



Life Writing at the Terminus: Glacier Memoirs and Planetary Relationality

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Abstract

This essay examines the American glaciologist M Jackson’s *While Glaciers Slept: Being Human in a Time of Climate Change* and *The Secret Lives of Glaciers*; the British glaciologist Jemma Wadham’s *Ice Rivers: A Story of Glaciers, Wilderness, and Humanity*; and the Icelandic writer Andri Snær Magnason’s *On Time and Water*, all of which employ autobiographical discourse to convey the enormity of the climate crisis as it is manifested in the rapidly accelerating loss of Earth’s glacial ice. I discuss these writers’ accounts of their turn to life writing to augment the limited persuasive force scientific data, their scaling of the temporality of glacier recession to the time spans of their own lives, their attribution of sentience to glaciers through an engagement with non-Anglo-European worldviews, and their expressions of grief at the impending death of Earth’s glaciers. I suggest that these texts demonstrate how the distinctive truth claims, temporal modalities, subject-positioning strategies, and affective appeals of life narrative provide a particularly supple hermeneutic schema in which an understanding of the moral ramifications of humans’ mutually dependent relationships with more-than-human nature—what Amy J. Elias and Christian Moraru have described as ‘a planetary ethics of relationality’—might be fostered.

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What if we argued that part of living in this modern world means living in a world with ice—ice that is not going or gone, but that enriches our shared world and is worth fighting for?

—M Jackson, *The Secret Lives of Glaciers*

Should we draw words for discussing the Earth from science, emotions, statistics, or religion? How personal and sentimental can we get?

— Andri Snær Magnason, *On Time and Water*

The urgent need for human beings to rethink the relationship between our species and the natural environment has become a recurring theme in scholarly writing about climate change. Calls to conceptualize a ‘relationality’ that expands beyond human interpersonal connections—and beyond restrictive categories of ‘life’ and ‘sentience’—have arisen from disciplines such as actor-network theory, Indigenous studies, the new materialism, and posthumanism. Scholars of life writing have added their voices to the conversation by pushing past ‘the entrenched anthropocentrism of life writing’,¹ broadening the scope of the field’s long-established concepts of ‘relationality’ and ‘relational identity’ to encompass human subjects’ dynamic, formative, and morally fraught interactions with Earth’s bio-, geo-, hydro-, and atmospheres.² In this essay, I aim to contribute to this endeavor by taking up four recent publications that employ autobiographical discourse to convey the enormity of the climate crisis as it is manifested in the rapidly accelerating loss of our planet’s glacial ice. I examine the American glaciologist M Jackson’s *While Glaciers Slept: Being Human in a Time of Climate Change* (2015) and Jackson’s later book *The Secret Lives of Glaciers* (2019); the British glaciologist Jemma Wadham’s *Ice Rivers: A Story of Glaciers, Wilderness, and Humanity* (2021); and the English translation of the writer and literary critic Andri Snær Magnason’s *On Time and Water* (2021), first published in Icelandic in 2019. I suggest that these texts offer examples of how the distinctive truth claims, temporal modalities, subject-positioning strategies, and affective appeals of life narrative provide a particularly supple hermeneutic schema in which an understanding of the moral ramifications of humans’ mutually dependent relationships with more-than-human nature—what Amy J. Elias and Christian Moraru have described as ‘a planetary ethics of relationality’—might be fostered.³

My engagement with these texts has been motivated by my own tenuous, second-hand connection to glaciers. My maternal grandfather, Arthur Johnson, worked as a glaciologist with the United States Geological Survey (USGS) from 1924 to 1966, and then as a professor of civil engineering at the University of North Dakota. In 1980, he published *Grinnell and Sperry Glaciers, Glacier National Park, Montana: A Record of Vanishing Ice*, a report based on his own data-collecting expeditions to the two glaciers throughout his career, along with his analysis of studies dating back to the first years of the twentieth century. His findings should surprise no one reading them today: in a span of less than seven decades, Grinnell Glacier had decreased in area from 530 to 315 acres, and Sperry Glacier's area had shrunk from 800 acres to 298. While the report's abstract characterizes this decline as 'a reflection of climatic conditions',⁴ the now-ubiquitous phrases 'global warming' and 'climate change' are absent from the document. It was completed at a turning point in the geophysical sciences, when these terms were only starting to gain ground in the scholarship and the impact of human activity on the planet's climate was still a matter of debate. Five years earlier, the geochemist Wallace Broecker had argued that increasing levels of atmospheric CO₂ would be the primary driver of an 'ever-steepening rise' in global temperatures⁵ and warned that humanity 'may be in for a climatic surprise'.⁶ Eight years later, the climatologist James E. Hansen's testimony to the US Congress, in which he forecast a future of extreme weather events caused by greenhouse-effect temperature increases, launched 'global warming' into the public conversation. In that same year, 1988, the World Meteorological Association and the UN Environmental Programme established the Intergovernmental Panel on Climate Change to track scientific inquiry into the possible drivers of the trend. Thirteen years passed before the IPCC, in its 2001 report, declared a consensus on greenhouse-gas emissions from human activity as the likely culprit.⁷

I don't know where my grandfather stood within those early debates. His report does not speculate on possible causes of the 'climatic conditions' responsible for the accelerated pace of Grinnell's and Sperry's recession, and apart from the doleful word 'vanishing' in its title, it offers me no clue to what he might have thought, much less felt, about that loss. Like the boundary surveys Julie Cruikshank describes in *Do Glaciers Listen?*, his text is 'rich in measurements and records of instrumentation but thin on observations about human experience'.⁸ I was sixteen years old when it appeared, and at the time, although I had a vague notion of what he did for a living, I had no interest in it. Pinned above the desk in his home office was an enormous topographical map of a glacier, which to my eyes might as well have been a blank

sheet of paper; I never asked him which glacier it was, or if he'd drawn the map himself, as he likely had. I do remember his telling me, in one of our rare conversations about his work, that almost all the glaciers he had surveyed were melting at a rate unprecedented in recorded history. If he found this data alarming, either he didn't show it, or I didn't register his concern. He had been dead for almost two decades when it dawned on me that he had contributed to the development of climate-change research, and when I came across *Grinnell and Sperry Glaciers* among the papers my mother had boxed up after his death, I made my way through its dense technicalities with mix of admiration for his accomplishments and regret for my lack of timely attention.

My belated curiosity about Arthur Johnson's thoughts and feelings about vanishing glacial ice has drawn me to a later generation of writers who directly express their personal responses to the impending disappearance of Earth's glaciers. An emotional investment in glaciers runs deep in the life narratives of Jackson, Wadham, and Magnason. All of them recount how their professional interest in glaciers developed from their intense attachments to the landscapes of their early lives. Jackson's family operated a farm in Washington with a view of Nisqually Glacier on Mount Rainier; Wadham spent her youth wandering the Cairngorms in the Scottish highlands, a region shaped by glaciers in the last Ice Age; Magnason grew up among Iceland's glaciers, and members of his family were directly engaged in the advancement of glacier science in his country. Each of their texts teaches us a great deal about the effects of climate change on glaciers while enlisting the resources of autobiographical discourse to embed that instruction in compelling testimonies to what glaciers mean to them personally and what they ought to mean to us.

Coming to Terms

While Jackson, Wadham, and Magnason uphold the importance of rigorously objective climate-change research, they all acknowledge that as a means persuading audiences of non-scientists to recognize and act in response to the dire threats our planet faces, the logos of data and statistics is necessary but insufficient. With its frightening scope and magnitude, the information confronts us with a kind of sublimity: it overwhelms and disables the imagination. As Gene Ray observes, in an attempt to come to terms with the 'intellectual and emotional pressures' of anthropogenic climate change, 'scholars and artists are struggling with the findings of

the earth sciences and are rethinking the categories of human and non-human, nature and the social, bios and geos'.⁹ The three writers whose work I examine here join this struggle by integrating research on glacial recession into accounts of their affective and moral responses to that loss. Insofar as they disband 'the oppositions between objective scientific knowledge and subjective autobiographical rumination, between the external material environment and the inner workings of the self',¹⁰ their texts can be compared with the 'material memoirs' of the health impacts of environmental toxins Stacy Alaimo examines in *Bodily Natures*. Like the climate activist Greta Thunberg, whose public self-disclosures Anna Poletti has recently analyzed, these writers make 'both affective and epistemological claims on [their] audiences',¹¹ and as Poletti rightly argues, 'to describe something as affective is not to dismiss or diminish its power to influence what and how we know'.¹² For Jackson, Wadham, and Magnason, personal storytelling, with its appeals to pathos and ethos, provides a means of conveying what Jackson calls 'the hermeneutic nature of glacier change'.¹³ We do need to *know* what is happening to Earth's climate by way of objective scientific observations, but without a subjective *understanding* of their implications, which entails a recognition of a planetary relationality, we will remain stymied, frightened, and unable to imagine a large-scale collective response to the climate catastrophe.

Jackson's frustration with the rhetorical insufficiency of scientific discourse is evident in an early passage in *While Glaciers Slept* where she writes, 'Climate change is talked about in specialized, isolating language that implies it to be a blanket effect happening to the entire world in the exact same ways'.¹⁴ In such universalized and depersonalized information, she argues, 'There is no unique moment connecting a person to a climate change, to the climate change, to this tremendously isolating and homogenizing phenomenon. There is no unique experience nor culminating interpretation or story that moves beyond the jargon and acronyms'.¹⁵ As I will discuss later, Jackson's *While Glaciers Slept* attempts to fill this gap, in part by detailing her responses to harrowing moments in her personal life—the amputation of her mother's leg after a car accident, the cancer diagnoses and deaths of both her parents—to amplify the insights about the impact of climate change readers glean from her glaciological research.

Jackson's later book, *The Secret Lives of Glaciers*, draws on a year of ethnographic inquiry into Icelanders' attitudes about glaciers and climate change. Because her own life story takes a backseat to those of the Icelanders she interacts with, this text falls less squarely into the memoir genre, but Jackson remains a keenly observant, self-reflective presence in the narrative. Her project aims 'to shift the narrative needle on

how people worldwide think about glaciers, and to arouse greater consideration of the complexity and richness amongst ice and people that varies by place and time'.¹⁶ By recounting and analyzing conversations with Icelanders with diverse attitudes about climate change, she demonstrates that '[h]ow people understand change, and what value they assign it, filters through their own culture—and, I would hasten to add, their own personal experiences'.¹⁷ She asserts that to achieve a large-scale, collective approach to addressing climate change, 'it is essential to begin paying attention to the cultural stories people tell about their backyards. It is these stories that often determine what people see and cannot see, and how people fit themselves into larger processes at play'.¹⁸ Both as a memoirist and an ethnographer, Jackson upholds the telling of life stories as indispensable to combating resignation and despair in relation to climate-change; she dismisses all-is-lost pronouncements by scientists like James Lovelock, who has claimed that human beings lack the capacity to combat climate change, as 'a complete waste of words'.¹⁹

Among the four texts I consider here, Jemma Wadham's *Ice Rivers* offers the most extensive explanations of the procedures and findings of glaciological research, but like Jackson, Wadham anchors the science in a personal story involving illness and loss, including the death of her father in a car accident when she was eight, a miscarriage, and her mother's terminal breast cancer. In her introduction, Wadham echoes Jackson's concern about the rhetorical inadequacy of data on climate change: 'Our news feeds are bombarded daily with reports of waning glaciers, but I can appreciate that to many people these are impersonal tales with little meaning. *Oh, there goes another glacier, how sad!*'.²⁰ At a high point in her career, emergency surgery for a brain tumor diminishes Wadham's cognitive capacities, making scientific writing difficult, and she struggles to overcome the existential crisis of her near-death experience. 'Fortunately,' she writes, 'at a time when I lacked belief in almost everything I'd ever done or would ever do, my passion for glaciers remained undimmed, and I tentatively began to wonder how I might share my discoveries as widely as possible, while I was still alive'.²¹ The impulse to reach an audience beyond her fellow scientists guides her toward personal narrative: 'Then one day I tried a different tack and started for the first time to write creatively about my life with glaciers. I had no expectations of what I could or couldn't do—it was my own secret project. It felt very liberating'.²² *Ice Rivers*, a text deftly melding the discourses of glaciology and life narrative, is the outcome of Wadham's leap into an unfamiliar genre.

Like Jackson's *Secret Lives*, Andri Snær Magnason's *On Time and Water* focuses on Iceland and its imperiled glaciers. This wide-ranging book integrates the results of scientific studies, reflections on Icelandic literature and language, and accounts of Magnason's own climate activism (including two interviews with the Dalai Lama) into a profoundly personal life narrative. He begins the book by recalling the sudden meltdown of Iceland's economy in 2008, an event Magnason describes as so shocking as to be unspeakable. 'When a system collapses,' he writes, 'language is released from its moorings [...] People find it difficult to hit upon the right phrasing, to articulate concepts that match their reality'.²³ He moves on to compare Iceland's economic crisis with the global climate crisis, both of which 'surpass any of our previous experiences, surpass most of the language and metaphors we use to navigate our reality'.²⁴ In *On Time and Water*, Magnason turns to life narrative in an attempt to find a language that can adequately convey the all-but-unspeakable reality of climate change. He recalls a conversation with climate scientist Wolfgang Lucht, who admits that specialists in his field have trouble communicating to lay audiences. "'We publish computer models and diagrams according to established scientific conventions; people look at them and nod and take them in to a certain degree, but they do not *understand* them, not really'",²⁵ Lucht says, later adding, "'people don't understand numbers and graphs, but they do understand stories. You can tell stories. You must tell stories'".²⁶ In *On Time and Water*, Magnason takes on this challenge, weaving his wide-ranging research on climate science into a story encompassing several generations of his family, his study of Icelandic literature, and his country's social and ecological history.

Both scientific reports and autobiographical texts involve a pact between author and reader, based in part on the verifiability of factual claims, but also on the author's ethos as a credible witness. In their 2001 book *Greenspeak*, a linguistic analysis of environmental discourse published in the same year as the IPCC's Third Report, Rom Harré, Jens Brockmeier, and Peter Mühlhäusler mark the difference between the rhetorical function of scientific truth-claims and the moral arguments of environmentalists, observing that 'moral and aesthetic discourse assumes, for one thing, that there is a further dimension of truth altogether, which is occupied by moral truths, and these cannot be reduced to truths of the kind recognized in geography, geology, and the other natural sciences. So they have to be given some other kind of accreditation'.²⁷ In their life writing, Jackson, Wadham, and Magnason simultaneously leverage their credibility as experts on glaciers and mobilize self-exposure and confession to present themselves as expert witnesses to their own experiences. By mooring the narrating 'I' to rapidly shrinking glaciers, their texts draw the objective

reporting of facts into the sphere of subjective but no less trustworthy testimony, where facts articulate with moral truths.

‘Coming to terms’ seems an apt expression for these writers’ recourse to life narrative in an attempt to wrap their own and their readers’ heads around the enormity of climate change as evidenced in glacial recession. ‘Term’ denotes both a limited period of time and a word with a context-specific application. It derives from *terminus*, Latin for ‘boundary’ or ‘end point’, and *terminus* is the scientific term for the front of a glacier, more informally called its ‘snout’ or ‘toe’, the site where glacial melting is most visibly apparent. Terminal illnesses end in death, and all signs point to the terminal condition of many of Earth’s glaciers. Jackson, Wadham, and Magnuson endeavor to come to terms with the gravity of this situation through strategies that ally the terminology of science with the tropology of narrative discourse. In one such strategy, they turn quantitative means to qualitative ends by aligning the stepped-up timeline of glacial recession with the finite span of individual human lives to dramatize—and personalize—the alarming acceleration of that loss.

Scaling Glacial Time

To underscore how, as Magnuson puts it, ‘Earth’s mightiest forces have forsaken geological time and now change on a human scale’,²⁸ all four of these life narratives situate the term limit of an individual human life within two geological time frames: the recent past, in which glacial recession has alarmingly accelerated, and a foreseeable future in which many of Earth’s glaciers may no longer exist. This narrative strategy represents the ‘recalibration of times’ that Harré, Brockmeier, and Mühlhäusler identify as a recurring feature of environmentalist discourse, as ‘[t]o talk about nature requires us to formulate assumptions or presuppositions about the temporal order(s) in which we believe ourselves to live (or we believe we once lived in before the ecological crisis “broke out”).’²⁹ In a later essay, Brockmeier argues that a synthesis of time frames is also a key component of autobiographical writing: ‘In being transformed into the diachronic structures and thematic aspects of a story, episodes of fundamentally different temporal dimensions appear to be fused in one order, the order of autobiographical time.’³⁰ In each of these texts, human-sizing the temporality of glacial melt emphasizes the urgency of the threat to glaciers and to the well-being of the planet as a whole, but by implying that glaciers, like humans, are *mortal*, it also undergirds these writers’ overarching claim that glaciers have *lives*

worthy of respect and protection, and not only because we view them as canaries in the coal mine of climate change.

As I mention above, Jackson represents the rhetorical shortcomings of scientific discourse in terms of temporality. She goes on to mark its failure to offer ‘a “right now moment” where we greet the unimaginable, interact with it, and let climate change into our homes and hearts and imaginations’.³¹ In *While Glaciers Slept*, Jackson uses her own age as a ‘right now’ benchmark to orient readers within the timeline of environmental degradation. ‘I am thirty years old’, she tells us in her first chapter. ‘For my entire life, the landscape has been fluctuating because of anthropogenic climate change. Anthropogenic. That means us—humanity—our actions and choices and emissions and denials and inabilities to work together’.³² The polysyndeton in the last sentence here is a recurring feature of Jackson’s prose in *While Glaciers Slept*, the breathless phrasing conveying the urgency of her message. Later in her memoir, Jackson refers to what scientists postulate as a ‘climate lag’ of forty years between the causes and measurable effects of changes in Earth’s climate, which means that the impact of emissions at the time of her writing won’t be detectable until 2050. ‘I will be sixty-eight years old then. Today, that seems unimaginable’.³³ While Jackson compares our resistance to envisioning the future devastations of climate change to disavowals of our own ageing and death, she quickly adds that while the world will have changed by 2050, ‘Where it won’t be is at the end’,³⁴ implying that accepting our lives’ term limits need not parallel a fatalism in regard to Earth’s future.

Like Jackson, Wadham coordinates the progress of climatic changes with her own life span, focusing more specifically on glacial recession. She opens the afterword to *Ice Rivers* by looking back over her career, noting that

[e]very glacier I’ve written about has shrunk during the twenty-five years that I’ve been studying them, to different degrees depending on how much the air and oceans around them are warming, and the character and circumstances of each individual glacier. The same is true of the overwhelming majority of glaciers in parts of the world I’ve not had the fortune to visit.³⁵

This retrospective passage follows a proleptic speculation at the end of her final chapter. Recounting her return to Pastoruri Glacier in Peru after a long recovery from brain surgery, Wadham contemplates the uncertainty of her own and the glacier’s future: ‘Maybe it would be here in twenty years, maybe it wouldn’t. Maybe I would, maybe I wouldn’t’.³⁶ Before the onset of the Anthropocene, twenty years was hardly

a blip in glacial time, but as Wadham suggests here, the anthropogenic decline in the health of glaciers now makes it possible for an individual human being and a glacier to share the same grim prognosis.

Magnason's *On Time and Water* offers the most sustained and elaborate examples of the scaling of geological time to human proportions, expanding their scope to encompass several past and future generations of his family. Noting that his grandfather was born four years after World War I, Magnason reflects on 'how the world can change in a lifetime. I think about all the wars and all the progress, all the revolutions in the arts and sciences, and I think forward a hundred years into the future as I try to evaluate and understand scientists' predictions about where we are heading'.³⁷ 'Thinking forward' is a recurring theme in *On Time and Water*. In an early chapter, Magnason asks his ten-year-old daughter, Hulda Fillipía, who was born in 2008, to determine the year in which she will be as old as her ninety-four-year-old great-grandmother, and then the year her own ten-year-old great-granddaughter, if she were born in 2092, would turn ninety-four. When she arrives at the correct answer, Magnason delivers the lesson embedded in the puzzle: through her influence in loved ones' lives, Hulda Fillipía 'can have a direct impact on the future, right up to the year 2186'.³⁸ Magnason reprises this game in the final chapter of his memoir, 'A future conversation', projecting a scene in 2102 in which Hulda Fillipía, now in her nineties, asks her twelve-year-old granddaughters the same questions and responds to their answers in the same spirit, assuring them that 'your time is also the time of the people you will know and love. The time that you will shape. Everything you do matters. You create the future every single day'.³⁹

In the context of glacier science, the temporal scaling these authors employ can be seen as a literary analog to the technique of 'repeat photography', which juxtaposes a photograph of a glacier from the past with a photograph at a later date, taken at the same time of year from the same vantage point, to track the reduction in a glacier's mass over time. The box of materials my mother labeled 'Arthur Johnson (for John)' contained a large album of photographs of Nisqually Glacier, one of the sites of my grandfather's fieldwork. It includes many examples of repeat photography, one comparing shots of Nisqually from August 1915 and August 1943.

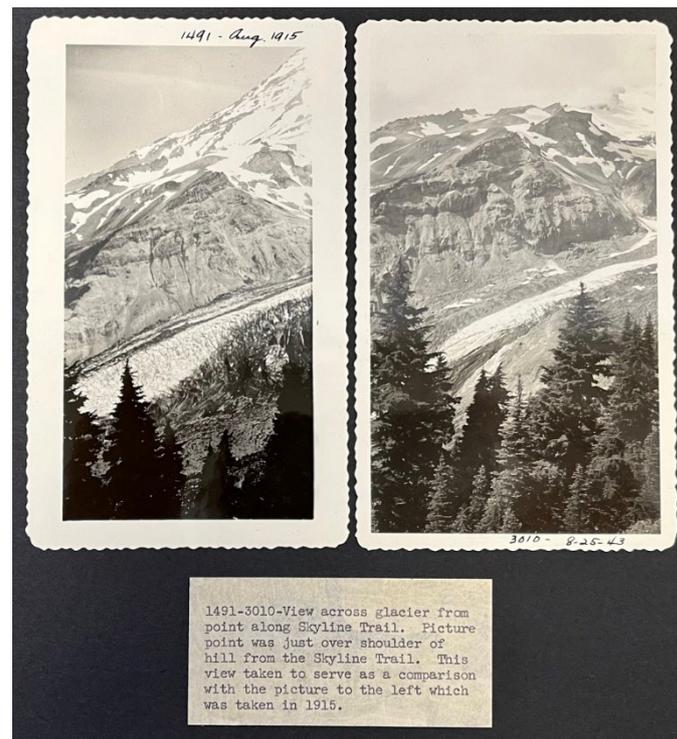


Illustration 1: Repeat photographs of Nisqually Glacier in 1915 and 1943. Archive of Arthur Johnson.

Dani Inkpen has argued that ‘repeat photographs typically isolate glaciers from their shared histories with humans and other beings’⁴⁰ and notes that when, in the mid-twentieth century, this comparatively crude method was largely overtaken by more precise types of measurement, glaciologists turned the camera onto themselves to document their activities. Wadham’s *Ice Rivers* reflects this practice with its glossy insert of photographs of Wadham and her coworkers on the glaciers they have studied, and the pages of Magnason’s memoir are interspersed with black-and-white photographs of his family’s glacier expeditions, but as I indicate above, all three authors structure their narratives in ways that mirror the then-and-now images of repeat photography, ‘putting themselves in the picture’ to illuminate humans’ shared histories with glaciers.

An example of amateur repeat photography makes an appearance in Jackson’s *Secret Lives* in her account of a conversation with Jökull, an Icelander who throughout his life had visited the glacier Skálafellsjökull, often in the company of his father. Like Jackson’s parents, Jökull’s father died of cancer, and a sequence of images recording Skálafellsjökull’s shrinkage inspires a comparison:

He pulled out his phone and showed me images of Skálafellsjökull from five, six, and ten years previous. The change in the glacier was easily discernable. Jökull said that he worried about his friend Skálafellsjökull—that each time he visited Skálafellsjökull, the glacier looked decrepit and sick. It reminded him of how his dad looked when he went through chemotherapy.⁴¹ Depicting Jökull’s backward glance through a decade of images, Jackson shows how Skálafellsjökull, like Wadham’s Pastoruri, faces an existential crisis on the scale of a terminal human illness.

In *On Time and Water*, Magnason conjures a future scene involving repeat photography that follows the pattern of the other instances of prolepsis in his narrative. ‘When I turn ninety’, he writes, ‘I will show my thirty-year-old grandchild pictures of Skeidarárjökull on a projector screen. They’ll see a glacier that three generations of my family had the opportunity to get to know before it vanished. When I take a photo of a glacier, it’s like I’m recording and preserving an old woman singing an ancient lullaby’.⁴² Here, as throughout his narrative, Magnason’s projections into the future of his family and of Iceland’s glaciers address Jackson’s concern in *While Glaciers Slept* that ‘[w]e do not look to the future because we do not see it’.⁴³ His simile between glacier photography and the preservation of cultural heritage envisions a relationship in which all parties are equally valued. For all three writers, scaling glacial time to human proportions evokes a relationality that puts human beings and glaciers on an equal—and equally precarious—footing.

Relating to Glaciers

In life writing studies, ‘relationality’ has been theorized as a constitutive dimension of human subjectivity that is reflected in the formal features of autobiographical discourse. In Paul John Eakin’s influential formulation, autobiographical texts reveal ‘the extent to which the self is defined by—and lives in terms of—its relations with others’.⁴⁴ Scholarship in the field has been extending these relations into the biosphere, to ‘others’ conventionally understood as alive, primarily animals, for example Cynthia Huff and Joel Haefner’s work on ‘animalographies’, but also plants (Hughes-d’Aeth; Ryan). In their life narratives, Jackson, Wadham, and Magnason invite us to conceive of a relationality encompassing Earth’s geosphere, where glaciers live (and die) in mutually dependent relationships with human beings. Their writing reflects the movement toward the radically inclusive ‘planetarity’ in contemporary literature and art Elias and Moraru document in their 2015 edited volume *The Planetary Turn*, which sets out ‘to start mapping this expanse, that is, to begin to read the planetary as a

repertoire of aesthetic routines *structurally presupposing and further stimulating relationality*'.⁴⁵ In their introduction, the editors ask, 'in what kind of stylistics, if any, are planetarity's relationality and dialogics couched?'.⁴⁶ An examination of the narrative discourse Jackson, Wadham, and Magnason employ suggests some answers to this question.

Jackson's prose in *While Glaciers Slept* is particularly rich in tropes that fuse scientific and poetic discourse to convey intimate bonds between human and glacial lives. In one lyrical passage, she interrupts a list of topographical features that determine a glacier's flow with stressful upheavals in human lives. 'The stress', she explains, 'might be an leftward or rightward flow around a mountain, a sudden uphill or downhill, a change in earth material, an unsettling rumor or a doctor's diagnosis; it might even be the invasion of another glacier, intruding, overtaking'.⁴⁷ She later crafts a simile linking human despair and the effect of diminished precipitation on glacial ice, explaining that '[t]he less snow or water a glacier is able to take in, the more a glacier will shrink, like a person no longer able to hope or have faith'.⁴⁸ In *While Glaciers Slept*, Jackson's relationship with her mother often serves as the vehicle of her metaphors, as when she describes her emotional struggle concerning her role in the car accident that led to the amputation of her mother's leg. A young girl at the time, she had pressured her mother to drive her to a store to buy a coveted pair of plastic 'jelly shoes', and for years she dealt with her sense of responsibility by disavowing it altogether. Spinning this experience into an allegory for climate change, she asks, 'What happens if the planet finds herself driving down a lonely stretch of highway in mid-afternoon with her child clutching a pair of jelly shoes to her chest?'.⁴⁹ In the following pages, she unpacks the allegory, acknowledging that while she realizes she did not directly cause the accident, 'looking back at my teenage self, I see countless parallels between the way I responded and how people are responding to climate change. We seem so busy not being responsible'.⁵⁰ Figuring Earth as a parent on whom we depend *and* who is vulnerable to the direct and indirect consequences of our choices, Jackson illuminates our complex ethical stance in relation to the environment.

Jackson returns to a parental metaphor in *Secret Lives* when she analyzes her conversation with Jökull about Skálafellsjökull Glacier. 'What struck me as we talked', she writes, 'was how clearly Jökull perceived a livingness, an inner personality, a force of life, emotions, and consciousness in Skálafellsjökull—he sensed something intangible in the ice that was as real to him as his father'.⁵¹ Expanding on this comparison, Jackson goes on to suggest that 'perceiving sentience might also include perceiving a partnership—perhaps even a responsibility for and of that sentient thing

and that sentient landscape that thing lives within. It might include caring about that glacier the way you might care about a family member or a friend'.⁵² Here again, Jackson's language positions humans as accountable to a living, conscious natural world.

Although the synthetic tropology Jackson employs in both her books cannot evade an anthropocentric anthropomorphism, I would argue that it engages in the 'careful and strategic forms of anthropomorphism' John Charles Ryan, drawing on Alexa Weik van Mossner and Jane Bennett, ascribes to ecologically attuned writing on plant life.⁵³ Jackson herself recognizes the pitfalls of anthropomorphism. In a section of *Secret Lives* that begins '[i]magine, for a moment, a glacier *alive*',⁵⁴ she privileges the concept of sentience over anthropomorphism, personification, and teleology (purposeful self-direction) as a means of imagining glacial 'aliveness'. For her, sentience is a key dimension of animism, 'a sophisticated ontological position...which is predicated on diverse relations with the environment and the world as a whole'.⁵⁵ Jackson attempts to attune her style to this ontology of relationality; in many of her metaphors, vehicle and tenor melt into each other, shifting comparisons toward equivalencies. In this regard, the figures of metonymy and synecdoche—signifying by way of adjacency, contiguity, *pars pro toto*—may more fittingly apply to her overarching aim to convey intimate, mutually defining connections rather than to compare essentially unlike things.

Alongside the perhaps unavoidable risk of anthropocentrism, Jackson's efforts to ascribe aliveness to glaciers also runs the more avoidable risk of cultural appropriation. In her discussion of animism in *Secret Lives*, Jackson acknowledges that Indigenous cultures throughout the world attribute sentience to natural phenomena, and she offers numerous examples, including a reference to Julie Cruikshank's anthropological research with Tlingit and Athapaskan elders in Alaska and Yukon Territory in *Do Glaciers Listen?*.⁵⁶ This recognition is important, Jackson argues, 'because, contrary to common assumptions, perceiving something as alive that is more than human is not just within the prerogative of Indigenous, First-Nations, or Aboriginal Peoples. It could be perspectives held by you, me, or anyone worldwide'.⁵⁷ Such invitations to universalize raise a difficult ethical and political question: where does learning from Indigenous relationships with nature veer into an instrumentalization of Indigenous knowledge, by which, as Cruickshank warns in the conclusion of *Do Glaciers Listen?*, Indigenous communities 'face double exclusion, initially by colonial processes that expropriate land, and ultimately by neo-colonial discourses that appropriate and reformulate their ideas'?⁵⁸ More recently,

dAXunhyuu geographer Jen Rose Smith has echoed Cruickshank's concern, arguing that tapping communities like hers for 'alternative' ecological viewpoints 'articulates Arctic Indigenous peoples not as so many autonomous sovereign polities, but as a potential resource of land-based knowledges that can recover a global "we" from self-inflicted destruction'.⁵⁹ I point to Jackson's recruitment of Indigenous perspectives—a move now *de rigueur* in so much scholarship on climate change—not to impugn it, but rather to highlight the pitfalls well-intentioned non-Indigenous writers like Jackson, Wadham, and Magnason must always negotiate when they venture across ontological and cosmological boundaries.

Wadham and Magnason also look to non-Euro-American cultures for conceptions of glacial aliveness, sentience, and agency. One of Wadham's contributions to glacier science was confirming that the beds of glaciers host anaerobic microbial life, a discovery indicating 'that a large area of the planet beneath glaciers, previously assumed to be essentially dead, was very much alive'.⁶⁰ In light of this discovery, Wadham argues, we must reorient our perception of glaciers 'as frozen, sterile wastelands' and see that they are 'as much a part of Earth's biosphere as the forests and the oceans'.⁶¹ In the course of Wadham's expeditions to glaciers around the world, this empirical observation about the life of glaciers takes a metaphysical turn as she learns about the cultural value of glaciers in various regions. She observes that in the Gilgit-Baltistan region of Pakistan, local inhabitants attribute not only life but sex to glaciers and propagate these essential water sources by combining ice from male and female glaciers.⁶² Later, describing her work in the Cordilla Blanca in Peru, she devotes a paragraph to the Quechua people's 'deep spiritual relationship with their water and glaciers through the spirit gods—the *Apus* (Lords) and *Pachamama* (Mother Earth)—who reside in the mountains and ensure the success of their crops'.⁶³ In her chapter on the Himalayas, Wadham most closely connects her own life experience with another culture's conceptions of glacial life and agency. Admiring Hinduism's reverence for the Ganges, sourced by Gangotri Glacier, she is 'very taken by the idea that glaciers and springs were the realm of living goddesses with the power to cleanse and give life' because on her research expeditions she 'had at times felt close to some kind of vitality that was neither human nor born of the terrain'.⁶⁴ Wadham asserts that these numinous experiences do not conflict with her commitment to empiricism, remarking that while science cannot explain all phenomena, 'It doesn't mean they don't happen. The same goes for events in my personal life'.⁶⁵ She then offers a striking example: 'swamped by grief' after her mother's death, she visits a medium, who summons her mother's spirit and channels such precise details about her mother's final days that

Wadham is assured of the contact's credibility. Wadham leaves the session 'slightly unnerved that my entire world view up until that point had been so very one-dimensional'.⁶⁶ Striving to open a space in which the different truth claims of science, belief systems, and personal testimony can not only coexist but reinforce each other, these passages from *Ice Rivers* encapsulate the rhetorical task all three of these writers undertake.

Magnason's training in literary studies is evident in his philological approach to drawing connections among different cultural perceptions of glaciers. When he recalls the Old Norse *Prose Edda's* attribution of the origin of the world to Audhumla, a cow born of frost who in turn gives birth to Ymir, whose body becomes the whole of the natural environment, he is struck by the resemblance of this story to the Hindu account of Kamadhenu, a primordial cow 'closely related to the sacred Pritvi, which is the Earth itself, often depicted as a cow'.⁶⁷ He goes on to identify a region in Nepal called Humla, the long-favored starting point for travelers to the sacred sites Mount Kailas and Lake Manasarovar, fed by Kailas's glaciers and the source of four major rivers in the region.⁶⁸ 'Could it be that there is some connection there?' Magnason asks. 'Actually, there is a word in Icelandic (*samband*) that's also in Hindi (*sambandh*): they both mean 'connection'. Everything is related to everything. Everything fits'.⁶⁹ In *On Time and Water's* penultimate chapter, Magnason inserts his own life and work into these speculative connections, returning to the *Prose Edda's* primordial cow and professing, 'I believe Audhumla revealed herself to me and made me write this book so as to secure my children's lives and future'.⁷⁰ Like Wadham's encounter with her mother's spirit, Magnason's epiphany invites readers to accept a claim that magnifies, rather than contradicts, the empirically verifiable data his text abundantly incorporates.

With his dive into world religions and Indo-European linguistics, Magnason takes part in the 'resurgence of interest in translation as comparative reading and cultural interaction' Elias and Moraru identify in the turn to planetarity in critical studies,⁷¹ and in different ways, each of these writers suggests that a comparative, cross-cosmological orientation can advance our understanding of human-nonhuman relationships and cultivate 'an ethics of care for both organic and inorganic planetary resources and a social stance mindful to conserve cultural legacies'.⁷² For them, the recognition of a global, collective obligation to preserve glacial ice begins with local, individual responses to its loss.

Grieving Glaciers

By scaling glacial time to human proportions and ascribing sentience to glaciers, Jackson, Wadham, and Magnason all attempt to narrow the gap between our experience of devastating losses in our personal lives and our experience of the environmental devastation wrought by anthropogenic climate change. In doing so, they suggest a tentatively affirmative answer to Judith Butler's question of whether 'the situation of mourning' can 'supply a perspective by which to begin to apprehend the contemporary global situation'.⁷³ Figuring glacial and human lives as equally grievable, they propose that glaciers are morally considerable entities whose destinies are inextricably conjoined with ours.

'Death is almost unbearably common', Jackson remarks in the opening chapter of *While Glaciers Slept*, 'as much as it is, simultaneously, almost unimaginable for each of us as individuals'. In the next line, she writes, 'I observe this to be the same with climate change'.⁷⁴ Jackson's parents died of cancer less than two years apart, and the impact of this loss reverberates through *While Glaciers Slept*. In the opening pages of her memoir, she sets the stage for an ongoing alignment of the 'almost unimaginable' deaths of beloved humans with the 'unthinkability' of climate change: 'I cannot untangle in my mind the scientific study of climate change and the death of my parents. My whole life, climate change has been progressing, and I cannot understand realistically what has happened to my family without stepping back and seeing what is happening to this world'.⁷⁵ Jackson goes on to fold her personal narrative into a passage relating the flight of plant and animal species into the refuge of cooler regions as their environments warm. Like theirs, 'my personal climate has fractured and splintered and the topography of the landscape is unrecognizable and I find the change is anthropogenic and has a name—grief—and I'm looking for refuge'.⁷⁶ Here again, Jackson employs polysyndeton, her sentence building to a climax that situates emotional responses to personal and planetary desolation within the category of grief. The loss of her parents intensifies Jackson's intuitions of a relationality binding humans to the environment. After her mother's death, Jackson longs to 'tell her my life, my thoughts, the evidence that I've found that I am surrounded by the deep overlap of the human and more-than-human worlds—that this myth of two separate, different worlds, ours and theirs, isn't true'.⁷⁷ For both Jackson and Wadham, a parent's death renders 'thinkable' phenomena that confound, yet can coexist with, scientific inquiry.

Jackson's *While Glaciers Slept* points to the ethical implications of this meshing of parental and glacial mortality. In her description of her flight home to be with her

mother as she died, Jackson asks, ‘Can we live without glaciers? Yes. But what kind of life would that be? Would we miss the mothering capacity of our global thermostats?’⁷⁸ Later, in a discussion of Iceland’s success in tapping its volcanic landscape for sustainable energy, she addresses her American readers and asks, ‘As a nation, we can live without geothermal renewable energy. But should we?’⁷⁹ Jackson’s juxtaposition of the questions ‘can we?’ and ‘should we?’ echoes Immanuel Kant’s crucial distinction among technical, hypothetical, and categorical imperatives. Humans may possess the skills to devise solutions to survive in the absence of glaciers (the provision of the technical imperative), and doing so would preserve human well-being and happiness (the aim of the hypothetical imperative), but *should we?* implies the categorical imperative, a recognition of glaciers as morally considerable ends in themselves rather than only as means to serve human needs. In *Secret Lives*, Jackson returns to this moral position, arguing that caring for glaciers ‘includes caring for glaciers as independent of people, but also as connected to people. What happens to one impacts the other. There is then a mutual implied responsibility—perhaps even implied moral choices, issues of equity or ethics’.⁸⁰ Though we must acknowledge that Kant’s formulation of the categorical imperative restricts it to our treatment of ‘humanity’, and that Jackson’s metaphors of ‘mothering’ and ‘thermostats’ lapse into anthropomorphism and instrumentality, her attempts to draw glaciers and humans into an ethically fraught relationship exemplify how representing a planetary relationality, along with its moral ramifications, puts pressure on autobiographical discourse and ethical philosophy alike.

Wadham’s and Magnason’s texts also bring responses to personal losses and glacial demise onto the common ground of grief. Wadham relates that after a miscarriage, ‘I entered a tailspin of grief and loss, and my relationship followed my emotions down into the abyss. To escape the hole I was in, I needed to reconnect with the glaciers which had fueled my passion over twenty years’.⁸¹ Her deep psychic investment in glaciers comes to the fore when she returns to Pastoruri Glacier after her brain surgery. She recounts that while standing at the glacier’s terminus, ‘I felt a tectonic shift in my mind’.⁸² This geological metaphor sets the stage for Wadham’s imbrication of her own mortality and the glacier’s:

As I approached, tears streamed down my face—this glacier was so beautiful, so solid, so pure and yet inexorably melting away. I leaned in, stretching out my arms to embrace it like an old friend. I pressed my face into the tiny sharp ice crystals on its vertical face, and its melt combined with my tears, and together they flowed

down my face. Maybe it would be here in twenty years, maybe it wouldn't. Maybe I would, maybe I wouldn't.⁸³

While some readers might register an excess of sentimentality in this passage, in the context of the whole of Wadham's narrative, it represents the culmination of her alignment of her own dwindling life span and the retreat of glacial ice.

Wadham's visit to Pastoruri also appears to have corresponded with the shift in her writing practice that led to *Ice Rivers*. Describing a pivotal encounter with the Peruvian artist Erika Stockholm, she relates that she and Stockholm 'learnt that we were both storytellers, but constrained by different conventions and notions of how our stories should be told. Mine in data and facts; hers in happenings and feelings'.⁸⁴ Together they develop and stage a performance piece centered on Peru's Shallap Glacier, the runoff from which sheds toxic metals into the water supply for communities downstream. Wadham performs the role of the glacier itself, and the opportunity 'to express long-suppressed emotions—to be freed from the straitjacket of scientific conventions—felt incredibly cathartic, and I was stunned when audience members approached me afterwards and revealed that they'd wept as the glacier sickened, as it poisoned its river, and as it finally died. They wanted to know, what could they do?'.⁸⁵ For Wadham, the spectators' response testifies to the capacity of art—supported by science—to inspire a shared grief that gives rise to a shared commitment to undoing the institutional forces that simultaneously degrade the environment and dispossess human communities.

Magnason offers a particularly powerful fusion of mourning and motivation. In a chapter entitled 'Writer's block', he recalls his visit to Iceland's wilderness region Kringilsárrani before it was flooded by the Kárahnjúkar hydroelectric dam in 2006 and his writing at the time in support of preserving the area as a national park. 'I'd found myself overwhelmed by melancholy at the unruly devastation that washed out this peerless region', he writes, 'yet I chose words that seemed moderate and inviting to readers. I used the prevailing language of innovation, liberalism, utilitarianism, and marketing'.⁸⁶ *On Time and Water* represents Magnason's turn to life writing for his environmental advocacy, and in 2019, the year his book appeared, that turn took the form of an obituary. In that year, Iceland's Okjökull lost its designation as a glacier, and Magnason was commissioned to write the memorial affixed to the monument commemorating the dismal event. It reads, 'Ok is the first Icelandic glacier to lose its status as a glacier. In the next 200 years, all our glaciers are expected to follow the same path. This monument acknowledges that we know what is happening and what

needs to be done. Only you know if we did it'.⁸⁷ Here, as throughout *On Time and Water*, Magnason scales the temporality of glacial recession to the spans of present and future human lives. His admonition implies that mourning Okjökull 'furnishes a sense of political community of a complex order, and it does this first of all by bringing to the fore the relational ties that have implications for theorizing fundamental dependency and ethical responsibility'.⁸⁸ Reported in international news, Magnason's brief message has reached a wide audience; its impact on perceptions and behaviors, as Magnason suggests, remains to be seen.

While Jackson, Wadham, and Magnason express grief at the impending deaths of glaciers, they caution against succumbing to pessimism and resignation. Wadham concludes *Ice Rivers* by quoting Magnason's memorial to Okjökull, tapping its monitory energy, and though Jackson recounts that in reading Joan Didion's *The Year of Magical Thinking* after her mother's death, 'I recognized in myself the signs Didion wrote of, the impasse of grief and sadness',⁸⁹ she insists that in confronting climate change, we cannot remain at an emotional impasse but must act collectively in response to the mutual vulnerability of human beings and the environment. Recruiting strategically anthropomorphic metaphors, she asserts, 'People need glaciers, just as glaciers now need us. Sudden crevasses in our lives can leave us helpless and alone, but we are never isolated for long. What makes up a glacier, I remember, is millions and millions of little snowflakes, reaching out to one another, grasping hands'.⁹⁰ Magnason likewise calls for a globally collective response: 'Since humankind faces a shared challenge, the world's nations will be forced to work together in an unprecedented way'.⁹¹ Along with Donna Haraway, all three writers encourage us to learn how 'to mourn without despair, so as to stay with the trouble',⁹² presenting grief as a catalyst for a forward-thinking, determined, concerted response to the meltdown of our world.

I don't know if my grandfather grieved the vanishing ice of the glaciers he studied, or if he accepted the theory of anthropogenic climate change that was emerging in the last years of his life. Unboxing his archive reawakened my own grief at his passing, adding to it a measure of remorse. I now find myself envying Magnason's access to his own grandparents' accounts of their adventures on Iceland's glaciers, and as I read Jackson's *While Glaciers Slept*, one sentence hits me particularly hard. When we acknowledge the perils of climate change, she writes, 'We know what is at stake, what we stand to lose, the extensive conversations we have not held yet with our dying parents'.⁹³ I do know, however, that glaciers enriched Arthur Johnson's world. One of the farewell letters he received from colleagues on his retirement from the USGS refers

to Nisqually Glacier as ‘your baby’. My mother tells me that he loved the glaciers, and she points to a photograph from his last visit to Glacier National Park in 1973, when he was seventy, as a testament to his devotion. Placed alongside a portrait from early in his career, it offers a human-scale example of repeat photography.



Illustration 2: Arthur Johnson, n. d.



Illustration 3: Arthur Johnson in Glacier National Park, 1973.

Many of the photographs of Nisqually in my grandfather’s archive have been cut into sections and spliced together to achieve a panoramic view, often extending beyond the album’s pages.



Illustration 4: Compositing photograph of Nisqually Glacier in 1949.
Archive of Arthur Johnson.

In my view, these composited images emblemize the need to stretch our resources for representation to grasp the enormity of climate change, not only to document it but also to *interpret* and *understand* it. I have tried to show how Jackson, Wadham, and Magnason stretch the resources of autobiographical discourse to augment the limited persuasive force of the discourse of the natural sciences, coupling what we can *know* about the planet's vanishing ice through glaciological research with what we can—and should—*think* and *feel* about it by way of an expanded understanding of the precarious existence we share with glaciers and of the moral imperatives our shared precarity entails. If we fall short of this understanding, we may simply sit back and watch as Earth loses its capacity to sustain human and more-than-human life, a loss no one will be left to grieve.

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Notes

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