "ideal" amount really means: what can we afford to lose? Who and what will be sacrificed (first) in the name of global development and infinite growth? Who is not worth attending to, and whose bodies are we not considering when we worry about local levels of pollution? The current system indicates that pollution is an acceptable cost for *someone* (although not necessarily us) to bear. Mass contamination (chemical, synthetic, plastic) cannot be fed back into the cycles of production—waste must be displaced.

The term "metabolic rift" describes the fracture of cyclical ecosystems that "govern the interchange of materials" in living beings and nature as a whole. While metabolism allows for a system's regeneration and continuance, its rift is characterized by unequal exchanges of pollution and profit brought on by the global economy, and the alienation of human beings from nature.[5] Historically, the pollution of a place has rendered possible the economic growth of another. In a particularly blunt example, the large-scale nineteenth-century guano trade saw the British Empire pilfering nutrients and rich soils from Peru and Chile; this created the fertile land and produce on which an empire was quite literally built. This "nutrient flow" was a one-way relationship, leaving the original lands subject to degradation and resource wars.[6] Would the Empire have been as powerful if Britain's soil fertility had remained poor, depleted, and unable to nurture life? While abundance accumulates, contamination is outsourced (see Koko, Nigeria, where Italian companies paid residents $100 a month to unknowingly store 18,000 drums of hazardous waste).[7] In Ontario, landowners can be paid to receive and store part of the 25 million cubic metres of possibly polluted "excess soil" produced annually from development projects (a figure that has been on the rise since 2017).[8] Meanwhile, three hours away from Mississauga, Sarnia's Chemical Valley, with over 60 oil refineries and factories, houses 40 percent of Canada's petrochemical industry and has the most polluted air in the country. It is bordered by Aamjiwnaang First Nation, a community that has been actively documenting and resisting the significant public health impacts of the Chemical Valley.[9] Meanwhile, the pushing through of more pipelines is an attack on Indigenous sovereignty and health—all for the sake of meeting consumer and industrial oil demand.

…and a tiny, solid particle of fugitive dust escapes a material pile in Clarkson's industrial area and sneaks into the luscious ecosystems of bodies at Lakeside Park…

Being and feeling contaminated implicates every body as a porous node in an overall earthly metabolism. Contamination provokes us to situate ourselves in material exchange and relation with the environment, other people's bodies, and any organism that breathes or absorbs—in the act, expelling what was inner into outer, trading recognition of a mutual influence. We do not bear pollution's effects equally. The material interconnection that lived (and feared) experiences of toxicity make visible could profoundly shift understandings of risk, responsibility, local environmental ethics and lobbying—as well as *the source* of climate change, and its potential alleviation of its negative effects. Such allegiances must benefit all forms of life, and conspire against the forces that be and systemic imbalances that consider certain acts of toxic colonialism acceptable because they are profitable.

The body is already, always open. But are you polluted enough?

Part three of a serial column by a member of *The Society for the Diffusion of Useful Knowledge* team on the physical and material traces of climate change and environmental violence in the region.

1 Region of Peel Official Plan Review, "Air Quality," 2008, https://www.peelregion.ca/planning/officialplan/pdfs/air-quality-discussion.pdf.

2 Poverty is an established risk factor in environmental inequity and poor health (or, lack of the means to mitigate the worst effects of pollution). The relationship between toxification, capital, and colonialism is explored extensively by Florence Margai in *Environmental Health Hazards and Social Justice: Geographical Perspectives on Race and Class Disparities* (London: Routledge, 2013).

3 Damian Carrington, "Global Pollution Kills 9m a Year and Threatens 'Survival of Human Societies'," *The Guardian*, 20 October 2017, https://www.theguardian.com/environment/2017/oct/19/global-pollution-kills-millions-threatens-survival-human-societies.

4 "Maximizing the Net Benefits of Pollution," University of Minnesota Open Library, https://open.lib.umn.edu/principleseconomics/chapter/18-1-maximizing-the-net-benefits-of-pollution.

5 "Metabolic rift" is Karl Marx's conception of ecological crises under capitalism. "Spurred on by competition and constant growth, capitalism is not capable of self-sufficiency" like metabolic processes in nature. See Brett Clark and John Bellamy Foster, "Ecological Imperialism and the Global Metabolic Rift: Unequal Exchange and the Guano/Nitrates Trade," *International Journal of Comparative Sociology* 50, no. 3–4 (2009): 313–314.

6 Ibid.

7 "In the 1980s, Italy paid a Nigerian town $100 a month to store toxic waste–and it's happening again." Stephanie Buck, Timeline, 26 May 2017, https://timeline.com/koko-nigeria-italy-toxic-waste-159a6487b5aa.

8 Canadian Urban Institute, "2018 Ontario Excess Soil Symposium," https://www.canurb.org/2018-ontario-excess-soil-symposium.

9 Patrick McGuire, "The Chemical Valley," *VICE News Canada*, 8 August 2013, https://www.vice.com/en_ca/article/wd4exq/the-chemical-valley-part-2.

The Need for Urban Climate Justice

Sara Hughes

As many nations have failed to develop meaningful climate change policies, cities have become leaders on climate change, in a variety of ways and for a variety of reasons. Preventing the worst effects of climate change requires dramatic reductions in greenhouse gas (GHG) emissions, and in most cases, national governments have been quite slow and unambitious in their response to this fact. Nonetheless, hundreds of cities around the world have made pledges to reduce their own GHG emissions by 30, 50, or even 100 percent over the next few decades. For example, the City of Toronto has committed to reducing its GHG emissions by 80 percent before 2050.[1] Cities are also proactively responding to the effects of climate change, developing new strategies for resilience and adaptation. In many ways, climate change policy has shifted from the global to the local.

An important but often overlooked feature of this shift is that developing a local or urban-led response to climate change does not erase politics. Rather, urban leaders and climate change advocates must navigate a complex political terrain in their efforts to decarbonize cities and implement adaptive and resilient solutions. Climate change is also a new issue for cities to engage with, and there are often steep learning curves for practitioners and decision makers. New capacities, funding sources, and organizational relationships are often required for effective climate change policy at the local level.

Many cities that have been leaders on climate change—including Toronto—have made some initial progress on their goals. For example, Toronto has seen its GHG emissions fall by around 16 percent compared to 1990 levels.[2] This is the product of a province-wide shift away from coal, but also city-level projects to capture methane at landfills and improve energy efficiency. The city has developed some truly innovative approaches to reducing GHG emissions, including a program for developing marketable carbon credits and new financing tools for energy efficiency retrofits in buildings.[3] Nonetheless, like many North American cities, Toronto now faces the challenge of meeting steeper GHG emissions reduction targets in a context where the low-hanging fruit has been picked. Decision makers and advocates are grappling with the complexity and political challenges of deep GHG reductions that will begin to require more of government, the private sector, and residents.

Cities need to bear down on their climate change goals if they are to realize the potential for change that has been ascribed to them by the global community. It is in proceeding forcefully toward deep GHG reductions that cities will confront and manage the new social and political realities of their climate change work. Reducing a city's GHG emissions by 10, 15 or 25 percent can be done without major disruptions. Changes to the existing grid, subsidizing energy retrofits, and building some methane capture plants or solar installations can often do the trick. Going deeper requires more significant social, economic, and political restructuring. It will mean changing the way people move around the city, and where they move to; it will mean changing the way people build and use buildings, or perhaps where buildings are located in the first place; it will mean changing where energy comes from, and perhaps even who owns and has access to that energy.

It is through these new and deeper engagements with climate change that questions of justice and equity should come to the fore in our cities. Around the world, cities are becoming much more unequal places, with highly segregated neighbourhoods and highly differentiated access to urban amenities and services. As cities consider major reconfigurations of their economies and infrastructure in pursuit of their climate change goals, the process and outcomes should include and benefit poor, marginalized, and equity-seeking groups. Such an approach can be called "urban climate justice."

There are at least three reasons why urban climate justice is important and urgent. First, there are *normative* reasons for including and benefiting poor and marginalized communities in urban climate responses. This means it is simply the right thing to do, and reflects ideas of fairness: it is not fair that certain members of society should be disadvantaged or disproportionately affected by climate change; conversely, it seems fair that those who have contributed the least to climate change (typically the poor) should not bear as much of the cost of responding to it; it is also fair that all members of society, not just those with access to power, contribute to a vision of what future, climate-friendly cities should be.

Second, there are *substantive* reasons for involving all members of society, all types of people and organizations, in the process of generating climate change solutions for cities. Research has shown that deliberately seeking out diverse perspectives, and engaging the people whose lives are affected by policy choices, produces better decisions. Decision makers are more likely to develop a renewable-energy plan, or energy-efficiency programs, that reflect the needs and capacities of their communities if those voices are included in the decision making process.

Finally, there are *instrumental* reasons for building and maintaining a broad coalition of residents and advocates that support climate change responses. Many cities are beginning to find that linking their climate change goals to broader challenges related to housing, health, and poverty is making it easier for them to get financial support from city council and build electoral support among voters. For many urban residents, climate change is one concern among many. Issues that seem more immediate, like their health or affordable housing, can eclipse or override support for diverting valuable city dollars to climate change initiatives. Developing programs that are cross-sectoral is challenging from an organizational perspective, but may have political benefits.

Cities are positioned to remain leaders on climate change in the US and Canada, and are facing new challenges as they turn their attention to deep reductions in GHG emissions. Bearing down on these challenges requires centering urban climate justice—it is the fair and "right" thing to do, it leads to better policy outcomes, and it may improve the political feasibility of ambitious climate action. Building the cities we want our children to live in means taking the concerns and needs of all residents into account.

1 "TransformTO," City of Toronto, https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/transformto.

2 "Toronto's Greenhouse Gas Emissions & Targets," GHG Emissions, The Atmospheric Fund, http://taf.ca/climate/urban-ghg-emissions.

3 For more details, see Sara Hughes, "Reducing Urban Greenhouse Gas Emissions: Effective Steering Strategies for City Governments," *IMFG Perspectives* 16 (2017): https://munkschool.utoronto.ca/imfg/uploads/371/imfgperspectives16_shughes_feb_2017.pdf.

The role of municipalities in changing behaviours

The Climate Change Project
City of Mississauga

As the impacts of climate change become increasingly clear and widespread, we must all work to decrease greenhouse gases and become more resilient to the expected impacts of climate change. That includes cities, which have an important role to play in climate change action. Indeed, cities have a variety of mechanisms that they can use to drive local action on climate change, including:

- Land use and urban planning
- Licensing and regulation
- Leadership and awareness
- Community engagement and service delivery
- Operations and workforce[1]

When it comes to encouraging more sustainable habits, behaviours, and consumption patterns, the City of Mississauga has focused its efforts on the development of a regulatory framework (e.g., bylaws, resolutions), as well as on community engagement and service delivery. Laws and regulations discourage behaviours that could harm the environment, while also encouraging positive actions that citizens can take. To this end, the City has passed a number of bylaws, resolutions, and strategies that not only strive to alleviate climate change, but also ensure that City staff and residents are doing their part to contribute to an environmentally sustainable and resilient Mississauga.

The City has started to pass some laws that support climate change mitigation and adaptation. For example, the City has passed an anti-idling bylaw, a storm sewer bylaw, and a tree protection bylaw. The tree protection bylaw is a good example of a regulatory tool that encourages residents to "live green," prohibiting residents from removing three or more trees from their property in a single year without first receiving approval from the City.[2] Currently, Mississauga is home to over two million trees, and is projected to reach over three million by 2032, with the help of the City's One Million Trees campaign. There is little dispute that trees play a vital role in decreasing greenhouse gases: our urban forest removes 454 tonnes of particulate matter, ozone, sulfur dioxide, carbon monoxide, and CO_2 from the City's air annually.[3]

In an effort to further demonstrate leadership in environmental stewardship, Mississauga City Council passed a motion to request that the Federal Government develop a national strategy to reduce plastic pollution. This strategy would help to make all plastic packaging recyclable or recoverable by 2030, and entirely diverted from landfills by 2040.[4]

Another important role the City can play is in outreach and education. The City offers a variety of programs, partnerships, and projects to ensure opportunities for active community engagement. Through our community engagement and service delivery programs, the City is in close communication with local businesses, community organizations, and residents. We focus on face-to-face interactions in order to provide more meaningful engagement, and offer opportunities for community involvement through outdoor environmental education, youth- and business-focused programs, outreach booths at community events, and environmentally focused campaigns and events. To complement this, the City also uses a variety of online and social media channels (including Twitter, Facebook, Storify, City of Mississauga website and the Residents Survey) to reach and engage an even larger number of people.

The City has also partnered to create environmental education programs. The City's Environment, Recreation, and Parks and Forestry Divisions collaborated to develop an outdoor education and gardening camp, with the goal of establishing more environmental education programs in the Recreation program calendar. The City also partnered with Ecosource, an organization that focuses on how residents can change their lifestyles to become more environmentally friendly, to offer a community gardening program connecting Mississauga residents with local gardening spaces; the aim was to encourage active, healthy living and also help green the city.

Through the Climate Change Project, the City has organized and led a number of events that promote climate action and inform residents about what they can do to help combat climate change—from planting trees to taking public transit to reducing household waste. In 2018, the Environment Division was able to bring awareness of climate change to approximately 7,200 residents through a variety of events such as the Imagine2050 Escape Room, the After Dark Earth Market, and the Imagine2050 Photo Contest.

A multifaceted approach is perhaps the best way a municipality can encourage its residents to act on climate change: rules and regulations are important, but so are outreach, education, and providing opportunities for residents to become involved in their communities. For more information and to find out how you can participate, visit https://yoursay.mississauga.ca/climate-change.

Part three of a serial column on the work guiding the City of Mississauga's Climate Change Action Plan.

1 "Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation," Local Governments for Sustainability, 2010, http://www.icleicanada.org/images/icleicanada/pdfs/GuideWorkbookInfoAnnexes_WebsiteCombo.pdf.

2 Private Tree Protection By-law, City of Mississauga, http://www.mississauga.ca/file/COM/treeprotection.pdf.

3 "Protecting Our Natural Areas and Trees," City of Mississauga, http://www.mississauga.ca/portal/residents/natural-areas-and-trees.

4 Ali Raza, "Mississauga Focuses on Using Less Plastic, Urges Federal Government Develop Plan," 24 June 2018, https://www.mississauga.com/news-story/8688504-mississauga-focuses-on-using-less-plastic-urges-federal-government-develop-plan.

CALL FOR PARTICIPATION - PLEASE CONTRIBUTE TO

A PEOPLE'S ARCHIVE OF SINKING AND MELTING: NUNAVUT

"Sinking and melting" places exist around the world–they are places that are already or in the near future may become uninhabitable because of the combined physical, political, and economic impacts of climate change, including sea level rise, erosion, flooding, glacial melting and subsidence.

A People's Archive of Sinking and Melting invites contributions from Nunavut. If where you live is threatened to disappear–becoming uninhabitable now or in the foreseeable future–please contribute to A People's Archive of Sinking and Melting (www.sinkingandmelting.tumblr.com).

HOW TO CONTRIBUTE

1. CHOOSE any* item

Your contribution can be something natural, manufactured, found, made, or discarded, including trash. Any item is equally valuable as a record of a sinking or melting place, as contributed by someone who lives there. It doesn't have to originate from that place – it can be anything that is there.

***WEIGHT LIMIT:**
Your contribution should weigh 1/2 lb. or less. Do not contribute items with import/export prohibitions/restrictions.

2. MAIL your contribution to:

A People's Archive of Sinking and Melting
c/o Amy Balkin, Registrar
2136 Fell Street, Apt. 301
San Francisco, CA 94117

3. EMAIL the below information about your item to:
registrar@sinkingandmelting.org

1. Item name:
2. Materials:
3. Contributed by:
4. Location:
5. Latitude/Longitude (if available):
6. Location is Sinking/Melting/Other:
7. Date found/contributed:
8. Notes/further information:
9. Attach JPG/phone images (up to 10MB)

Your contribution will be permanently added to the archive and exhibited in the future, when it will be presented with the information you provided and the UNFCCC Party Grouping of the location it represents.

4. ADD an interview (optional):

If you'd like to provide an interview to accompany the archive online (and for possible publication) answer and email these questions –

- *Do you live where the object came from? If not, what is your relationship to that place?*
- *What have you seen disappear, or expect to disappear, environmentally or otherwise? What do those disappearances mean?*
- *What's your relationship to the object(s) you contributed?*
- *Why did you contribute to the archive? What do you hope for your contribution, and the archive generally, to change or draw attention to?*

Interviews can be found on the COLLECTIONS pages: http://sinkingandmelting.tumblr.com/newyorkcollection

ANY QUESTIONS?

Please email co-registrar Amy Balkin at **registrar@sinkingandmelting.org**

Confetti
Colored paper

Laura Colomban and Marcel Sparmann
Venice, Italy
45° 26' N, 12° 20' E
February 23, 2013

"Confetti from the Venice Carneval."

VENICE COLLECTION
2.13/6079

Global Warming Dogsled Expedition
Video on PAL DVD

Øle Jorgen Hammeken and Bertrand Lozay
Uummannaq, Greenland
Lat/Long: 70°40'29"N, 52°07'35"W
December 2012

In 2007 an UPI expedition led by Ole Jorgen Hammeken found an alternative route from Uummannaq-Ikerasak to Ilulissat through the ice-cap. Because of the last 10 years global warming there is now longer sea-ice on the Disko Bay during the Winter, and the old dogsled route is not possible to use anymore. - Uummannaq Polar Institute

http://www.upi.gl/dogsled.htm

GREENLAND COLLECTION
10.12/6025

Annex I, II, B (Denmark)

Seaweed
Toothed wrack, *Fucus serratus* (TBD)

Michael Hampton
Burton Bradstock, Dorset, United Kingdom
Lat/Long:
Saturday 30 August, 2014

"In Memoriam Charlotte Blackman."

The sample was collected on the Hive beach, Burton Bradstock, close to the site of a fatal rockfall that happened in 2012. Erosion at the site was due to a combination of extreme rainfall that penetrated the limestone cliffs creating fissures below the surface along with bedrock erosion caused by the sea. The collapse killed an unfortunate passerby, Charlotte Blackman, who must be regarded as a victim of global warming.

Image by Ruza Leko

UNITED KINGDOM COLLECTION
8.14//6100

Keys
Brass

Ranu Mukherjee
San Francisco, California, USA
Lat/Long: 37.765764/-122.401007
February 9, 2016

Remnants of a set of keys, metal keys, common in this time.

How location is impacted by climate change:

Drought, projected sea level rise of 8 ft by end of century in a place surrounded by water with vulnerable infrastructure. Projected loss of species.

Note: This particular location is prone to liquefaction and likely has contaminated ground soil.

CALIFORNIA COLLECTION / USA
01.16/6109
Annex I, II, B

Blue string
Woven plastic

R.U.B.A.R.B.
Upper Ninth Ward, New Orleans, Louisiana
29° 57' 15" N / 90° 4' 30" W
2012

Found on an abandoned lot

NEW ORLEANS COLLECTION
5.12/6012

Glacier Film (2012)
35mm Lomokino film, color; digital transfer
Zoë Leonard
Jökulsárlón, Iceland
Lat/Long: 64° 4' 13" N, 16° 12' 42" W
November 19, 2015

Lomokino films are made on 35mm format film. The camera is hand crank, allowing for a variable frame rate. On average, there are four exposures per 35mm frame.

ICELAND COLLECTION
11.15/6107
Annex I, II, B (First Commitment Period)

Fire Extinguisher Inspection Tag
Paper, wire

Micaela Neus
Palmer Station, Anvers Island, Antarctica
64°46' S, 64°03' W
2012

For Extinguisher #SF40532. Someone made this tag in 2005 to record the monthly inspections of this A-B-C Fire Extinguisher in the BIO-LAB back stairwell. Different members of the fire team wrote their initials each month until December 2011 when I used the last space on the tag. From the blank spaces, you can see that inspections sometimes lag at the end of the summer and the end of the winter when the respective crews get tired of the routine.

ANTARCTICA COLLECTION
12.12/6001

Dugong Fossil Rib Fragment
Metaxytherium floridianum
Kristie Anders
Peace River, River Road SW, Zolfo Springs, Florida, USA
Lat/Long: 27.3552° N, 81.8066° W
May 11, 2016

The dugong was deposited when the sea level was higher. It's hard to date when this individual was here, probably about 100,000 years ago. It is related to manatees. This particular species of dugong is extinct. This rural area is one of the land masses people in Florida may move to as coastal refugees, and may see a population boom, and infrastructure demands will increase (water, sewer, electric). The land is subject to winds and rains from storms, hurricanes, and flooding, as the Peace River does flood.

FLORIDA COLLECTION / USA
5.16/6110
Annex I, II, B

Dislodged Firebrick
Firebrick, Concrete, Rocks
Alicia Milne and Luis Vasquez La Roche
Constance Estate, Icacos, Trinidad and Tobago
Lat/Long: 10.062647, - 61.927161
September 10, 2016

This firebrick was collected near to the site of a house on Constance Estate, Trinidad and Tobago, that was destroyed and claimed by the sea. The ruins are still visible in the waters of Columbus Bay. At the location where it was found there is a make shift retaining wall made of rocks and destroyed materials from the house, used to protect the remaining land from the sea. Icacos is 1 metre above sea level.

Notes: Icacos is located 11 km away from the Venezuelan coast and is witness to high levels of legal and illegal activity between the two countries.

TRINIDAD AND TOBAGO COLLECTION
9.16/6112
Non Annex I

Local Useful Knowledge: Resources, Research, Initiatives

The **CHANGE** Lab (**Cities, Health, and Neighbourhood Geomatics**), led by Kathi Wilson, Professor of Geography at UTM, uses demographic data, surveys, and fieldwork to study the links between health and place. With a frequent focus on newcomer and Indigenous populations, Wilson's lab studies inequalities in Canadian health care, and the expressions of inequality across urban and rural geographies. Wilson maintains a strong relationship with the Healthy City Stewardship Centre (a coalition of Peel-area hospitals and organizations) and the Newcomer Centre of Peel to study newcomers' experiences of healthcare and settlement in Mississauga. Wilson identifies determinants of health that are often simple or overlooked, such as the availability of parkland or the reasons why residents may be more likely to take up smoking. In doing so, she builds on a research trajectory that runs throughout the CHANGE Lab's work. Employing diverse methodologies—from air-quality monitoring devices to health surveys and demographic data—her lab asks: how do an individual's neighbourhood and local environment contribute to their health outcomes?

Local Enhancement and Appreciation of Forests (LEAF) works with communities to protect and sustain the tree canopy throughout the heavily urbanized Greater Toronto Area. Since 1996, LEAF has worked with citizens to plant and maintain trees at schools, businesses, parks, multi-unit dwellings, and homes. They prioritize planting native species, including those that have been nearly eradicated like the pawpaw, a tree with citrusy fruit that is unlike any other species indigenous to Southern Ontario. In addition to the regular legwork of planting and park stewardship, LEAF maintains an education program which runs workshops and tree tours, publishes guides to species identification, and presents on issues facing the urban tree canopy. These initiatives work to develop the next generation of tree stewards and arborists, through LEAF's Young Urban Forest Leaders program. Leaders learn best practices from arboriculturists, and they work with local park organizations to launch Adopt-a-Park-Tree programs, which ensure the health of newly planted trees in city parks. Tree adopters are taught to maintain and nourish their chosen trees, and how they provide for the broader ecosystem of birds and insects. Through the broad range of programs offered by LEAF, more residents are learning about the care and stewardship required to sustain a healthy urban tree canopy.

Canadian Mental Health Association, Ontario Division's **Mood Walks** program promotes physical and mental health by encouraging exercise in Ontario's green spaces. In partnership with Hike Ontario, Conservation Ontario, the Ontario Council of Agencies Serving Immigrants and the Centre for Innovation in Campus Mental Health, CMHA Ontario's province-wide groups hike regularly to benefit from the effects of exercise in natural environments. Building on the commonly-held belief in the need for fresh air, doctors and therapists have increasingly turned to prescribing nature walks (or what some call "forest bathing") for their patients and clients, the benefits of which are widely supported by research. In the case of Mood Walks, participants note lower stress levels after participating and express satisfaction with the social and physical aspects of group exercise. While Mood Walks first began with pilot programs engaging youth and seniors, the program now primarily serves post-secondary students on more than twenty campuses across the province, including UTM. In doing so, Mood Walks aims to foster healthy habits in young adulthood and mitigate the stresses of post-secondary education. At a more basic level, however, nature walks are an easy habit to take up—and in recognition of this, Mood Walks invites individuals to start their own local chapter with the help of a freely available program manual.

The **Newcomer Centre of Peel** (NCP) is a settlement services organization whose wide scope aims to address many of the challenges faced by newcomers to the region. With newcomers making up a slight majority of Peel residents, settlement services are in high demand. NCP provides English training, business start-up advice, counselling, childcare, connections to community services, and assistance for employment, co-op, and volunteer positions. Located in Cooksville, the Centre is host to activities of all kinds, from youth karaoke to winter driving skills. NCP's Community Connections groups for youth, adults, and seniors meet regularly to facilitate social programs centered on arts and crafts, games, job skills, and conversation circles, among others. NCP is not solely focused on city-dwellers, however; they have recently begun to collect data on rural newcomer settlement in Peel. In a co-authored study, the organization worked with scholars (including Kathi Wilson of CHANGE Lab, above) to determine the health effects of newcomer settlement in rural communities. NCP's multifaceted approach to settlement is thereby well-positioned to help people adapt to shifting employment and housing market trends.

Since 2011, the **Ontario Climate Consortium** (OCC) has worked to predict and mitigate the effects of climate change on local and regional environments throughout the province. As a consortium of universities, conservation organizations, and regional governments, the OCC draws from diverse bodies of knowledge to pinpoint the risks associated with climate change. As is evident in OCC studies, climate change risk necessitates diverse responses—be they infrastructural, such as flood barriers, or policy-informed, like the shift toward a green economy. As such, the OCC connects specialists with wide-ranging expertise. With the Region of Peel as a founding member institution, OCC studies have examined pressing local issues, such as regional climate forecasting, risks to agriculture, and extreme weather resilience. The OCC's case studies evaluate risk to specific infrastructure and environments, as evinced in its localized study of extreme weather vulnerability and resilience in Port Credit. The OCC's uniquely localized research demonstrates the need for co-operation across all sectors in order to mitigate and adapt to the effects of climate change.

Zero Waste UTM is a newly formed student group that aims to spread awareness of waste management, and to provide tools and ideas for students and faculty to reduce their waste. The group is part of a growing Zero Waste movement which offers alternatives to disposable packaging and overconsumption. Zero Waste UTM highlights plastic pollution in particular as a major problem of consumer culture, with reference to the proliferation of microplastics in oceans and waterways. In October 2018, the group held a two-day Zero Waste Farmers' Market on the UTM campus featuring vendors selling their goods in bulk or using low waste materials. Visitors could bring their own jars to fill with bulk home cleaning supplies and body care, or purchase locally produced honey and maple syrup, or even find upcycled items such as tote bags, scrunchies, and beeswax wraps. Alongside promoting alternative options for consumers, Zero Waste UTM recently hosted a clothing swap, empowering students to trade or donate clothes they no longer need. As such, the group makes it easy for students, staff, and faculty to reduce their environmental footprint by rethinking their everyday habits.

Biographies

Born and raised in Madagascar before settling in Paris in the early 1980s, **Malala Andrialavidrazana** fuels her practice by moving from one land to another. By way of the photographic medium, she interrogates barriers and interactions within cross-cultural contexts, thoughtfully shifting between private spaces and global considerations to explore social imaginaries. Over time, she has invented a language that is resolutely turned toward history, while simultaneously expressing a profound engagement with contemporary issues and developments. Based on extensive in situ as well as bibliographic and archival research, her visual compositions open up the possibility of alternative forms of storytelling and history-making.

Amy Balkin is an artist whose works propose alternatives for conceiving the public domain outside current legal and discursive systems, addressing property relations, environmental justice, and equity in the context of climate change. ***A People's Archive of Sinking and Melting*** is a growing collection of items contributed by people living in places that may disappear (or already are) owing to the physical, political, and economic impacts of climate change, including sea-level rise, coastal erosion, and desertification. Organized into "common but differentiated" collections, contributed objects together form a record of community-gathered evidence, and an archive of the future anterior—what will have been. The *Archive* operates from the principle that any item is equally valuable as a record of present or projected future disappearance of a place, as chosen by someone there. It can be anything that happens to be there, including detritus, flotsam or jetsam. As of 2019, the archive contains contributions from Anvers Island (Antarctica), Cape Verde, Greenland, Kivalina (Alaska), Nepal, New Orleans, Panama, Peru, Senegal, Trinidad and Tobago, and Tuvalu. *A People's Archive* invites contributions at www.sinkingandmelting.org.

Jeff Diamanti teaches Literary and Cultural Analysis at the University of Amsterdam. In 2016–17 he was the Media@McGill Post-doctoral Fellow in Media and the Environment where he co-convened the international colloquium on Climate Realism. His work tracks the political and media ecology of fossil fuels and has appeared in *Radical Philosophy*, *Postmodern Culture*, *Mediations*, *Western American Literature*, and *Reviews in Cultural Theory*, as well as the books *Fueling Culture* (Fordham UP, 2017) and *A Companion to Critical and Cultural Studies* (Wiley-Blackwell, 2017). He is currently working on a book called *Terminal Landscapes: Media Ecologies of Post-industrial Energy Cultures*.

Sara Hughes is an Assistant Professor in the Department of Political Science at the University of Toronto. Her research interests include urban politics and governance, water policy, and climate change policy. She focuses on understanding how political interests, institutions, and environmental problems interact at the urban scale, and the social and environmental outcomes they generate. Her research has been funded by SSHRC, Connaught, and the Government of Minnesota, and she has held fellowships at the US Environmental Protection Agency and the National Center for Atmospheric Research. In 2013, she was named a Clarence N. Stone Scholar by the urban politics section of the American Political Science Association. She has a PhD in Environmental Science and Management from the University of California, Santa Barbara.

W. R. Peltier is a Professor of Physics at the University of Toronto, Director of the Centre for Global Change Science, former Principal Investigator of the Polar Climate Stability Network, and Scientific Director of SciNet. His research interests include atmospheric and oceanic waves and turbulence, geophysical fluid dynamics, physics of the planetary interior, and planetary climate.

Jacquelyn Ross is a writer based in Vancouver. Her fiction, poetry, essays, and art criticism have appeared in *BOMB*, *Mousse*, *C Magazine*, *The Capilano Review*, artforum.com, Kijiji, and elsewhere, and her recent chapbooks include *Mayonnaise* and *Drawings on Yellow Paper*. She publishes books by emerging artists and writers under the small press Blank Cheque, and is currently at work on a novel and a collection of short stories.

Vancouver-based artist and writer **Marina Roy** is Associate Professor in visual art at the University of British Columbia. She works across a variety of media, including drawing, painting, sculpture, video, and animation. Her artwork investigates the creaturely and the grotesque at the intersection of language and materiality. Her theoretical interests are largely psychoanalytical, biopolitical, and ecological. In 2001 she published *sign after the x* (Arsenal/Advance Editions; Artspeak), and her book *queuejumping* will be published through Information Office in 2019. Roy exhibits her work nationally and internationally, and in 2010 she was recipient of the VIVA art award.

D.W. Schindler began his career as an Assistant Professor at Trent University (1966–1968). In 1968, he was the founding director of the Experimental Lakes Area (ELA) in northwestern Ontario, where ecosystem-scale experiments with a variety of pollutants and long-term monitoring of lakes and streams have taken place for over 40 years. He was the Killam Memorial Chair and Professor of Ecology at the University of Alberta from 1989 to 2013 and is currently Professor Emeritus. Schindler's science aims to underpin environmental policy and has earned him numerous national and international awards, including the Gerhard Herzberg Gold Medal, the First Stockholm Water Prize, the Volvo Environmental Prize, and the Tyler Prize for Environmental Achievement.

Alexis Shotwell teaches and writes in Ottawa, on unceded Algonquin territory, where she's a part of the Punch Up anarchist collective. She is the co-investigator for the AIDS Activist History Project (aidsactivisthistory.ca), and author of *Knowing Otherwise: Race, Gender, and Implicit Understanding* and *Against Purity: Living Ethically in Compromised Times*.

John P. Smol is a Professor in the Department of Biology at Queen's University, where he is also holder of the Canada Research Chair in Environmental Change. He was the founding editor of the *Journal of Paleolimnology* and is currently editor-in-chief of the journal *Environmental Reviews*. He is also the series editor of the book series Developments in Paleoenvironmental Research and is on the editorial boards of several other journals. He holds and has held adjunct appointments in Canada, the United States, and China. John co-directs the Paleoecological Environmental Assessment and Research Laboratory (PEARL) at Queen's University, a group of about 40 paleolimnologists working throughout the world on a variety of limnological and paleoecological problems.

David Suzuki is an award-winning geneticist and broadcaster, and co-founder of the David Suzuki Foundation. In 1975, he helped launch and host the long-running CBC Radio program *Quirks and Quarks*. In 1979, he became familiar to audiences around the world as host of CBC TV's *The Nature of Things*, which still airs new episodes. From 1969 to 2001, he was a faculty member at the University of British Columbia, and is currently Professor Emeritus. He is widely recognized as a world leader in sustainable ecology and has received numerous awards for his work, including a UNESCO prize for science and a United Nations Environment Program medal. He is also a Companion of the Order of Canada. He has 29 honorary degrees from universities in Canada, the US, and Australia. For his support of Canada's Indigenous peoples, Suzuki has been honoured with eight names and formal adoption by two First Nations.

Joseph Tisiga was born in 1984 in Edmonton and is a member of the Kaska Dena Nation. He is currently based in Whitehorse, where he is a manager of an emergency youth shelter. Tisiga studied at Nova Scotia College of Arts and Design, and his work has been shown at the Kitchener-Waterloo Art Gallery, Yukon Art Centre, Diaz Contemporary, Parisian Laundry, The Winnipeg Art Gallery, SBC Gallery of Contemporary Art, MASS MOCA, the Museum of Contemporary Native Arts, the Ottawa Art Gallery, UQAM Gallery, and West Vancouver Museum. Tisiga was a finalist in the 2009 RBC Painting Competition, was long-listed for the Sobey Art Award in 2011, and was named a REVEAL Indigenous Art Award winner in 2017.

GLOSSARY
An entangled lexicon for a rapidly changing world

Artifacts are objects created or modified by humans that are of some cultural significance. They often exist within the context of an archive, collection, or other system of classification, and are valuable for their relation to the broader grouping; consider Amy Balkin's *A People's Archive of Sinking and Melting* (p. 24), where the objects speak to legacies of environmental violence, or Marina Roy's *Carrying Capacity* (p. 4), which catalogues the lives of fossil fuels. In another sense, artifacts are defined as something (a belief, behaviour, or concept) left behind by a particular institution or dominant strain of thought—for example, contemporary acts of racism and white supremacy as artifacts of regimes of colonialism and slavery (see Shotwell, p. 8).

Bitumen, also called **asphalt**, is a black, gummy substance composed of hydrocarbons. It can occur naturally (sometimes called **crude bitumen**), accumulating in deposits formed from the remains of once-living organisms subject to intense heat and pressure under the earth's surface (as in Los Angeles's La Brea Tar Bits or Alberta's Athabasca oil sands). Its more common form, **manufactured bitumen**, is a residue remaining after the distillation of petroleum (see Roy, p. 4).

Chemical Valley refers to the concentration of forty percent of Canada's petrochemical industry in Sarnia/Aamjiwnaang (see Xiang, p. 21 and EDAction & Clear, *SDUK01* p. 20). The site of over sixty refineries and chemical plants, Chemical Valley has been the subject of serious public health concerns, produced by cumulative effects of industrial pollutants which intermingle in the atmosphere, water, and soil. A site as well of significant community resistance the to the oil industry, Chemical Valley has also come to symbolize the failures of government and corporate environmental regulation to adequately safeguard public health.

Desire: A strong feeling of longing, want, hunger, sexual attraction, wishing, ambition, yearning, hope, greed, aspiration, infatuation, or craving (see Ross, p. 14; Cochrane, p. 20). For questions of desirability bearing on access to space, resources, services, and the relationship between the natural and built environment, see Tisiga, p. 12.

The term **emissions** refers to diffusion of elements or substances, often used specifically in relation to **greenhouse gas emissions** (see Hughes, p. 22; Diamanti, p. 16; and Cochrane, p. 20). The profound potential effects of climate warming caused by these emissions is detailed in this issue in "Open Letter to the Federal Government" (p. 7).

Energy: Power or force derived from physical or chemical resources, referring to natural processes (e.g. solar, wind, geothermal) or power generated from the burning of fossil fuels (see Roy, p. 4). Fossil fuels continue to be integral to our current economic system despite a shift in the Global North towards post-industrial societies (see Cochrane, p. 20), an ongoing reliance described as **energy deepening** (see Diamanti, p. 16). Also used to refer to vitality or activity; see Roy (p. 4), who discusses art as a form of energy that challenges conventional productivity.

Environmental racism refers to the purposeful and disproportionate siting of pollutive industries or waste facilities near racialized communities. This term identifies unequal exposure to toxins and pollutants along racial lines. With its origins in the resistance of Black residents to a toxic landfill planned for their community in Warren County, North Carolina, environmental racism identifies how geography, race, and health are deeply intertwined (see CHANGE Lab, p. 26). In Ontario, the decades-long resistance of Grassy Narrows First Nation to mercury poisoning is one ongoing case which bears the effects of environmental racism (for others, see Murphy, p. 10 in *SDUK02*).

GDP, or **gross domestic product**, is a value that represents the total goods and services produced in a defined region, typically a country, intended to indicate the health of its economy. **Nominal GDP**, which is not adjusted for inflation or deflation, can be distinguished from **real GDP**, which is measured against a base year and thus accounts for price changes. The current convention is that substantial growth in real GDP indicates a well-functioning economy, while minimal growth or a contraction marks a recession or (if ongoing) a depression. GDP growth is considered positive, regardless of the degree to which growth disproportionately expresses the preferences of the wealthy (see Cochrane, p. 20) or impacts those who do not benefit.

GIS (or Geographic Information System) is a method of storing, analyzing, and visualizing spatial data. Contemporary GIS methods typically record environmental change using remote sensing technologies—the bird's-eye view provided by satellites. GIS is used as an analytical tool at many different scales: at a regional scale in CHANGE Lab's studies of place as a determinant of health (see their profile on p. 26), or at the scope of global climate systems in the work of Kent Moore (see *SDUK02*).

Kinship: A network of relations between people based in a shared social context, typically defined by family ties or lineage. Kinship can mobilize biological ancestry, and can also consist of processes where individuals claim membership and affinity with a group, or take responsibility within it; the group may or may not recognize the individual's claim (see Shotwell, p. 8).

Methane capture is a process where methane gas emitted by industry or from landfills is diverted or stored, either to be further used as a source of energy, or burned (since the carbon dioxide produced from burning methane produces a far smaller environmental impact than the methane itself would). A component of larger emissions-reduction strategies, which also require deeper social, economic, and political restructuring (see Hughes, p. 22).

Path dependency describes how previous actions and current contexts influence a progression of events. Diamanti (p. 16) discusses this in relation to fossil fuels, where energy use creates a setting within which more energy is required (see also **energy**).

Pollution: The release of a substance into the environment at a rate faster than it can be dispersed, decomposed, or converted into a non-toxic substance. Many (see Xiang, p. 21; Clear & EDAction, *SDUK01*, p. 20; Murphy, *SDUK02*, p. 10) argue that pollution also functions as an index of systemic inequalities, with already-marginalized communities bearing its most deleterious effects (see **environmental racism** in this glossary).

Resilience is the ability to respond to change and adversity. It forms a pillar of climate-change planning, as resilience studies determine the extent to which an area is seen as responsive to environmental change (the Ontario Climate Consortium, p. 26, has executed several such studies). Forming connections between disciplinary boundaries, resilience studies examine infrastructure, architecture, emergency response, community connectedness, and other factors to determine how a place will respond to derivations from normal conditions (see Whyte, p. 9, in *SDUK01* for a discussion of Indigenous nations' resilience planning, and The Climate Change Project, p. 25 in that same issue, for initiatives led by the City of Mississauga). As such, resilience is a mitigating factor when assessing **risk** for climate-change planning.

Risk: In a climate-change context, risk often refers to how the environment can be measured, calculated, and predicted for economic and legal ends such as insurance or infrastructure. It also involves assigning value or probability to unknown (and often unknowable) environmental conditions (see D.T. Cochrane's recurring *SDUK* columns on the friction between the economy and the environment). In broader terms, **risk management** attempts to predict and plan for events that elude understanding and estimation, as in the "act of God" clause that appears in many insurance policies. For tangible examples of how risk factors into urban planning, see the work of the Ontario Climate Consortium (profiled on p. 26).

Scarcity, in economic terms, describes a gap between limited resources and demand for those resources. But this definition of scarcity smoothes over the social and political dimensions of scarcity: Who lives in scarcity because of structural lack of access to resources and services? How does scarcity accrue in bodies, in relationships, across generations? (See Ross, p. 14; Tisiga, p. 12).

Violence is typically understood to concern the use of force with the intent of causing harm (see Ross, p. 14), but also refers to the use of power to achieve symbolic victories at the expense of others' freedom, safety, and well-being. This second connotation highlights the violence inherent in processes of settlement, extraction, and nation-building (see Shotwell, p. 8; Andrialavidrazana, p. 18; Davis & Todd, *SDUK01*, p. 13) that underwrite the visibly violent processes of genocide and environmental destruction.