CHAPTER 42

Humanizing Climate Change

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Physical manifestations of climate change are everywhere (Intergovernmental Panel on Climate Change [IPCC] 2021). Record-breaking temperatures. Ice sheets calving off from glaciers. Sea levels are rising, with unprecedented flood events becoming the new normal in coastal areas. Plant and animal ranges are shifting, geographically as well as temporally: trees are flowering in different windows of time, leading bees and other pollinators to face greater constraints in the work of pollination (Dalsgaard et al. 2013; Inouye 2020; Keret et al. 2020; National Aeronautics and Space Administration [NASA] 2021). Animals' nutrition is affected, as their habitats are squeezed into new narrows of space and time (Rosenblatt and Schmitz 2016). Normally biodiverse and colorful coral reefs are bleaching into dead zones, brought about by excessive carbon dioxide released when fossil fuels are burned (Altieri and Gedan 2015; Silverstein 2022). Dry areas are now drought ridden with longer, more frequent, and more intense periods without precipitation (Zhang et al. 2021). Although such manifestations of climate change are often dramatic and may appear as sudden, climate change is happening constantly, presenting itself in less-dramatic forms. Greenhouse gas data infiltrate our consciousness as well as our atmosphere, with numbingly imperceptible doses of daily violence (Ray 2020). Engaged environmentalists are urged to "do the math" (McKibben 2016) regarding carbon dioxide, methane, and ozone-depleting molecules as they translate into rising global temperatures. All these phenomena and more are symptoms of a warmer world.

I suspect you have heard this litany of woes before. The daily news headlines about wildfires, drought-stricken agriculture, more intense hurricanes, storm surges, land subsidence, and biodiversity losses are the on-the-ground realities of human-induced climate change. Small wonder that isolated polar bears standing on drifting icebergs are among the most iconic images of our era (Gonzalez 2019; Tamisiea 2022). It is likely easiest to tone down our emotional response to these realities, to let this information not really sink in. Our human psyche tends to look for news that we actually want to believe, leading us to minimize the existential threat that climate change poses to life on our planet. It's a natural psychological response to deny their reality by negating our human agency in causing the problems, noting the impossibility of changing fossil fuel-emitting lifeways (Wray 2022). We often talk about climate-related events like floods and hurricanes as "natural disasters," distancing ourselves from our own agency in instigating their increased intensity and frequency and separating humankind from the natural world in which we are embedded. Climate change news can become background noise, with every new UN report accompanied by so many tweets that argue about the problem, its solutions, and its importance

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that it's hard to find consistently reliable information. It's understandable if your conscience is stashing this information away in a corner of your brain relegated for subjects involving emotional anxiety, only to be cracked open when it is good and safe, say, on your therapists' couch. Any of these responses is completely normal. None, however, are what the current moment requires of us.

In what follows, I offer a foundational understanding of the physical science of climate change. I aim to convince you that there are underappreciated dimensions of climate change that have to do with our feelings and social and cultural relations. Centrally, this chapter argues that climate change is not simply a reality of tremendous physical importance but also one that requires a relational perspective in which humankind actively reimagines the relationships that we hold with one another as human populations and with the other species and ecosystems with whom we share the planet. Social and cultural geography helps us understand these relationships through its central concern with the interrelationships between humankind, place, and space. This chapter furthers knowledge that embraces investigation into the more-than-human worlds it informs the design, governance, legal, and ethical questions underpinning Earth systems taking shape in personal, local, national, regional, or global scales.

The Physical Science of Climate Change

The natural scientific basis informing the reality of anthropogenic climate change involves an abundance of evidence surrounding how ever-more turbulent conditions of life on planet Earth are becoming an intensified new way of life (Folke et al. 2021). Natural scientists, including hydrologists, oceanographers, geologists, paleontologists, and atmospheric scientists, have studied, debated, and researched climate change for a generation (e.g. Crutzen and Stoermer 2000; Ayers and Dodson 2010; Bauer et al. 2021). Across disciplines, they share a clear, cohesive, and consensus view about why human-caused climate change should be understood as a real phenomenon.[1] Their explanations coalesce around the idea that climate change is *anthropogenic*, meaning that the present rise in global temperatures has a clear link to human activities. The indelible marks that human activity leaves on the Earth are produced across space and over time through heterogeneous social and environmental interactions. In a geological sense, this ongoing event is known as the *Anthropocene* (Bauer et al. 2021). The name grants an ignoble recognition to humankind's role in altering planetary bio-geo-chemical cycles that govern the planet's geology, climate, and ecosystems (Crutzen and Stoermer 2000).

Remarkably, much like the "natural" disaster phenomenon described previously, when climate change is explained through a natural science lens, it becomes remarkably devoid of people. Despite holding a shared understanding of the human drivers of climate change, the realities behind global warming often are communicated through spatially and temporally distant abstractions, diagrams about molecules, and graphs about temperature rise, rather than being rooted in humankind's experiences and stories.

A brief description of the phenomenon of climate change serves to illustrate how the physical renderings of climate change science tend to paradoxically omit people from the very narrative in

1 The scientific evidence for global warming is "unequivocal," in the language of the Intergovernmental Panel on Climate Change. Studies of scientific consensus on climate change find that over 90% of scientists agree about the reality of anthropogenic global warming. For such studies on scientific consensus and to get a sense of the narrowness of the dispute over whether consensus exists, see W. R. L. Anderegg, "Expert Credibility in Climate Change," *Proceedings of the National Academy of Sciences* Vol. 107 No. 27, 12107–12109 (21 June 2010); 10.1073/pnas.1003187107. P. T. Doran and M. K. Zimmerman, "Examining the Scientific Consensus on Climate Change," *Eos Transactions American Geophysical Union* Vol. 90 No. 3 (2009), 22; 10.1029/2009EO030002; and N. Oreskes, "Beyond the Ivory Tower: The Scientific Consensus on Climate Change," *Science* Vol. 306 No. 5702, p. 1686 (3 December 2004); 10.1126/science.1103618.

which we are the central protagonists. Since global temperatures began being systematically measured at weather stations and from ships in the mid-1800s, the pattern in global temperatures has been on an upward trend. On average, the world has warmed at least 1.9 °F since 1880 (NASA 2021). The largest rises took place in the late-twentieth century on land, rather than in the oceans (Rosen 2021). Distilled simply, climate change occurs when greenhouse gases (GHGs), in the form of carbon dioxide, methane, and ozone-depleting substances, are emitted into the atmosphere, where they absorb infrared radiation emitted at the Earth's surface (US Environmental Protection Agency [EPA] 2021). Major sources of GHG emissions include fossil-fuel combustion (think: power plants and transportation), agricultural use of nitrogen (think: fertilizers), and methane emissions from ruminant animals' digestive processes (think: cow farts) (IPCC 2021).

Accumulation of GHGs leads to a greenhouse effect and associated planetary warming (Houghton 2015). The chemical processes underpinning these changing weather patterns and deleterious natural hazards are often complex, though they can be modeled and involve feedback loops and scenarios where tipping points are reached. In other words, an ecosystem's biological capacity is exceeded, leading the water – and, along with it, the weather, plants, and animal populations – in an ecosystem to go haywire, never to return to what was previously considered normal (Kolbert 2015). Often, time-lag effects from historical emissions mean that the GHGs already in the atmosphere will continue to affect us for decades to come (Houghton 2015). The risks of climate destabilization are exacerbated by positive feedback loops (IPCC 2021). For example, when losses of reflecting surfaces like ice lead to increased solar radiation absorption, the planet will warm even further. The loss of carbon sinks, such as tropical rainforests, also significantly adds to global GHG emissions because the carbon stored in trees and soil is released back into the atmosphere as a gas when trees are cut down (Baccini et al. 2017).

The ocean, too, is a huge source for absorbing emitted carbon: more than 90% of the heat from anthropogenic sources and a third of our carbon emissions are absorbed by the planet's oceans (Woody 2019), but it is this very process of carbon absorption that leads to the formation of carbonic acid, which raises the ocean's overall acidity and weakens phytoplankton's abilities to produce oxygen (Altieri and Gedan 2015). When deprived of oxygen, marine environments enter a state of *hypoxia*, a deoxygenated state in which most marine life is unable to remain viable (World Meteorological Organization 2021). How common is ocean deoxygenation? In 1965, worldwide tests of the ocean indicated only 45 sites worldwide with low oxygen conditions, but by 2011, around 700 such sites were reported (International Union for the Conservation of Nature [IUCN] 2019).

How significant is global warming? If you were to snap your fingers today and stop all new GHG emissions, the emissions already in the atmosphere would continue to create a 1.1 °F (0.6 °C) rise of the Earth's surface temperatures (Rood 2014; Dvorak et al. 2022). The melted sea ice not only is not going to refreeze but would continue to melt for about 40 years, until the planet's climate restabilizes (Hansen et al. 2005). If we do not significantly cut emissions, our average global temperature will exceed a critical 1.5° threshold. After that threshold, the stability of most systems keeping our planetary habitat in a semblance of balance reach *tipping points* – what the Climate Reality Project describes as "dangerous points of no return" (Climate Reality Project 2019). The UN's IPCC assesses that if the world's emissions continue apace, the planet will be somewhere between 5.4 and 9 °F hotter (3–5 °C) in the year 2100 than today's average (Climate Reality Project 2019; IPCC 2021).

What are politicians doing about this threat? Climate change negotiations on a global political level tend to revolve around strategies to mitigate GHGs (Luomi 2020), which are themselves abstractions, insofar as we do not actually *see* the molecules of emissions, let alone have relationships of compassion or care for them, as we might with, say, a polar bear or a fellow human being. Decision-makers come together at international conferences – most notably, the Conference of the Parties (COP) meetings – on a regular basis, following from the United Nations Framework Convention on Climate Change (UNFCCC), which was first drafted in 1992. Nearly universally adopted, the UNFCCC is ratified by 197 countries and went into effect in 1994 (UNFCCC 2022).

It was largely symbolic for over two decades; despite commitments to address global warming following agreed individual targets, greenhouse gases continued to increase. Fast forward by 21 more high-level international meetings: only in December 2015 did the UNFCCC parties agree that the long-recognized problem of climate change needed to be addressed in substantial ways, giving rise to the 2015 Paris Agreement (UNFCCC 2022). The main goals established in the 2015 Paris Agreement were to:

> strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 °C. Additionally, … to increase the ability of countries to deal with the impacts of climate change, and make finance flows consistent with a low GHG emissions and climate-resilient pathway.

Six years later (delayed by the COVID-19 pandemic) in Glasgow at the COP-26 UN countries reported back, making new commitments (UN Climate Change Conference – UK 2021). Developed nations pledged to pour over a billion dollars per year to finance climate-change responses and renewed their goals for more ambitious approaches (UN Climate Change Conference – UK 2021). Diplomats debated how much money to contribute, set global targets for emissions reductions, and established national priorities to support collective interest in keeping the planet's life-sustaining systems in check. Global leaders articulated goals such as reducing deforestation, devoted resources for renewable energy technologies, and considered the merits of different strategies for carbon sequestration (COP26 2021). Yet, even if all nations that pledged to reduce their emissions at the 2021 COP-26 summit contributed their promised $100 billion annually *and* met their pledges to reduce emissions reductions by 2030, our planet will still exceed the crucial 1.5 °C calibration mark (Climate Action Tracker 2021).

In such discussions, climate change is considered as technical – a problem to be addressed through interventions that alter the inputs and outputs of molecules by engineering solutions such as upgrading infrastructures or shifting economic incentives to yield more environmentally efficient outcomes. Degrees of global warming, climate models, and carbon molecules take center stage. I return to this point about approaching climate change through technical lenses momentarily. For now, I want to take a step back and reflect on the last three paragraphs.

Earlier in the chapter, I explained in very simple terms a significant amount of global warming-related science and some climate policy, too. Did you notice your eyes glazing over the statistics or your mind glossing through the dense language of hypoxia, feedback loops, and carbon sinks? If so, perhaps you have already grasped my implicit point: The only thing scarier than the numbers and molecules noted here are the stories of the lived human and more-than-human world that is experiencing the changes. This chapter argues that it is imperative that we not only tell those stories of suffering but also do the social, political, and emotional work of *humanizing* climate change. Adopting a *relational* perspective about the place of humankind within our earthly habitat helps us think differently about this moment of climate reckoning. It may even offer us a new worldview. Certainly, this moment calls for imagining different paths from the business-as-usual strategy that made such a mess of the planet over the past few hundred years.

Now that the basic science is squared away, the rest of this chapter tackles the more ethically, emotionally, socially, and politically complex terrain of climate change. The interdisciplinary approach to climate change adopted by many human geographers and political ecologists incorporates methodological tools from anthropology, sociology, and political science (e.g. ethnography, surveys, case studies, modeling, and primary and secondary source analysis). Social scientists have especially important contributions to offer, helping the world make sense of society's responsibility for and responses to climate change. But before we move on to such topics, let us go back to that hanging point about why it is problematic to approach climate change from a purely technical, problem-solving lens.

Rendering Climate Change Technical

Taking a dehumanized and technical approach to understanding climate change without considering social justice and broader human experiences is problematic on multiple levels. Such framings generally lead to public actions that foreclose addressing the present-day realities and longer histories of people who are already affected by climate change (Singh and Swanson 2017). Illustrative of this technically centered approach is a recent headline from the *New York Times*: "Air Eau de Parfum smells like fig leaf, orange peel and jasmine. It comes from carbon emissions" (Young 2021). How nifty that a company is figuring out how to convert carbon dioxide into a fragrance! Consumption of luxury green goods undoubtedly feels good to the consumer. But try championing this new perfume to someone in the Maldives, whose islands, by 2050, will likely be uninhabitable due to freshwater shortages and sea-level rise (Storlazzi et al. 2018). Suddenly, the attraction of this fragrant new solution to climate change seems fishy, if not completely stinky. Even mainstream environmentalist solutions are often consumerism masked under a thin green veneer (Luke 1998; Dauvergne 2018), with giant corporations like Coca-Cola, Walmart, and Nike claiming to be sustainability leaders (Dauvergne 2016), and environmental organizations enticing membership with gift offers (Conca 2001). Consuming "better" has a long history of promoting itself as a solution to the very problems that capitalism and overconsumption created in the first place (Maniates 2001; Maniates and Princen 2017) and tends to ignore or obscure the inequalities present in the capitalist system and the underpinning values, ideologies, relationships, and practices that drive the climate change problem (Hornberg 2019).

Resilience, often offered as a solution in the wake of natural disasters by public health experts and urban planners alike, promotes an emphasis on climate adaptation by building back better, smarter, or stronger, whether through green energy infrastructures, social programming, or improved architecture (Galvin 2018). In the name of climate resilience, billions of dollars are poured into recovery efforts in US communities and around the world (US EPA 2016). Such technically complex and capital-intensive solutions ignore the structural inequalities and historical legacies of disempowerment that made many socially marginalized groups vulnerable to climate threats in the first place (Derickson 2016; Joseph 2016; Taylor and Schafran 2016; Kaika 2017). In the name of resilience experiments, cities like Miami Beach, Florida, promote utopian visions of luxurious lifestyles bolstered by sophisticated physical infrastructures, while governing to ensure that such resilience plans rest upon entrenching historically unequal social and economic relations and maintaining the status quo (Pelz 2019; Wakefield 2019). Although proscribing the strengthening of community ties and social networks, resilience solutions tend to ignore the historically rooted practices of care and healing in communities which experienced previous historical traumas (Ranganathan and Bratman 2021).

The imperative to find technological solutions to the climate emergency frequently leads to a reliance on engineering feats that promote carbon dioxide removal, without giving serious consideration to how policies, economics, and the world's underpinning energy economy might also need to shift to reach a world of zero emissions (McLaren and Markusson 2020). Even some of the greatest proponents of such strategies recognize the irony: "the first rule of holes is you stop digging the hole before you try and fill it," quipped David Keith, a physics and public policy professor at Harvard who also founded the Canadian-based direct air capture startup company Carbon Engineering (Kopecky 2019). Although direct air capture is still something of a moonshot strategy to address global warming, energy-intensive and infrastructurally challenging new technologies that could capture and store carbon, known as Carbon Capture and Storage, are attracting significant public attention and investment, especially from the coal, oil, and gas-burning power plants that hope such technologies will allow their operations to continue as normal (Stone 2019). Attractive as pulling carbon from the air or atmosphere might seem, such solutions tend to ignore substantive policy and economic changes. Moreover, they sidestep the weighty moral and ethical questions involved in adopting risky, untested technological measures as solutions to address global

warming (Burns and Nicholson 2017). In contrast, greenhouse-gas pricing policies that set a price on carbon, while taking regulatory measures that create stricter limits on GHG emissions in the first place, could well serve to alleviate emissions problems from their source (World Bank Group 2022).

Distilling responses to the climate crisis down to a policy-oriented numeric exercise in which financially efficient solutions can be stacked up against their respective benefits in terms of carbon sequestration and GHG emissions reductions is certainly appealing for pragmatic reasons. Project Drawdown, which has declared itself "the world's leading resource for climate solutions" (Hawken 2017), is a helpful illustration. Project Drawdown ranks the 100 most prudent strategies for addressing climate change based on feasibility and economic cost–benefit rationale allowing for triage amidst a predicament that often seems beyond human control. The merits of taking strategic actions to address climate change using the drawdown approach are numerous: the calculations are scientifically based, triangulating between in-hand technologies and the cost-benefit analysis of adoption and aiming to be economically and socially holistic in the accounting exercise (Hawken 2017). Once the estimates are summed up, the top solution to address global warming boils down to managing and shifting refrigeration coolant chemicals. If it feels too good to be true that saving so much life on the planet comes down to redesigning our air conditioners and refrigerators, perhaps it is that simple, as well as that complicated. Technocratic solutions can go only so far in addressing the climate emergency.[2] Technological solutions, policy shifts, and economic solutions must go hand-in hand to produce the widespread societal changes necessary to achieve a more meaningful response, and to come to fruition, societal demand is a requisite for spurring research, policy, and markets in different directions.

Humanizing Climate Change

A considerable body of scholarship in human geography and political ecology notes that infrastructures and other built-environment interventions that address the human-made problem of climate change are often presented as neutral solutions to the climate crisis (e.g. building higher seawalls, fireproofing building materials). In fact, such infrastructures are deeply imbued with power and politics and encode visions of modernity and progress into both the background of landscapes and the foreground of climate-change adaptation responses (Latour 2012; Larkin 2013; Funk 2014; Doshi 2017; Colven 2020). Think back for a second to that question of just how much somewhere between 8.4 and 9 °F climate change might matter: The difference between one degree of global warming and 5° of global warming is not like swapping out your t-shirt for a longer sleeved one. Among other impacts, those tiny increments will yield melted sea ice and, thus, rising sea levels such that the fate of entire species and cities are at stake.

Without challenging some of the fundamental epistemologies of human–nature relations, the concept of growth itself is understood by many scholars as part of the core ideology that underpins our current climate crisis and the planet's ecosystem limits more generally (Meadows et al. 1972; Latouche 2009; Daly 2010; Gómez-Baggethun and Naredo 2015; van den Bergh and Kallis 2015; Wanner 2015). Many argue that the paradigm of growth should be countered with a praxis of degrowth – an alternative that critiques the ways in which material production is a necessary condition for perpetuating capitalism (Alier 2009; Escobar 2015; Kallis 2015). Degrowth thinkers draw upon a long legacy of environmental thought dating back to 1970s scholarship and highlighting the importance of limiting both population and economic growth because of

2 Energy-efficiency campaigns that encouraged shifts from incandescent lightbulbs to more energy efficient (and less mercury-intensive) ones offer a relevant parallel. Changing the lightbulbs – or the air conditioners – can make a difference in overall energy consumption, but such shifts are no substitute for the larger-scale changes necessary to generate system-wide changes to how electric energy is both produced and consumed. For more, see Doerr (2021).

planetary limits (Gorz 1980[1977]; Meadows et al. 1972). They build upon critiques of the paradigm of sustainable development, arguing that it problematically entrenches infinite economic growth as a hegemonic social goal (Sachs 1993; Latouche 2009; Daly 2010). Instead, voluntary simplicity, a repurposing of the commons, and a sense of conviviality all could work in favor of promoting autonomy, understood as the "ability of a collective to decide its future in common" and be freed from external impositions such as religion and economics (Kallis 2015, p. 8).

The degrowth literature, which is largely silent on the linkage between race, caste, and capitalism, does converge with another, more equity-focused, vein of political ecology scholarship around its endorsement of freedom as a key analytical framework for thinking about environmental issues (Ranganathan 2017). Abolition ecologies (Heynen and Ybarra 2021) aim to respond to the ecological predicament by adopting a lens of abolition, inspired by both historical movements against slavery and present-day movements against incarceration (Davis 2005; Du Bois 2014[1935]; Taylor 2016). Broadly understood, abolitionism draws upon the idea that there is "unfinished liberation … [from] processes of hierarchy, dispossession, and exclusion that congeal in and as group-differentiated vulnerability to premature death" (Gilmore 2017, p. 228). When freedom is understood through Black radical, feminist, and decolonial scholarship, environmental oppression can be understood as part of the intersectional struggles that threaten, coerce, and harm people, preventing them from having a life that is free from oppression and that enables self-determination (Ranganathan 2017).

The scholarship tackling these ideas is critical of much of the world's existing social and economic order, but it is fundamentally hopeful in the face of the seemingly insurmountable task of averting a planetary apocalypse. Instead of being fatalistic about climate change or continuing to ignore the violence of white supremacy (Pulido and De Lara 2018), abolition ecologies call our attention to the ways in which land and water-based politics are dismantling structures of oppression, often through coalition work that seeks justice and makes place within community (Heynen and Ybarra 2021). Instead of seeing resilience as something that is *lacking* or that requires massive investments, this scholarship points us toward the perspective that even historically underserved, dispossessed, and exploited communities living in wounded places have experienced long histories of care, self-reliance, and mutual aid, despite the odds stacked against them (Reese 2018; Ranganathan and Bratman 2021).

As Indigenous scholars have long suggested, climate change unfolds through the legacy of colonialism yoked to capitalism in uneven ways, making Indigenous groups both especially vulnerable and particularly experienced in coping with ecological harms wrought by colonial settler legacies (Whyte 2013). Terror, land displacement, pollution, and cultural harm in those communities are shared motifs of long-standing experiences involved in extraction of fossil fuels and natural resources (Saro-Wiwa 1992; Weaver 1996; Mignolo 2011; Davidsen and Kiff 2013; Estes 2019). Climate-related risks, explains Potawatomi philosopher Kyle Powys Whyte (2019), stem from an experiential base of knowledge that understands its drivers as the economic, industrial, and military forces that have long displaced and exploited Indigenous peoples. Ecologist and essayist Robin Wall Kimmerer, who also draws upon her Potawatomi identity, offers a discussion of the Windigo legend as illustrative of the economic system that this severed relationality has wrought: the Windigo is a mythic monster of the Anishaabe people known for its cannibalism and greed. Kimmerer writes:

> An economy that grants personhood to corporations but denies it to the more-than-human beings: this is a Windigo economy … we seem to be living in an era of Windigo economics of fabricated demand and compulsive overconsumption. What Native peoples once sought to rein in, we are now asked to unleash in a systematic policy of sanctioned greed. (2013, p. 306)

Historically and into the present, the close ties between capitalism and colonialism dehumanized Indigenous peoples and appropriated their lands, while erasing this process in public memory (Tuck et al. 2014; Whyte 2019). Not unlike waste and pollution (Zahara and Hird 2016;

Liboiron 2021), climate change exists within a complex of historical and contemporaneous structures and processes that contest the primacy of both neocolonialism and capitalist logics.

We live in an age of capital, argues world historian Jason Moore, and part of the fundamental problem with the Anthropocene concept is that it entrenches a dualism between nature and society, instead of seeing how human organizations, in the form of empires and world markets, are "porous within the web of life" or a world-ecology in which nature, power, and capital are inextricably interlinked (2016, p. 5). A more relational view of humans *and* nature positions the historical processes of imperialism, capitalism, industrialization, racial formations, and patriarchy as both producers of life as we know it and messy products of exchanges within the web of life. The alternative to seeing the binary of a human–nature divide is an awareness that we can and, indeed, *must* strive to make kin with other species (Muñoz et al. 2015; Van Horn et al. 2021).

This framing of kin, as ecofeminist scholar Donna Haraway writes, offers a relational way of experiencing the world as one where you "have an enduring mutual, obligatory, non-optional, you-can't-just-cast-that-away-when-it-gets-inconvenient, enduring relatedness that carries consequences" (Haraway 2019, n.p.). This sense of kinship fosters the ability to more deeply appreciate how our lives are entangled with the more-than-human world (Haraway 2015; Van Horn and Hausdoerffer 2017). Acts of "kinning" and "caretaking relations" offer a praxis through which the Earth, including everything within it and all that creates it, can be seen as an involving, ongoing, active, and all-encompassing way of acting, being in, and knowing the world such that our climatological predicament can be both responded to and better understood (TallBear 2019; Van Horn et al. 2021;).

What good will all this relating do for us in the face of urgently rising sea levels and a seemingly ceaseless rise in atmospheric GHGs? It feels satisfying, for one. Geoscientist Marcia Bjornerud describes kinning as a process of de-alienating ourselves from our identity as Earthlings in glowing terms:

> How marvelous to know that our bones – minerals made of calcium and phosphorous, themselves derived from rocks – can be mapped one-to-one onto those of almost every other vertebrate, from amphibians to zebras. How amazing to realize that our blood is a distant memory of seawater. How good to feel in our marrow that we are Earthlings, fully native to this ancient, verdant, resilient Earth. (2021, p. 19)

Tapping into the amazement, marvel, and interconnection with other species described above is one of many strategies that can help people productively face up to the existential dread, anxiety, and despair that so frequently derive from the daily deluge of bad environmental news (Ray 2020; Wray 2022).

Learning new ways of relating and exploring new or forgotten meanings of humanness may also help us respond to the climate crisis by unveiling alternative pathways in the face of emergency. These new paths could allow for an emergence from the climate crisis through whole systems change; in other words, shifting our concepts of well-being and our ways of expressing values could help us move in a new direction, opening up new possibilities for climate responses and ways of living (Pereira 2021). Further, there are radical implications for our epistemology and ontology involved with embracing a more pluralistic perspective on planetary survival. Adopting a more capacious understanding of human entanglements and care relations could usher in a pluriverse, or a way of understanding that the world need not be dominated by a hegemonic paradigm of modernity and could be envisioned as a world in which many worlds are possible (Bellacasa 2017; Escobar 2018, 2020). A pluriversal starting point for understanding the human-ecological predicament might refreshingly begin without centering the hegemonic worldviews responsible for the planet's destruction (de la Cadena 2015; de la Cadena and Blaser 2018).

Focusing on the human side of the climate-change problem offers an alternative, one in which power, inequality, modernist and liberal values, and political-economic systems are interrogated and challenged. Doing so allows for a deeper and more nuanced understanding of the climate-change

problem as not just inputs and outputs, economic costs and carbon sequestration benefits. Instead, this more humanistic and socially grounded understanding reveals uneven social, political, and economic systems undergirded by philosophical, epistemological, and ethical approaches that created the problems of climate change. Interrogating and reimagining those systems is integral to responding to the question of how to restore planetary balance in the future. In practice, this change may look like any number of things: in my own life, they take form through efforts to build community land ownership and intentional community (Bratman et al. 2018), championing local-based composting cooperatives, and working with bees (Bratman 2020; Sponsler and Bratman 2021), while also teaching and writing about the interconnections between anti-racist and decolonizing thought and its relevance to and environmental action.

Conclusion: Coping with Climate

Climate change certainly involves numbers that point us toward some apocalyptic visions of the future, but a myopic numeric focus can obscure our emotional response and ability to conceptualize the realities of climate change. The realities behind the numbers are planetary, but they are also human, and more than human. Our species are the protagonists of climate change, and we are also its victims. Despite centering ourselves as instigators of the climate crisis, we tend to narrate ourselves out of the picture when we talk about the consequences of global warming and what to do about it. We are taking untold numbers of other species down with us amid what is already considered the world's sixth mass extinction (Kolbert 2014). What would some of those now-extinct species want to tell us, if we tried to listen?

What we can listen to – here, now, in our own language(s) – are human experiences of and resistance to climate change. Underpinning the droughts, hurricanes, biodiversity losses, and wildfires, we can bear witness to stories of human suffering, loss of land and homes, and experiences of imagining new ways of relating to the world. The Anthropocene forces us to ask new ethical questions about what it means to be human and to collectively survive as a species (Churchill 2020). We are both a force of nature and part of nature. How should we collectively respond to the challenges of living in a "new" nature? We must begin with recognition of the ways in which the more-than-human world is in mutuality and interrelationship with human communities.

By way of illustration, I share a little of my own human, personal grappling. To me, the year 2100 feels a long way off, and I (I hope!) will be pleasantly decomposing somewhere by then. Even with all my accumulated knowledge about climate change, it's easy to acknowledge how a few degrees hotter sometimes feels like a welcome prospect on a cold winter day in the northeastern United States. My reality check of "doing the math" looks something like this: 2100 is the year in which my child, who is three years old as of this writing, will (I hope) turn 82. This is the warmer world that most of you, reading this chapter, will also (I hope) live to see in your lifetime and in which your children will have to live. As a parent, it is my responsibility to nurture my child into experiencing a life worth living. By necessity, that responsibility means not just caring for my own progeny but caring for the planet as a whole – one that tomorrow's ancestors[3] can inhabit. It does not mean choosing a place to hole up in and insulate our family, protecting our privilege; indeed, protecting privilege will be increasingly impossible. Although the weather may be delightfully balmy in Chicago in November, it will just as likely mean that entire coastal cities get decimated by hurricanes, while the Great Lakes region deals with both flooding events and record low water levels (Egan 2018). It is not unlikely that at some point, my family members or I will be forced from our home or experience a drinking water shortage due to a "natural" disaster, likely wrought by humankind's totally-not-natural GHG emissions. I will be trying to learn from those

3 An insightful compendium on ancestral relationships and their implications of environmental ethics is Hausdoerffer et al. (2021).

who already experience such traumas right now, at the moment of this writing, and already count myself as fortunate to be fairly buffered from such experiences thus far. It makes sense to me to lean into cultivating a world where such inequalities are not so severe, a world in which achieving social equity is considered part and parcel of reckoning with the effects of climate change.

Now ask yourself: what will climate change mean for your loved ones? What has it already meant to you in your own life? Physical geography will offer you the tools for thinking these questions through in terms of maps of rising heat levels and predicted sea rise. Cultural geography will help you grapple with them by asking you to consider how people are affected by climate change in particular spaces and places and how people's lifeways, experiences, and economic differences create and resist climate change across both place and time.

Now, take a pause from reading this chapter and sit with the question: what does climate change mean to you and your loved ones, now and as you think about the future? Write a little response, now, in your notes. Really. Sit with the question. Make space for it in your heart. If you are reading this during hurricane or wildfire season, answers may readily come to mind, but even a few months out from those events, connecting the dots might prove elusive. The brain can hold trauma and memories in fickle ways. Confronting the emotional valence of climate change, which so often goes ignored by the trappings of intellectualism and dominant science, is a first step in rendering climate change as part of the human experience. By that I mean your personal human experience and our shared collective one. Cultural geography as a field can help us understand how climate change is constituted.

Climate change has already and will continue to touch each of us, even if indirectly. We all breathe the same air, drink water, and depend on land for life. In all likelihood, those basic needs will remain the same, although the constraints on our most essential life-sustaining resources will be substantially more constricted and some will experience the intensity of climate suffering much more than others. Practicing *radical resilience*, to borrow environmental ethics scholar Paul Wapner's phrase, should start with a politics that understands suffering, using climate pain as an axis for political transformation toward something that is not a state of bounce-back, but a state and place of getting-better. Radical resilience identifies, based on experiences of climate pain, the present structures that drive climate change politically, economically, and socially. It, then, works to transform those structures, building the inequity of existing climate pain into the core of the approach (Wapner 2017). Radical resilience does not have to be entirely depressing. As Sarah Jaquette Ray argues, Gen Z

> can rise above self-pity and hatred for humanity, vanquish myths of powerlessness, reject the seduction of denial, and turn away from the distractions of consumable happiness … reframing environmentalism as a movement of abundance, connection, and well-being may help us rethink it as a politics of *desire* rather than a politics of individual *sacrifice* and consumer *denial*. (2020, p. 7)

Moving beyond ourselves, the challenge in listening to other species involves decentering the ego to establish a more-than-human understanding of our relationality to other beings that live on the planet. Beekeepers, whom I have studied ethnographically for the past six years, universally listen to their hives as they work with bees. They have learned to recognize subtle audial shifts as cues for their own behavior. Sometimes, bees will indicate that a beekeeper should slow down in their work with the hives, and other times, hurry up and get out, so as not to further antagonize. Beekeepers frequently speak or sing to the colonies, finding that it has a mutually relaxing effect. This sort of listening helps prevent a beekeeper from getting stung, but it also helps keep the bees alive. The practice involves one of recognition that our well-being, and even our individual lives, are intertwined. Good listening teaches that. Mushroom foragers repeatedly come back to the same patches of woods in search of certain gourmet fungi, year after year, tending to the forest floor with a sense of care, practiced alongside a recognition of the desire to partake in nature's bounty (Tsing 2015). Alice Walker wrote about connecting with the Earth, and her own thoughts, by listening to trees, gaining a poignant lesson from her listening to them: "The Earth holds us

responsible for our crimes against it, not as individuals, but as a species – this was the message of the trees" (Walker 1988, p. 662).

The gap between listening to other species and beginning to defend life on the planet is becoming bridged, too, as policy measures inch closer toward acknowledging the social shifts already afoot that aim to reclaim and restore more harmonious relationships with the natural world (Gach 2019). Rights to Nature are enshrined in the Ecuadorian constitution, thanks largely to the activism of Indigenous communities (Kauffman and Martin 2021). The Whanganui River in New Zealand recently gained legal personhood, and India's Ganges River was similarly protected (Youatt 2017; Kramm 2020). People are rising in protest: the Extinction Rebellion in the United Kingdom sustained two weeks of civil disobedience, yielding visible progress toward achieving their demands (Taylor 2019). The youth movement is gaining landmark momentum toward pressuring governments to address the urgency of the climate crisis, pushing world leaders to get over the "blah blah blah," borrowing the words of their forefront activist, Greta Thunberg, who urges nations to start taking action (Hassan 2021). Notably, the campaign for divestment from the fossil-fuel economy is already causing a robust economic shift. As of this writing, more than US $40.5 trillion has been shifted in global investments out of fossil fuel industries and into managed funds (Divestment Database 2022). The divestment movement is associated with a significant drop in the economic stature of oil and gas companies (Stand.Earth 2021).

A conclusion can be an invitation to new beginnings, restored relations, and a future imbued with a greater sense of justice. In that spirit, rather than summing up, I invite you to look to the intellectual guidance of kindred human ancestors who offer wisdom for the future. The great American writer, poet, and civil rights activist Maya Angelou wrote that "The truth is, no one of us can be free until everybody is free." Her words can be put into conversation with the illustrious American conservationist Aldo Leopold: "Only the mountain has lived long enough to listen objectively to the howl of the wolf." Not being so ancient as mountains, our species can reacquaint ourselves with what it means to live in our hearts alongside our minds. It is objectively clear and acknowledged that our climate-changed world is deeply flawed. Through feeling into the work of restoring our relations with one another and with the more-than-human world, we can begin addressing climate change in a meaningful way. By checking our tendency to exploit and extract from one another and the more-than-human world, we can get on a different path of earthly relations. In so doing, we engage a process of becoming more fully human.

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