Low-Carbon Research Methods

Low-Carbon Research Methods: Making Equity and Epistemological Gains through Decarbonising Academic Work

The Low-Carbon Research Methods Group

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Introduction: A Manifesto for Low-Carbon Methods

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This is a volume about research methods, carbon emissions, and the epistemological and equity gains that might be won through thinking these things together.

It begins with the axiom that our research methods do more than merely frame our studies of the world: methods make worlds, in and beyond academic research. This claim is, in part, common to most forms of social research training. Graduate students are increasingly taught that the means by which we study something—as well as how we subsequently disseminate our findings—do not stand outside of our objects and subjects of study, prior to and neutrally reporting data from afar. Methods instead are thoroughly entangled in the dynamics we analyse, the fields we join, and the character of the research communities therein. It is also often through method that the legacies of colonialism, ableism, sexism, and other forms of material and social violence subtly contour the kinds of knowledge we produce, the kinds of actions that knowledge makes possible, and the kinds of researchers that thrive in the academy. Demographically and epistemologically, methods are constitutive and as such are a site of action and activism. And so, when we talk about methods, we are also talking about power.

Power works through ideas and language, but also through matter. This is especially significant in the context of global climate change. On a warming planet, our choice and practice of research methods have impacts on the world not only through the specific insights they might contribute to the work of climate action, but also—and perhaps most directly—through the greenhouse gases (GHGs) that are produced in the course of our studies. When we undertake the kinds of scholarship that

require carbon-intensive work, we are, in small but significantly accruing ways, contributing to the making of future worlds—futures where our chances of halting warming at 1.5°C or even 2°C are diminishing, and with consequences unjustly distributed across the globe. Methods matter in the kinds of knowledge and knowledge-producing subjects that fossil fuels enable, as well as in the widening gyre of the climate impacts that we differentially contribute to and bear.

All this talk of power invites considerations of strategy. Methods also matter because they offer distinct opportunities herein. A focus on shared habits and standards, rather than discrete moments of personal fossil-fuel consumption, is all the more important because attempts to decarbonise the academy, like any other area of social life, risk slipping into unhelpful moralism and scalar lacunas if they are advanced only through blanket injunctions for individuals to use less resources. A narrow emphasis on greener consumer choices often requires participants to personally and haphazardly take on greater social and financial costs, while generally failing to secure larger structural reforms that would accelerate the adoption of lower-carbon alternatives for all or address extant inequalities in the labour system.

Approaching the issue through research methods helps us avoid these dilemmas, while opening up new avenues for action. Methods are among the key means by which professional norms and practices are evaluated and reproduced across the social body of a discipline. What's more, they are uniquely open to reinterpretation. Academics, more than most other workers, generally enjoy considerable freedom in defining and experimenting with both their topics and means of research, and value interventions in methodology as a practical and intellectual pursuit. We can mobilise this fact in our organising for environmental and social justice.

This book collects diverse and collaborative analyses on how we might do so. It takes an expansive approach to method—inclusive of diverse and evolving means of data collection, analysis, and research dissemination— though it focuses particularly on qualitative research and its digital and mobility infrastructures. Building on long-standing work on the constitutive role of scholarly practice (Barad, 2007; Law et al., 2011; Liboiron, 2021; Mol, 2002; Smith, 2021), its authors seek to trace and reassemble the role of fossil energy in our professional norms and work rhythms.

We do so across intersectional struggles over climate justice, labour conditions, and the shifting character and circulation of academic knowledge. We occupy many different positionalities, from career stages, states of employment security, academic disciplines, ability, and global locations within the humanities and social sciences. In keeping with commitments to climate justice, the book divides its focus between both scholarly communities in the Global South, who are experiencing the consequences of climate change at an ever-greater pace, and those in the Global North, who, even amid local inequities, have a responsibility to go further and faster in their decarbonisation efforts. Regardless of location, we do not act as critics seeking escape from the ethical and practical complexities of these problems; we are thoroughly in the middle of them—and are likely to always remain so. What then should we make of our position?

This introduction answers this question along several registers. It provides an outline of the general contours of the collective arguments in this volume. It also acts as a manifesto—a quick and dirty way of articulating problems and positions, of constituting a (potential) public, and soliciting new desires. The views here are broadly shared by the Low-Carbon Research Methods Group, and served as initial provocations for the chapters that follow. We hope that you feel the same mixture of urgency and curiosity that we do in weighing these questions.

0.1 Orienting Frames for Theory and Action

There are at least three different trajectories that bring us to the conjuncture of carbon and method, all with distinct timeframes, stakeholders, and models of change.

First and foremost, we might see the carbon intensity of our research as a straightforward site of climate activism: we want to decarbonise our academic work because we need to decarbonise everything. Meeting (or even sincerely striving for) the Paris Agreement's targets requires urgent and ambitious action across all sectors of the economy, most especially in elite and Global North institutions that produce an inequitable share of carbon pollution (Rogelj et al., 2015). If our goal is to act on this injunction, then our workplaces—and the highest-carbon components of our work—are obvious places to begin. This orientation urges us to ask: *What forms*

of collective action can we take, here and now, that will both prefigure and contribute to the carbon mitigation we so desperately need?

A different approach can be drawn from the energy transitions literature. The temporality of the question here is reversed; we begin with the assumption that, at some point in the future, significant restrictions on carbon emissions will be enacted. At that time, technologies that cannot be retrofitted to function with lower-carbon energy sources will become dramatically scarcer, while the price of new alternatives will be unpredictable and potentially extreme. Markets, technological innovation, and reactive legislation alone can't be relied on to serve our interests or to seamlessly maintain the work rhythms that have fossil energy at their core (Miller et al., 2013). Working back from this assumption is analytically useful as it helps us imagine and enact a planned transition towards lower-carbon industries and job markets, with the goal of lessening the impact on workers and communities that are currently tied up in high-carbon industries (and perhaps also finding redress for those that were blocked from fully joining that workforce in the first place). Coal miners and oil towns are often front of mind in such considerations, as energy transitions will bring obvious impacts to the social geographies of fossil-fuel extraction. Yet any workforce with ties to hard-to-mitigate emissions also has stakes in defining the terms of a just transition. This includes academia, with its ever more energy-intensive and mobile forms of work. It is therefore prudent to imagine how our workplaces and disciplinary standards might anticipate the coming energy transition, in order to better shape its terms and impacts. This orientation urges us to ask: *How can we prepare for a world that does not tacitly presume boundless access to fuel and electricity? Are our extant research practices equipped to adapt to this future? Who in our sector would be most impacted in such a shift, and what forms of redress might be needed to ensure socially and ecologically just outcomes?*

A third trajectory in and through the questions of carbon and method derives from the energy humanities, a relatively recently formed field of study that explores the complex interactions between energy systems and the forms of social life that evolved from and inform the distribution of different fuel and power regimes. Work in the field demonstrates how questions of fuel are never far from questions of culture, political values, and social relations—all of which are intimately tied to energy structures

that make certain kinds of social life possible at the expense of others (Petrocultures Research Group, 2016; Szeman & Barney, 2021; Szeman & Boyer, 2017). The aims of this research, like so many other forms of humanistic and social scientific inquiry, are both descriptive and political, seeking to better understand deeper barriers to ambitious climate action and the means by which we might advance a larger reckoning with the long-standing legacies of domination lingering in the infrastructures and norms of daily life. This orientation urges us to ask: *How can scholars self-reflexively approach the conjunction of our energy and social norms in the academy? How have our ideas of good scholarship been shaped by fossil fuels, and what new values might be needed to better galvanise transformations at our professional and epistemic foundations?*

0.2 Eight Theses on Low-Carbon Research Methods

From these orientations, and drawing on extended deliberations from the larger Low-Carbon Research Methods Group, we forward eight provisional claims about the ways climate change stands to alter not just what we research, but also how we do so.

0.2.1 Methods Are, to a Significant Degree, Always Questions of Mobilities

Travel underscores the work lives of most academics (Gärdebo et al., 2017). This is perhaps most obvious for colleagues who conduct ethnographic or archival research, almost always in locations far away from where they live and work. To access their data, and to be able to make strong ethical and argumentative claims with it, they need to travel—often quickly, and across multiple sites—and thus to fly. More broadly, this is also true of practically every mode of research exchange; our calendars are supposed to be full of conferences, all held in major hub cities (or sometimes in more alluring vacation destinations), compelling us to queue at the departures gate. Our movement is expected, valued, and often subsidised. For some, joining academia comes as a surge in both symbolic class mobility and actual mobility, with a travel budget financing conferences and research trips. Not travelling, whether by choice or by constraint, imperils our ability to disseminate our research, forge networks outside our institutions, and generally contribute to the shaping of our fields.

0.2.2 Mobilities Are Environmental—And Some Are Clearly Better Than Others

All this travel has a climate impact. Planes are, however, a particularly intensive case. Aviation accounts for about one third of a typical university's total emissions profile (Ciers et al., 2019; Hiltner, 2018) and about half to two thirds of the work-related carbon footprints of full-time academics (Nicholas & Wynes, 2019) in the Global North. Worryingly, these emissions are largely unconstrained by any external regulatory actions. Universities, overwhelmingly, do not monitor air travel emissions, let alone integrate them into sustainability plans (Glover et al., 2017). Aviation is also excluded from the wider framework of the Paris Agreement. CORSIA, the supplemental agreement drafted for the sector, is heavily predicated on questionable carbon offsets. What's more, even if CORSIA were to succeed, the sector would still use up 12% of the world's available carbon budget for remaining within 1.5°C of warming (Pidcock & Yeo, 2016). Moreover, unlike other forms of transportation, airplanes are technologies that presently cannot—and may never—be adapted to work with a low-carbon fuel alternative at cost parity, and so are likely to remain an indefinite and significant source of carbon emission (Lyle, 2018; Peeters et al., 2016). As such, all research practices that require frequent, far-flung air travel—be it to archives, conferences, field sites, or industry meetings—can thus be considered a high-carbon modality and a climate-justice problem (Katz-Rosene & Pasek, 2024; Pasek, 2020).

0.2.3 Methods Are a Means for Mobility (In)justice

In addition to these environmental harms, the politics of movement is a central means through which social and material inequalities are experienced and reproduced. Mobility justice therefore provides a key framework through which we can better analyse and think across these interrelated struggles (Sheller, 2018); the concept asks us to interrogate whether the ease and intensity of elite mobilities are purely private matters, and whether or how the hypermobility of the few produces negative effects for the many. Academic air travel is a case in point (Sheller, 2022). Academic aeromobility impacts the character and social composition of academic work: the benefits and demands of research and conference travel fall unequally on different kinds of scholars, and so shape the demographics

of the participants in our disciplinary fora, both in the kinds of scholars and in the perspectives that are overrepresented or absent therein.

Academic methods and ideals are largely structured around a kind of high-carbon, jet-setting subject: one that is able-bodied and has an abundance of research funding and time, easy access to visas and border crossings, as well as a paucity of teaching and care work obligations, all of which lets them make multiple short trips to the documents and practices they seek to study as well as to conferences to share those findings.

Prestige accumulates to the frequent flyer, as does a certain kind of epistemic impunity. Unethical research practices, often discussed under the banner of 'helicopter', 'parachute', or 'extractive' research, have high-carbon mobility at their core. A system that rewards this kind of researcher above others also contributes to existing inequities in academia: ones that disadvantage precarious workers, women, disabled researchers, and researchers in the Global South. The 'rock star' model of academia has a structurally intertwined relation to energy and equity that works to the detriment of other kinds of knowledge-production practices and subjects. It also burns way too much carbon.

0.2.4 Low-Carbon Methods Won't Necessarily Be Progressive

Targeting carbon emissions is a way to remedy many of these inequities and potentially lessen the disproportionate advantages accrued by the academy's mobility elites. This outcome, however, is far from guaranteed, and pursing such a goal in narrow terms may even lead to the reproduction of harm.

A key lesson to learn from the history of climate politics is that many mitigation policies come with negative material and cultural impacts on working people, which in turn provides opportunities for reactionary political manoeuvres (Büchs et al., 2011; Lewin, 2019). A 'climate-change fundamentalism', that ignores questions of social inequity in debates about energy transitions also tends to reproduce inequalities in new terrains (Baker, 2021, p. 74). Academia is not likely to be an exception to this rule. We can easily imagine a future of green austerity cuts that further marginalise scholars and intellectual traditions that already struggle to sustain themselves, while those with generous external funding and private wealth continue to enjoy high rates of mobility. Nor do we welcome a

remedy that is hyper-localist in its practical and ethical horizons, excluding the recruitment of international students or the embodied study of peoples and places beyond the university's backyard. Travel is integral to many research projects, partnerships, and life courses. It is speed and frequency—not distance—that are at issue.[1]

0.2.5 Digitisation Is Both a Solution and a Problem

Faced with these considerations, a common response is to simply digitise everything. The COVID-19 pandemic, and its temporary cessation of travel, teaching, and in-person gatherings, intensified this impulse, throwing us all inelegantly into the world of Zoom. As a result, online conferences, virtual ethnographies, digital archives, and video calls are, by now, common features of academic work. Could they provide the grounds through which a low-carbon suite of methods might be built?

In part, yes. Virtual conferences have dramatically better carbon profiles than meetings involving air travel, as well as the potential to reduce costs and improve accessibility for attendees (Hiltner, 2018; Pasek et al., 2020). Data from the early COVID-19 pandemic demonstrates remarkable improvements to the geographic, gender, and career-stage diversity of attendees at newly virtual events, despite the differential social pressures experienced during this time (Skiles et al., 2021). Digital methods, moreover, are already well in use within long-practised and emergently theorised feminist, queer, and anti-colonial ethnographic (Günel et al., 2020) and archival (McKinney, 2020; Powell, 2019) practices, where the ability to work across disparate sites, evolving systems of classification, and in more-than-textual modes provides distinct advantages.

And yet, an unqualified turn to the digital also poses its share of hazards. Many of these are methodological: digital methods cannot be flexibly swapped in for other modes of study; they constitute markedly different research projects, sites, and ethical complications (Venturini et al., 2018). Social protocols, hospitality, and care work function differently in digital spaces, and yet are ever more essential to the success of online research exchange (Bastian et al., 2022). A concerted evaluation of the practices of

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[1]We thank Shama Rangwala, Alexandria Barbera, and Miriam Mabrouk for their valuable insights on this point.

pandemic research is needed to assess the experiments that both worked and—significantly—fell short of our ethical and interpersonal standards. Simultaneously, we should resist the urge to quickly return to 'normal', forgetting lessons learned and radical possibilities entertained during this unique moment of exception.

Carbon is also a digital concern. The recent spike in video calls, as well as a longer trend towards large datasets, streaming media, cloud storage, and so-called artificial intelligence have contributed to an explosive growth in data centres, the massive buildings which store—and air condition—our data (Hogan, 2021; Obringer et al., 2021). While advances in energy-smart design have kept the electrical demand of these infrastructures relatively flat over the past decade, crises loom on the horizon. Design efficiencies have a material ceiling that is likely to be met in the next decade, and these threaten to rapidly accelerate the carbon impacts of the information and communication technologies (ICT) sector (Freitag et al., 2021; Masanet et al., 2020). Cutting-edge machine-learning research, moreover, is currently outpacing efficiency measures in its growing rates of resource use (Schwartz et al., 2019). Alternative modes of digital storage, exchange, and data analysis are possible, though not without limitations in the size, latency, and aesthetics of data transmission (Abbing, 2021; Marks, 2020). Green digital methods and designs, therefore, require analyses and invention more than simple adoption. We will need to craft these methods and means with care, lest data-intensive research becomes the new high-carbon norm.

0.2.6 *The Definitions of High- vs. Low-Carbon Methods Are Subject to Change*

The wider divisions we draw between the high and the low are, of course, crude and contingent. These relational terms reflect current climate trajectories and areas of acute concern that can only be addressed through collective, deep-seated changes in the ways we produce and disseminate knowledge. As such, these distinctions can—and we hope will—change in the future as emissions profiles, regulations, and technologies evolve. Yet there is also value in being analytically blunt today. Carbon accounting is subject to confounding error margins, shifting baselines, and baroque attributional mathematics (Lippert, 2012); it is therefore important to define and act on the parts of the wider milieu of work and climate that

stand out as obvious problems, no matter how you count them. These are, as we see it today, aviation and digital methods of research and research exchange that contribute to extensive cloud build-out.

0.2.7 Struggles Over Low-Carbon Methods Are Struggles Over the Future of the Academy

The time for both climate action and broader redistributive measures in the university is past due; as such, it is helpful to advance these goals together. Across the tenure divide, and within and far apart from environmental movements, there are growing possibilities for new alliances that could, jointly, constitute a force large enough to win transformative demands. The COVID-19 pandemic, along with wider anti-austerity shifts in climate politics, have intensified these points of coalitional connection (Levenstein & Mittelstadt, 2021): the risks of physical movement have been intensified, norms have been loosened, and the politics of access is now firmly articulated through joint questions of digital resource sharing, spatial mobility, and physical health. The labour prospects of graduating PhDs have never been more dire, just as the gap between elite researchers and the adjunct masses have never been so wide. At the same time, students are increasingly beset by climate anxiety; a global survey of young adults demonstrates that a majority of youth across the globe today experience negative emotions about their climate prospects (Hickman et al., 2021). Climate, like precarity, is a lived anxiety.

It is thus now a cliché to speak of many crises: of climate, of the humanities, of the public university, of publishing, or of academic ideals writ large. This framework is frequently more paralysing than mobilising. Yet, as all good organisers urge, we should be loath to let a good crisis go to waste (Aronoff et al., 2019). With intensifying pressures and failures in our institutions and norms there is cause for optimism about the possibilities—but not inevitability—of radical collective change. The trick is to illuminate ways through the present conjuncture that are both plausible and pleasurable—that make a better future a believable proposition.

0.2.8 The Future Will Be Collaborative

As many of the researchers in this volume repeatedly articulate, the work of imagining climate and mobility justice in the academy often returns to critiques of the individual actor, both in our theories of change and in the

primacy of single-author scholarship. No one person can do it all, and so the work of moving forward requires the work of joining together.

In imagining lower-carbon methods the need for more collaborative work frequently presents itself as a highly practical concern: if we cannot reach a distant archive or field site, perhaps there are local researchers we could contact, band together with, and share resources and authorship? Or, at home, our prospects of defending and advancing more accessible and equitable expectations for research and research exchange will be significantly advanced by their institutionalisation in union contracts, research ethics boards, departmental travel policies, IT procurement guides, and scholarly societies' conference committees—and thus through practices of dialogue, organising, and solidarity.

At the same time, increased collaboration strikes us as an epistemic necessity in the development of such a movement and its goals. Given how high-carbon norms deeply structure connections across a range of different economic, geographic, and social positions, the work of articulating and institutionalising the demands of mobility justice and lower-carbon computing is complex and requires the participation of many. There are no universal answers that can be determined at the outset, no solutions that cannot in turn produce harms, and no individual actions that are not imbricated in the norms and outcomes of our shared standards for good scholarship and good scholars. As such, the pursuit of low-carbon research methods is a fundamentally collective project: it binds together situated knowledges, distributed and differential capacities for action, and shared deliberations about the future character and role of the academy.

0.3 Structure of the Volume

This book is an attempt to imagine different challenges and opportunities for such work within specific methodological traditions in the humanities and social sciences.[2] It is a collaborative effort, emerging from an initial

[2]For a view on how this topic is being explored in the physical sciences, see https://labos 1point5.org/, a French initiative working to build consensus on how to measure and reduce carbon emissions in public research labs. Lab cultures present a distinctly different mode of social organisation and influence from those more common to the humanities and social sciences, though the 'labification' of qualitative research is changing these dynamics

writing sprint held in June 2021 during a lull between waves of COVID-19 surges. Over Zoom, Google Docs, and multiple time zones, previously unacquainted researchers from broadly similar methodological traditions and time zones were assembled into groups and asked to collectively examine the carbon intensity of their work processes and its impact on social relations germane to their fields of study. These initial contributions have since been expanded and joined by authors exploring related questions in publishing, work/time rhythms, and contrasting perspectives between the Global North and South.

While the pandemic has since lessened its intensity, it has by no means left us unscarred or enduringly unaffected. The virus is still present and still disabling. The mobility, health, workload, and access questions so abruptly thrown our way in 2020 continue today—and indeed were always in the backgrounds of many places and work environments (and the foregrounds of many further still). The risks of collectively forgetting these facts are considerable, and inhibit both the further development of practical knowledge and the political contestation of all the failures before and during the pandemic's wake. Accordingly, we hope that you will read this text with a parallel attention to the past and the present, as authors often move through COVID-19's moments of exception as a means to arrive at questions that endure far beyond them.

These reflections take many different and partial directions as well as writerly forms. Tending towards brevity, they index the strained capacities of researchers working during a period of crisis, as well as their aim to start—but not conclude—many conversations to come. A variety of styles are used to this end; the pages that follow experiment with generative modes of collective address and comparison across dissimilar locations and fields of expertise. Conventional academic essays are joined by, and often bleed into, genre conventions borrowed from the personal letter, the diary, the wish list, archival collage, and speculative fiction. The emphasis on collaboration (all but one chapter is a multi-authored affair)

(Wershler-Henry et al., 2021). See also Liboiron (2021b) for generative fusions of these traditions and the role of research methods as a site of anti-colonial political possibilities within the university.

demonstrates the need for relational thinking across these questions of shared norms and joint strategies.

That said, this book does not offer specific policies or frameworks ready to be taken up by institutions big or small, nor a playbook for how to win them. Pockets of activist administration are beginning to form in select corners of the academy, whether in new departmental flying-less policies (Concordia University, 2019; Le Quéré et al., 2015) or novel university tracking initiatives (Kreil, 2021). Similarly, wider reflections on sustainability and academic mobility are now emerging at the intersections of administration, scholarly communication, and research ethics (Bjørkdahl & Franco Duharte, 2022; Rockwell et al., 2021). These precedents are invaluable to the wider work ahead, demonstrating that reforms are both possible and necessary. Yet we write with the strong suspicion that the institutional administration of academic work will not be solely determinative of (nor sufficient for) a global and just transition for the research sector. To these discussions we add disciplinary and differential questions about the *how* of research and the worlds that research helps make. This returns us to the challenges and opportunities of method, and the necessity of finding our way through together as practitioners and shapers of shared epistemic norms.

This search begins in the archive. Kyle Devine and Jonathan Karpetz's first chapter explores how carbon materialises socially in historical research. While travel is the most obvious source of high carbon emissions to such scholars, the social imprint of carbon can also be found in the buildings that house archives and the energy required to maintain them. This includes various processes of digitalisation, often seen as a means of decarbonisation. Drawing on personal experiences and an analysis of the labour configurations of research, the authors detail how the carbon intensity of archival work is highly bound to diverse factors such as funding regimes, personal identities and emotions, copyright, industry capture, and staffing lines. The chapter opens up space to imagine much-needed transitions in the energy politics and cultures of research in parallel with wider struggles for public access and public benefits beyond the dictates of the market.

The practices and politics of archival research are examined further in the subsequent chapter, where Rachel Webb Jekanowski, Elizabeth-Anne

Johnson, and Shirley Roburn jointly consider the question of decarbonisation and decolonisation. Narrating their personal experiences as archivists and archival users, they describe multiple barriers faced by both junior scholars and community members in accessing materials held by state archives, posing questions around the conflicting imperatives of preservation and use. Through intersecting stories and dialogue between the authors, they describe a system where the value of sustainability takes on ambiguous ends, potentially sustaining both Indigenous cultural heritage and the colonial control thereof. Their chapter does not forward a programmatic approach to low-carbon archival work but instead offers a constellation of practices that seek to strengthen the articulations between climate justice and Indigenous sovereignty in the archives. Place-based research commitments, attentiveness to lived relationships between communities of study and practice, and care around the more-than-textual character of archival research and exhibition emerge as key considerations for workers on either side of the reference desk.

In the third chapter, Brent Ryan Bellamy, Anne Pasek, and Emily Roehl consider the climate and equity impacts of humanistic methods of close reading, textual interpretation, and visual analysis. Through an epistolary dialogue with its reader, the chapter interrogates the long formation of these techniques within the history of the European academy and its approach to canon formation, especially the stark class and spatial divisions that laid the groundwork for a connoisseurial approach that persists, in fragmentary multiplicities, in contemporary faculties of arts. Absent a common framework of taste, and across increasingly scattered research communities and conference circuits, the authors argue that humanistic scholarship's emphasis on personal interest and interpretation results in too many unsatisfying and unsuccessful attempts at research exchange and too many airplane trips. In place of a system that rests on the sufficiency of individual interpretations, the authors argue for more a collaborative approach to research exchanges built around the construction and shared exploration of research frameworks: a future where scholars gather around shared problems rather than shared objects of study.

A discussion of low-carbon ethnography begins in the fourth chapter. In an open letter addressed to fellow ethnographers, Kim Fernandes, Cindy Kaiying Lin, and Kate Elliott highlight the joint spatial and temporal

constraints of qualitative fieldwork. The norms of on-site field research necessitate (often quite substantial) travel, making ethnography both carbon intensive and frequently exclusionary. Drawing on perspectives from crip theory, the authors challenge the able-bodied experiences of time, productivity, identity, and achievement that define ethnography. Seeking to disrupt these norms, they invite ethnographers to think of how the concept of crip time could reconfigure their approach to research, opening non-linear and non-teleological methods of ethnography. They conclude with a series of prompts for future researchers interested in developing an intersectional and expansive approach to (s)low-carbon ethnography.

Chapter 5 continues these meditations on space, time, and mobility. Urmi Bhattacharyya, Pauline Destrée, Baldeep Kaur Grewal, and Hannah Knox are four anthropologists spread across multiple geographies, actively engaged in reevaluating what it means to decarbonise anthropology. Through a combination of shared reflections and personal asides, their chapter considers how low-carbon research methods stand to challenge and reinvent the notion of the 'field' and the production of knowledge within it. The authors focus on 'being there' as a key methodological requirement for ethnography and a common concern within their respective areas of research. While the condition of 'being there' is critical for immersive research methods such as interviews and participant observation, it also raises questions of mobility, equity, access, and climate impacts. Drawing from experiences with varied forms of adaptive fieldwork—including disrupted practices during early COVID-19 travel restrictions, logistical hurdles in Global North/South fieldwork, and neurodivergent solidarity practices—the authors grapple with the value of immersive methods across conventional and unconventional approaches. They identify three key dimensions of 'being there'—embodiment, mobility, and temporality—and suggest several emerging ways of 'being there otherwise'. The chapter ends with a wish list for low-carbon research practices to come, urging the reader to imagine energy transitions within academia that are equally attentive to the body and to funding regimes.

In Chapter 6, Riyad A. Shahjahan and Nisharggo Niloy draw our attention to the temporal and global politics of mobility, digital work, and decarbonisation. Across an enduringly unequal planetary terrain, they ask: who has the time to travel, and whose temporal rhythms are presumed and

accommodated in the infrastructures of knowledge exchange? Shahjahan (a tenured professor at an American university, with dual citizenship) and Niloy (a researcher based in Dhaka, Bangladesh) trace how their different class, citizenship, and geographic positions adjudicate their experiences of time within digital and mobile forms of research collaboration and exchange. Time proves to be an apt analytic for tracing colonial legacies in knowledge work, worker affects, and work outcomes. Moreover, the authors highlight often overlooked decolonial temporalities and critiques of Western clock time for their potential to challenge the limiting temporal frameworks of Global North climate action. Temporal politics are climate politics, from the minutia of our daily work rhythms to the planetary scales and actors we seek to disarm in a warming world.

COVID-19 brought an unprecedented turn to remote work and digital content delivery. Dawn Walker and Yani Kong explore the climate and infrastructural implications of this shift in the book's seventh chapter, reassessing when and how digitisation provides a legible low-carbon alternative. Focusing on media-streaming technologies the authors articulate growing areas of concern within the academic use of high-carbon digital networks. Against this story of technological expansion, they offer a framework of speculative thinking for imagining low-carbon alternatives that are not predicated on unending growth. Through an analysis of personal experiences with remote teaching and several alternative low-carbon networking projects, the authors demonstrate the stakes, impacts, and values that underscore differing models of connectivity. Their emphasis on speculation productively challenges techno-solutionist narratives and re-politicises the question of a digital turn to research and exchange practices.

Deliberations on decarbonising research methods through digitisation must also begin with the acknowledgement of the structuring role of the large tech corporations who own the infrastructure—as it were, the means of (research) production. Swati Mehta and Brian Sutherland highlight these realities in Chapter 8. They analyse digital networks as field sites and consider their duality as both epistemic cultures and epistemic infrastructures within processes of knowledge creation and circulation. Digital systems mediate the production and exchange of knowledge, including an ever-larger share of (social) networking within the academy. The authors challenge the presumed ephemerality and eco-friendliness

of these networks by grounding their energy-intense infrastructures and dependence on earthly resources. To attend to these realities and foster clearer socio-technical imaginaries for digital research methods, the authors propose dis/connection as a low-carbon research method. They define the method of dis/connection through strategies that are neither external to the network nor reliant on individual action. Instead, they are calculated reconfigurations of connections to platforms and rhythms of digital networks. The chapter shares examples of reconfiguring digital infrastructures, such as solar-powered servers and local data storage, and alternative modes of slow, hybrid, and multi-modal networking as methods of dis/connection. As a method, dis/connection reveals the otherwise ubiquitous structuring role and temporal demands of digital networks while also encouraging creative approaches to networking through other means and to other ends.

The book's ninth chapter continues the discussion of experimental digital methods by outlining an alternative approach to data-intensive computational research that is equal parts utopian and practical. Here, Brian Sutherland discusses strategies for addressing the high carbon expenditure of the massive compute resources that are required by many machine-learning, modelling, and neural-network methods. The prospects for decarbonising these research infrastructures are mixed: improving the energy efficiency of generative computers is ideal for conducting complex research; however, this most often increases overall consumption and shortens the working lives of digital components, making significant additions to the carbon ledger. Sutherland articulates an alternative approach through a series of sustainable energy and computing strategies that radically reconfigure the ownership, use, and value of compute resources. These include co-location near renewable energy sources; developing sustainable microgrids that enable local, energy independent computing systems; improving software and hardware design to build flexible computing architectures; and developing computing as a public, distributed good. These strategies point towards open, collaborative, local, and community-based futures for digital infrastructures and will thus be of interest to all researchers with data storage and processing needs.

Chapter 10 turns towards another central infrastructure in scholarly life: academic publishing. Drawing on their experiences as editors of

three Canadian open-access journals, Brent Ryan Bellamy, Lori Bradford, Rachel Webb Jekanowski, and Markus Reisenleitner analyse the varied challenges and actors implied by the concept of 'sustainable publishing'. This discussion bridges both practical and moral considerations of how publication workflows and funding could be reorganised towards a more equitable distribution of burdens and benefits, including multidirectional challenges to industry monopolies; experiments in alternative forms of peer review and peer hosting; and enhanced opportunities for mentorship, renumeration, accessibility, and multilingual care.

Authors Clarissa Reche and Felipe Figueiredo conclude the volume with a short story. Writing during an extreme heatwave in São Paulo, the authors use speculative fiction to narrate the future overthrowing of 'Continuity': a word that names the monstrous momentum and interrelations between the forces of colonialism, capitalism, and green markets. Through an epistolary dialogue between research collectives communicating across an enduring North/South divide, the chapter sketches a history of planetary transformation and epistemic revolution. This work beautifully encapsulates the themes of the book overall, highlighting the inadequacies of sustainability measures that narrowly focus on the carbon ledger at the expense wider social and ethical relations; the need for community control over knowledge infrastructures; enduring power asymmetries in the global circulation of knowledge; and the strategic value of solidarity, piracy, and rest in renegotiating this terrain. Against Continuity, the authors champion Intermittence as an organising principle and condition of life in a renewed terrain of research and interrelation that is better equipped to address the legacies of racism, genocide, and environmental harm.

Overall, the book's authors point to a tilted field when it comes to contemporary assessments of method. We have been changed by the COVID-19 pandemic, and have yet further changes we need to imagine and win in its aftermath. We are tired. We are inventive. We are inexorably going to work with research modalities that fit across both the social and material contexts we've inherited and those we want to organise towards. The way we narrate our methodological commitments is (and perhaps always will be) a mixture of ethical priors, practical problem-solving, and world-making in a speculative and hopeful register.

Methods, as these texts stress, are a political tool in building the world that we want to inhabit.

0.4 Conclusion

To end this manifesto, we here offer the broader concept of low-carbon research methods as a semiotic resource—or, as the authors of the patchwork ethnography manifesto write, a form of 'theoretical armour' (Günel et al., 2020)—to researchers struggling to change their personal labour practices and collective norms. We intend this as both a flexible intellectual intervention and a site of political strategy, enlivened by the unique opportunities posed by the social and material character of research methods. We hope that adopting the moniker of low-carbon research methods can help you frame and defend methodological choices in your fields of study and position within the differentiated labour markets of the global university. We hope that this concept can help fortify your efforts against forms of inquiry that harm you, your informants, and your colleagues, as well as in the work of forming wider collectives of scholarly reform and social reproduction. May we all put it to good use.

To this end, we hope that low-carbon research methods will be continually joined to other allied and ongoing struggles. An equitable energy transition for academia will also involve an expansion of the formal and informal labour organising we need to win different kinds of tenure and promotion criteria, as well as different kinds of graduate research benchmarks, that can better accommodate diverse ways of moving knowledge and bodies around. Early sparks to this end can already be found in many of our academic associations, where the push for more and better designed e-conferences, climate commitments, and experimental methods workshops are currently bringing these questions to the fore. Even more expansively, we need to scale such efforts to larger institutions—research ethics boards and large state funders loom large in our discussions—such that carbon impacts, mobility justice, and digital degrowth can join and modify existing metrics that determine the kinds of research that wins approval and support.

But in the meantime, and in that gap between individuals and institutions, there are disciplinary norms and methods. Methods have ways of circulating beyond subject fields, and across different levels of seniority

or global location, and so present themselves as particularly useful places to dig in and make interventions that exceed the personal. In the following chapters, and in the many research projects and trajectories described therein, methods are both starting points for larger reflections on the institutions and labour politics of academia, and sites of generative experiments and solidarities. We hope that they will provide food for thought and practice in equal measure.

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1

Carbon Realities and Speculative Ideas for Decarbonising the Archives

Kyle Devine and Jonathan Karpetz

1.1 Archives and Carbon Realities

Ever since Carolyn Steedman's landmark essay, much archival thought and scholarship has revolved around inhaling dust. Today, it is time to additionally orient archival research around exhaling carbon. For it is no longer just researchers who are stricken with fever, a symptom of exposure to the archive's economy of hoarding and expenditure. A related but wider economic formation now has the whole world burning up.[1]

Archives and archival research methods are aligned with the history of carbon norms and issues of class-based consumption under capitalism and within the academy.[2] For contemporary researchers, this means that archival processes and practices have typically been carried out at individual levels as legitimating procedures within social and scholarly fields of power. The current regime of archival location and organisation, along

[1]See Steedman (2001) on dust for some background, including the implicit reference to Derrida's work on 'archive fever'. For a discussion of hoarding and expenditure about the 'ethical-political function of the archive,' see Faulkner (2001, p. 192).

[2]For this position paper, we want to emphasise that we are writing as archival and library researchers—not archivists or librarians. We draw on archival and literary theory at a few points, but those are such vast fields that we wish to emphasise that we are not claiming expertise in them. We should also underline that we are beginning from a traditional or mainstream understanding of the archive and archival research traditions. Archival methods create and evaluate meaning by studying various unpublished historical media (often written documents) as well as by collecting data from published sources. Most commonly, these methods seek to find and sort through sets of such media, which reside in institutions—usually public and private archives. Archival methods form the basis of most contemporary historical research for most disciplines in the humanities and social sciences. Traditionally, archives have materialised and exist as a specific coordination of data and

with the related process of travel and retrieval, are thus not neutral methods born only of the need to preserve and mediate historical documents or artefacts. Instead, they participate in webs of relations that are enabled and enacted through contemporary regimes of extraction—which have environmental impacts.

The most common contemporary carbon-intensive dimension of archival work appears to be travel. Researchers journey substantial distances to access archives by plane and by car (but also, depending on local or national infrastructures, by bus and train). Often, such travel is carried out for short bursts of research, and historically, this has not involved carbon consciousness. In addition to taking such travel for granted, the performance of travel is also a critical manoeuvre by which researchers build up authority in their fields.

Research projects frequently require visits to numerous archives in numerous places. In this way, archives lead to other archives. Archival methods can also lead to interviews and fieldwork—which, given similar pressures to perform authority and authenticity in the academic world, have historically been conducted in person to consolidate legitimacy.

Both of us, for example, have chased documents in archives all over Canada, the United States, and elsewhere, whether these have been private and corporate or public and governmental. Both of us also have stories of taking carbon-intensive archival trips only to find out, sometimes within minutes of receiving the first trolley of boxes, that we were in the wrong archive.

Archival carbon materialises socially in several ways. Most obviously, again, this happens through emissions generated during travel. Yet archives have social carbon imprints given the buildings that must be constructed, maintained, heated, and cooled. Ongoingly and increasingly, archives have carbon emissions related to digitally scanning, sorting, and

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documents in a physical institution in a specific place, most usually related to the archive's logic of formation. That is national and provincial government archives, containing the historical information of government processes existing in the related national and territorial capitals of a nation, while private collections usually exist in related locations of a notable person's birthplace or career.

storing information. Depending on the size of the archive and the media in the archive, digital processes may make actual demands on energy resources and the societies that enable those resources.

It is essential to mention that these forms of digitalisation, which may be seen as forms of decarbonisation if they reduce the need to travel to archives, also make their own claims on social systems. To produce digital devices, for example, many people in many places are required to work the earth for materials, process them, assemble them and, later, recycle or trash them. Given the logics of contemporary capitalism, these people and these places tend not to be treated justly regarding land or labour. Not paying attention to the significant social effects of both travel-based carbon emissions and those of digitally enabled decarbonisation risks sustaining ways of thinking in which the carbon calculus of the Global North inflates its own 'solutions' into a universal context while concealing the distributed human and environmental costs of those very carbon-saving devices and measures (Pasek, 2019).

1.2 Speculative Ideas for Decarbonising Archival Research Methods

To decarbonise archival research, we have the following three suggestions, which we elaborate on in this section. First, change academic cultures surrounding archival work and related practices as described above. Second, increase certain forms of funding and change certain funding models. Third, modernise the notion of an archive and archival work, thereby also changing the labour configuration of these processes.

At the same time, we also want to continue raising certain questions about what decarbonisation means in this context—particularly when decarbonisation is closely connected to calls for ongoing and increasing digitisation.

1.2.1 Changing Academic Cultures

The most significant changes to the carbon-intensive processes of contemporary archival methods may be generated through changes to academic cultures and their relation to archival research processes (shaped as they have been by the material history of fossil fuels). Specifically, there should be a dislodging of pride and shame from the research process.

When we speak of pride, we mean the badge of honour usually attached to anyone brave enough to venture out to a distant archive to find the perfect hidden document. When we speak of shame, we mean the personal and social shame that can be attached to using more contemporary research methods, such as web searches or large semi-public repositories like the Internet Archive.[3] That is, archival work should no longer be seen as an end in itself that serves as proof of academic worth. Rather, archival work may be decentred and incorporated into a more holistic conception of historical research that might involve less carbon-intensive research methods, including web searches, online interviews, and more collaborative processes involving scholars in disparate locations.

As with many reductions that are necessary for a carbon-neutral future, the academy may have to become culturally accepting of less (Huber, 2019; Soper, 2020). Less labour is spent on archive research, with less production of archival materials, less travel for archival research, and ultimately fewer archives in general. That is not to call for the elimination of historical preservation. Instead, it is to think through the possibilities offered by a web of locations, practices, and resources that help preserve our pasts—making them accessible to future generations while detaching their operational logic from contemporary carbon-intensive practices.[4]

1.2.2 Altering Funding Models

With a change in academic cultures around archival research, there needs to be change in how funding is competed for and distributed for research projects. Contemporary funding regimes are tailored and usually explicitly encourage intensive carbon-based research practices, including air travel, as core justifications for providing funding. With that, these funding models often contain a set of assumptions around a certain kind of

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[3]These practices are also wrapped up in the tension between institutional and personal or local memory where 'smaller' resources, including personal effects and informal knowledge, are often considered to be not of scholarly value unless they are derived from more formal structures.

[4]'Less', then, should not mean a further consolidation of knowledge at formal institutions along with their complicated colonial legacies of information capture and distribution. Changes must include an increased recognition and valuing of smaller and more specialised archives that may provide alternative material-management practices and carbon efficiencies.

researcher–consumer with a kind of class mobility that is defined by and demands travel as part of the research process. These funding models must take a more holistic view of the research process, allowing for and even incentivising less intensive carbon methods. These can come in the form of anything from non-specific distributions of funds based primarily on need, to funding models that account for and enable the payment of offsite research labour at distant archives.

1.2.3 Modernising Archives and Archival Work

Such models cannot change without the concurrent modernisation of attitudes surrounding academic labour and its performance concerning the research process. These processes operate under an outdated logic that romanticises the view of the individual researcher and their pursuits while ignoring the class dynamics at play in the processes. Not everyone has the capital, time, or status to freely move between archives in their attempts to find answers. Further, these processes have been enabled through carbon-intensive processes that have until recently been little discussed and even less accounted for.

Any honest carbon-reduction model elevates collective actions and responses as key ways to address the climate crisis. Academic research is no different. Efficiencies gained through collaborative research models that share research resources, materials, labour, and funding will all have a significant material impact on the climate. Most specifically, these networks need to expand and extend beyond single institutions and disciplinary silos in ways that will allow for generative collaborations that will also positively impact the environment. All of this would need to come with a radical change in attitudes around academic work in the humanities that decentres the individual author in favour of community-generated work. With that would have to come new attitudes and policies around labour and compensation that would need to be at the heart of these new practices to ensure fair compensation and equal access to research resources and credit.

Modern archives have been built and are often positioned in direct response to the needs of academic institutions and related research processes. Any change to archival research methods that seeks to reduce carbon footprints will necessarily come with a reimagining and modernisation

of the vision and operating logic of archives, which moves away from the 'boxes in buildings' model of an archive toward a more holistic vision of that archive as a space of preservation and access that can exist in many places at once. Any of these changes must come from the recognition of archives and their related resources and vital public and community resources as well as vital parts of the small-'d' democratic project of most nations. That is, archives exist to surface shared histories rather than file away and mask the past. How archives can move more toward this vision while helping reduce carbon impacts is a central question that must be asked.

While it has been and will continue to be a significant point of debate and contention, archives require more buy-in from institutional actors. This is frequently displayed through the need for increases in their budgets, which will allow for the hiring of more staff to help organise and surface archival material. With that comes significant discussion surrounding the digitisation of archival materials. While we will try to unpack these debates below, there are tremendous incentives to digitise more and more archival material if the result will result in less carbon-intensive travel to archives to select and copy these materials. If these materials could ideally be digitised once and surfaced through online portals, this could theoretically help reduce the need to travel for material retrieval and the associated carbon costs of doing so in the future.

More specifically, there could be a reimagining of archival collection, tracking, and surfacing that more accurately reflects what is contained within specific collections. Researchers in the Low-Carbon Research Methods Group have all cited inadequate archival resources as key reasons why additional travel time and carbon resources were spent on research activities. Much of this can be achieved through certain digitisation processes—but also, we hope, a reimagining of collection-management and search-tools that are more attentive to the requirements of researchers examining collections from afar. Most archival collections remain relatively obtuse and inaccessible until a researcher arrives at a site, uniquely providing that labour to retrieve a specific set of information, as only they can, through their power as a researcher. Again, a more holistic vision would have tools that could allow that researcher to surface materials from afar while also allowing local researchers to aid in the surfacing and collaborative transferring of those materials. Here we are thinking of the

significant barriers to accessing online information through archives and institutional libraries that almost always favour rights holders over the public.

1.3 Extended Carbon Realities

As archives continue to digitise, and as digitisation is often perceived or advocated as a catch-all solution to the carbon-intensive character of air travel, it is worth raising some questions about these practices and precepts. We already mentioned the distributed human and environmental costs that can be concealed by carbon accounting and carbon discourse. Similar costs should be considered, given that digitisation requires a continued tightening of the knot between public institutions such as archives and the capitalist technology industries. Fernando Domínguez Rubio has offered insight into this process in the context of digitisation efforts at the Museum of Modern Art in New York: 'The tech industry is relentlessly pushing to lock [digital art objects] into ever-tighter software, hardware, and legal enclosures to sustain the logic of profit-making—a logic that … does not necessarily have unprofitable ideas such as public interest, common good, or collective memory at its core' (Rubio, 2020, p. 323) not to mention knowledge, truth, or the mitigation of climate crisis.

Another tendency, when considering digitisation as a form of access that bypasses the need for carbon-intensive travel, is the potential for rebound effects. This may seem silly. It is obviously less carbon intensive for a single scholar to do archival research online rather than in person after a long journey. But at a certain level, one-to-one comparisons miss the point. What we need is a way of understanding the aggregate effects of an entire technocultural system. This is where rebound effects become possible, even if it seems unlikely in archival research on its own. But there is also a kind of stacking effect or accretion effect, whereby new media systems do not simply replace one another like familial dynasties. Instead, these systems and their formats become mixed, mutually dependent, and sedimented as technocultural practices (and in their carbon emissions) (Devine, 2019; see also Pasek, 2023).

Perhaps the most current example of this in the world of education and research is digital teaching. It seems likely that in-person teaching

will not simply be replaced by digital teaching. Neither will the two exist separately. Instead, universities seem to be preparing to offer many future courses in the so-called hybrid format. This doesn't necessarily mean fewer students will attend in-person classes and therefore reduce carbon emissions from travel (certainly not, it would seem, in countries where students pay tuition fees and on-campus housing costs). Instead, the demands of the virtual classroom (in terms of the energy intensity of the internet and the human and environmental costs of producing ever more digital technology) will be added to those of the in-person classroom. This shouldn't be surprising, given the imbrication of the contemporary university with the capitalist system. The logic of capital often means that the possibility of less means the reality of more. Could something similar happen with archival research, where the immense effort of digitisation does not attenuate the need for archival travel but adds more carbon and social costs to the world?

Archives themselves are currently bracing for the intensification of the climate crisis. Some estimates suggest that nearly 99% of archives 'are likely to be affected by at least one climate risk factor' (Goldman, 2019; Mazurczyk et al., 2018). Surely, their preparation work will lead to archival change. From a research methods perspective, though, maybe archives and archival research can stay largely as they are or have been. Maybe the move to local labour collaborations and, perhaps, collaborative authorship represents a low-carbon future for archival research. Of course, this model would involve rethinking some of our deeply held ideals about scholars and scholarship (many of which were created in a world based on assumptions about carbon that are now in question).

Researchers would have to continue moving away from the romance of the singular genius and might sometimes have to sacrifice certain messages that can be communicated by some media interactions but not others. When John Durham Peters writes of history as a communication problem, he notes that 'a historian getting a first look at old documents will not go straight to the texts; he or she will look at the bundle, the order items are gathered, the creases, etc.' (Peters, 2008, p. 21; see also Gitelman, 2013). Local archival collaborators could help with these issues, too, when the text, the sound, or the image isn't enough and must answer other critical questions. In the end, this way of decarbonising archival research can be

thought of less in terms of what archival researchers would be giving up but, rather, what they (and the world of scholarship) would be gaining—the communities they would be connecting and the horizons they would be expanding.

In a sense, in sections 1.2 and 1.3, we have been proposing a model of patchwork historiography to match recent calls for patchwork ethnography (Günel et al., 2020).

1.4 Toward Low-Carbonism Research

To summarise, in this chapter we have been saying two things at once. First, low-carbon research is both needed and possible in relation to archival study. We have presented some ideas for how such work may be decarbonised, which is not simply about flying less or digitising more.[5] Those appear to be parts of the picture. But we also sense that more intricate transformations will be required in academic culture, funding, and labour. Such transformations need not be written off as losses. They may be understood as gains.

At the same time as we have been contributing to an agenda for low-carbon research, we have equally been advocating for what might be called low-carbonism research. Carbonism can be defined as a parochialism of the economic core, where decarbonisation is emphasised as an all-encompassing 'solution' to the climate crisis in ways that do not account

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[5]Although we have registered our reservations about digitisation in the body of the text, as doing so is central to our argument, we will here note additional reservations about anti-flying discourse in relation to carbon and climate issues. Plane shame, in its extreme forms—the ones that guilt anyone for flying for any reason and which call for an immediate end to aviation—comes with at least three problems. First, it risks alienating the millions of people who work in the airline industry as ground staff and air crew, which itself risks perpetuating the old 'jobs versus environment' hang-up that has long hindered class coalitions on environmental issues (Rose, 2000). Second, calls for individuals (including researchers) simply to fly less articulate a version of sympathetic consumption or consumer activism, each of which has histories as old as capital itself, neither of which has ever proven very effective in alleviating the suffering that capital brings (Glickman, 2009; Skotnicki, 2021). Finally, the responsibilisation of carbon emissions misunderstands who really benefits from aviation and who therefore should bear the real responsibility (capital and the top floor of its social architecture); it substitutes ethics for politics, and trades structural change for shopping carts (Huber, 2022; see also Katz-Rosene and Pasek, 2024).

for the human and environmental costs that will be incurred in the production of those very carbon-saving measures.[6]

Low-carbon research, in itself, poses no necessary challenge to capital and class, the sources of the ecological crisis. In fact, there are reasons to believe that capital is entirely capable of decarbonising production and consumption—including in relation to knowledge (Ajl, 2023, p. 5; Fraser, 2022, p. 122; cf. Christophers, 2024). This process is well underway in the so-called green shift or green transition. Green capital will have certain advantages over fossil capital, especially in terms of carbon. But it will do little to alter the underlying economic arrangement and social architecture that define the world today, which is compelled to pursue a particular form of 'growth', or the creation of new economic value, which is really a polite word for ongoing—and increasing—exploitation, oppression, and despoilation. It is possible to be low carbon while sustaining the war with otherness that animates the capitalist climate crisis. It is possible to be low carbon while upholding the social architecture dictating who may be treated like a subject (us, ourselves) versus that which, to continue the shift from fossil capital to green capital, must be treated like an object (it, them).

A lot of good will come from low-carbon research. We believe that good will come from low-carbonism research, too. If considering dust has been a crucial part of reminding archival researchers about the conditions of writing history, considering carbon may be a key part of how archival researchers contribute to the conditions of making history.

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[6]Of course, we recognise that the phrase *low-carbon* sometimes works as a placeholder that calls for a wider set of urgent transformations (not just GHGs more generally but other forms of pollution and robberies of nature), in the same way that *climate crisis* sometimes functions as a stand-in for the broader ecological disaster that is unfolding (not just the warming atmosphere but ocean acidification, land aridification, species extinction, and so on). Note also that what we are calling *carbonism* encompasses what others refer to in terms of carbon coloniality (Sultana, 2022), ecological or green imperialism (Frame, 2023), and carbon colonialism (Parsons, 2023)—while other authors raise similar concerns in terms of 'decarbonization and its discontents' (Benjamin Sovacool et al., 2019). Earlier work on similar issues used terms like environmental racism and environmental colonialism.

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2

Reciprocity as an Ethical Horizon in Archival Research

Rachel Webb Jekanowski, Elizabeth-Anne Johnson,
and Shirley Roburn[1]

Welcome—please join us at the threshold of the archive.

In this collaborative chapter, we walk interconnected paths in relationship to Canadian archives and the practices and people that sustain them. Oil-fuelled anthropocentric climate change threatens all forms of life, from non-human ecosystems to human societies. Archives and other cultural institutions face material threats from forest fires, flooding, and other incidents of environmental collapse. Transitioning global energy systems away from fossil fuels to renewable forms of energy (solar, wind) offers a solution to the climate crisis, but not to its underlying causes. Climate change, writes Kyle Powys Whyte, is an intensified form of colonialism (Whyte, 2017). Global warming—and the concept of the Anthropocene—should be understood within the context of continuing practices of Indigenous dispossession and genocide, which have accompanied the industrial revolution, the development of nuclear weapons, and other technological transformations accelerating climate change (Davis & Todd, 2017). Addressing the climate crisis requires *justice*. Decarbonisation must go hand-in-hand with dismantling the colonial institutions, land-use practices, and epistemologies fuelling the radical remaking of our planet.

This chapter is grounded in storytelling and conversation. We write as archival users and stewards: Rachel and Shirley work as university educators and researchers, and Elizabeth-Anne is a professional archivist. These

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[1]Authors' names have been listed in alphabetical order, reflecting the collaborative process of writing and editing this piece. This reflects our feminist practice of thinking with and through our lived experiences, and valuing the shared responsibility for its creation.

experiences inform the ways in which we grapple with the limitations of the archive and trace pathways towards reducing the carbon costs of North American archival research.

Within the humanities and social sciences, archival research has absorbed settler practices of dispossession alongside capitalism's resource-intensive norms. In North America, many archives operate on Indigenous land and may contain textual, photographic, and audiovisual records documenting Indigenous cultural heritage, housed far from the communities they depict. Norms of access also privilege university researchers, erecting barriers to those outside the academy.

Extractivism—or the unfettered appropriation and consumption of resources under capitalism and its attendant ideologies (Szeman & Wenzel, 2021)—also emerges in the language and cultural logics of archival research. Common phrases like 'mining the archive' position historical records as resource to be explored, developed, and refined into scholarly publications, grants, or other intellectual products. As our colleagues Kyle Devine and Jonathan Karpetz write in Chapter 1, current research models often romanticise individual 'discoveries' and success in the archive. Even when researchers have well-meaning intentions, inherited ways of working can inadvertently reproduce the extractive relationships.

In our first section—'Thresholds'—we outline the contours of the archive and archival research methods. Developing more equitable (and low-carbon) models of archival research asks practitioners and scholars to confront the extractive foundations of North American archives, libraries, and other knowledge repositories. It also requires meaningful engagement with the colonial histories and present-day harms of archival institutions, and recognising the importance of decolonising land alongside culture and language to the creation of thriving Indigenous futures.

In the second section—'Entering the Archive'—the narrative splits, as our individual voices come to the fore. Here, Elizabeth-Anne speaks to some of the shortcomings of digitising archival records, problematising what is typically understood as the solution to high-carbon archival research travel (for more on this perspective, see Chapter 1). In 'Wrestling with Exclusions', Shirley reckons with the centrality of trauma to North American archives.

Like streams meeting a river, our voices reconvene in the final section—'Pathways Forward'. Structured as a conversation, it gives us a way to think through collaboration and reciprocity as pathways towards more welcoming, accessible, and lower-carbon archival encounters. This work builds on the speculative proposals to decarbonise archival research in Chapter 1 to argue for a more expansive reorientation of academic practice. We ask how archives can better serve communities, distribute knowledge and resources more equitably, and collaborate constructively with those who have struggled with archival absences and barriers to access.

Collectively, we share an interest in a more reciprocal and flexible approach to archival work, brushing against the colonial valuation of preservation at the cost of access and mobility justice. By pointing to a larger constellation of practices, we seek to model ethical approaches to thinking about and working with archives, while holding onto the complexities of working with archival materials on stolen land. We hope that you, reader, may find these insights and contributions valuable in your own work.

2.1 Thresholds of the Archive and Method

Archives can be many things. They are a form of infrastructure, a repository for keeping official records as well as the flotsam and jetsam of history. Government and university archives are often public institutions funded by taxpayer dollars; corporate and institutional archives may be private, accessible only through the right connections (such as archives of the Catholic Church). Others, like the Interference Archive in Brooklyn, New York, exist thanks to the passion and dedicated labour of volunteers, balancing archival demands to preserve physical records with mandates to serve local communities.

Archives are also relational. In North America, they are inextricable from colonial histories of the land. They collect, preserve, and memorialise public and private records that document the shaping of the nation. Many public archives are a physical manifestation of the settler state, while also holding records of historical injustices that continue to reverberate across generations into the present. Black and Indigenous calls to decolonise settler institutions challenge these archival norms of valuation, preservation, and access grounded in colonial knowledge-keeping practices.

As a methodology, archival research requires scholars to travel to repositories, often by airplane, to work with original archival documents. Working on site certainly has many benefits, from conversations with archival staff to serendipitous encounters with other collections relevant to a project. Decarbonising this method, however, can create other opportunities for ethical engagements with place, community, and historical traumas. Low-carbon archival research can be co-constitutive: involving researchers and archivists, as well as environments shaped by carbon emissions, the communities from which artefacts and records have been extracted, and the lands on which archives rest.

2.2 Entering the Archive

2.2.1 *Problematising Digitisation*
Elizabeth-Anne

As an archivist, and as someone who's had a variety of roles in archives since I was twenty-two, I've spent a lot of my adult life in the archives as a physical space. For me, a White settler, archives have been an employer, the site of my vocation, and an entity that I have learned and unlearned a lot about during my education and career. I've worked in academic and government archives in Manitoba, Yukon, and Alberta. During this time, I have (maybe obviously) become attached to archives. They contain so much knowledge, so many original, real objects that sometimes haven't been read in decades. Working in archives can feel like having a secret.

It's impossible for me to work here, though, without thinking about archives' exclusionary nature. Archives have a specific, almost arcane set of rules for requesting and accessing archival material. Most of the institutions in which these archives live are colonial ones, built on stolen land and built to uphold colonial standards of who gets to access the knowledge they contain. While, as Joan M. Schwartz and Terry Cook have pointed out, 'archival practice perpetuates the central professional myth of the past century that the archivist is (or should strive to be) an objective, neutral, passive … keeper of truth' (Schwartz & Cook, 2002), the truth is that archivists wield enormous power over societal memory through our work acquiring, appraising, describing, and preserving records. The origins of North

American archival theory are written from a White, male, European perspective; the holdings of North American archives, too, reflect the colonial imperative at their hearts. Institutional archives contain documents and photographs and films that belong to people of other nations who weren't given a tidy Deed of Gift upon their acquisition. These records shouldn't be a secret, and they shouldn't be held by colonial archives.

From an archivist's perspective, decarbonising archival research goes hand-in-hand with changing the way archivists welcome people into our reading rooms and to the collections we steward. It requires a more meaningful collaboration between archivists, communities, and researchers—examining archival materials together, rather than taking an extractive, fly-in approach to data.

As archivists, it can seem that our first allegiance is to the material we steward. However, demystifying archives and making sure people can access that material is just as critical. Why else are we preserving it? If getting to the physical archives is difficult due to distance (and the carbon-heavy travel needed to overcome it), it may be just as difficult due to trauma or justifiable lack of trust in the institution that holds the archives. We must find ways to make archival material accessible to more people, both privileged and credentialled academics and members of the general public, regardless of the barriers to their visiting the archives reading room. Archives and archivists must share the knowledge we have around preserving archival material and facilitate its repatriation to Indigenous groups; until that happens, we must make the records we steward as accessible as we can.

Digitising records and providing online access is frequently proposed as the solution to lower-carbon archival research. Reducing scholars' need for travel to visit archives in person is certainly a significant way to lower emissions. This is not without its own issues, however; the limitations and costs of the digitised record should be appraised and acknowledged. Digitisation is a more complex process than simply scanning a document. Archives workers must design workflows for digitising and preserving archival material, and ensure that the metadata for locating and understanding the material is created. This work requires time, high-level knowledge of an institution's systems, and access to relevant software and hardware tools. The actual work of digitisation itself is often seen

as unskilled labour, and the people who do that work are compensated accordingly and often work in precarious positions.

The work doesn't end when an object is scanned and sent off to a patron, either. The act of digitisation creates a new archival object that also has to be managed, preserved (ideally in more than one location), and made discoverable so it can be reused by future researchers. These acts all require carbon in the form of power for storage servers and internet connections, not to mention the environmental impacts of mining rare-earth metals for the machines' components and the water required to keep the servers cool enough to function. As Benjamin Goldman points out, professional norms for digital preservation 'routinely lead to the duplication of archival material, dramatically increasing our storage requirements' (Goldman, 2019). In other words, for current best practices around digital preservation—practices enshrined in international standards—keeping multiple copies of a file is a feature, not a bug. Archivists and scholars like Goldman and Keith Pendergrass, Walker Sampson, Tessa Walsh, and Laura Alagna have suggested ways in which digital preservation can lessen its environmental impact. Among these is the suggestion that we don't need to keep multiple copies of every digitised object. In the meantime, however, the choice to digitise archival material and create more digital records to manage comes with spiralling environmental (and economic) costs (Pendergrass et al., 2019).

The effects of digitisation are not all external to the archival object, either. Digitisation also results in the reproduction of textual information at the loss of the physical attributes of the archival material. Information can be gleaned from the physical objects: the dimensions and physical wear-and-tear of a photograph or corporate memo, the scent of a hand-written letter, the texture of paper and the way it may have been folded. This informational loss will impact researchers differently, depending on their disciplinary training or research questions. Film and media scholars, for instance, may in fact need to observe the physical degradation of a media object—a tape cassette, a 16mm celluloid film reel. Wear-and-tear from ordinary use and the passage of time becomes part of its historical value. While digitisation is a crucial tool for providing access to archival material, it cannot fully replace the experience of interacting with the material in person and in place.

2.2.2 Wrestling with Exclusions: Encountering the Archive on Its Terms
Shirley

My visit to the Royal British Columbia Museum and Archives in June of 2021 challenged me in ways that were painful, surprising, and confusing. In trying to articulate these sorrows, Jordan Abel's *NISHGA* (2021) was a revelation. It answers questions I didn't know how to formulate, and it gave me courage. Although perhaps primarily for an Indigenous audience, it also speaks to others like me: those with a history too tangled to easily share, where it is confusing what to say or not, what to live and what to leave behind.

How does one confront, engage, deny, or carry unredressed historical grief? Grief that lives on in one's family, and in one's family that did not live?

Jordan's reworkings of a fragmentary, found archive through multi-mediation—composed of found poetry, expository writing, fading pictures, speech—hold no easy answers. But the work gestures to a path. What if one takes the time it takes? What if one returns, and returns again to an ethic of attentiveness that makes space for silences, that allows for them to be full and mysterious, holding what cannot yet be said?

One response to the absent archive, the archive of incinerated histories, is liveness. Liveness exceeds, escapes boundaries, moves from the stuck places—sometimes water, sometimes rage.

i. Archive

'There are three articles about this incident,' says the email from my sister, who is finally back to going through my uncle's boxes. She sends a digital photo of one.

Two people, an uncle and nephew, gunned down in their small shop. Possibly a gambling debt. Possibly a hate crime.

Who are they? Relatives? A friend? Randoms but my uncle kept tabs on it anyway, because hate always resurges? How should I know? Just another fragment to toss upon the slag heap of history, something I can't cope with now or possibly ever. It makes me angry. Sad if I let it. But it is also just an endless cesspool. It will never be better so why be swallowed in its darkness?

ii. 'We Have Been Lenient'

From the archivist:

Our policy which we made clear was that you need to submit requests for records at least 7 days in advance of your appointment. We have been lenient, but with a number of other requests coming in, we may not be able to make these books available for you at such short notice. Many of these books are available in other repositories, so if we cannot get these to you by Monday, you should be able to find them elsewhere.

Excerpted from my unanswered email to the archive's 'director of visitor experience':

I do not think library and archive patrons should receive a dressing down for requesting records ... it wasn't possible for me to give seven days notice for requests for further materials .... Contrary to the archivist's assumption, the books I requested are not easily available to me elsewhere .... Not every archive visitor is local or has endless time and funds to stay in Victoria and visit the archives; not everyone is a professional with training in archive research and procedures. Lots of community members would be put off or intimidated from getting this kind of response to an inquiry. This reply seems out of step with the Museum's efforts to diversify its appeal and encourage wider participation and representation.

iii. Kindness

One disdainful archivist does not an experience make. In the few days I was able to secure at the archive, the answer of the access request email alternated between the disdainful archivist and a much kinder one. The kinder archivist made sure the books were called up for me. In our correspondence, she said things like 'Many of our researchers have struggled to identify which of our records have been digitised. You are in very good company! We are working to make this more clear in new versions of our database. It's easy for us to check, if you're ever not sure.'

    She would explain things, but not shaming or assuming I didn't know. If there was a limiting rule, she would explain it: 'If these items lead you to additional records, we can do our best to provide you access. However, many of our records are stored off-site so we may not be able to bring them in for you with less than a week's notice.' She would say things like 'let me know if you have any further questions' or 'have a lovely weekend.'

    I was grateful to her.

iv. Beachhead

From the *Weekly Colonist* of Tuesday June 24, 1862 (excerpted from the paper that became the *Victoria Times-Colonist*, still the main newspaper in Victoria, Canada, today), a report from Bentinck Arm, Fort Rupert, and Nanaimo, describing the voyage of the sloop Northern Light:

Nothing of interest had transpired at Bella-Coola. The small pox had not yet got among the Indians there; but the Bella-Bellas were dying off very fast from its effects .... The ravages of small pox at Rupert have been frightful. The tribe native to that section was nearly exterminated. Forty out of sixty Hydahs who left Victoria for the North about one month ago, had died. The sick and dead with tie canoes, blankets, guns, &c, were left along the coast. In one encampment, about twelve miles above Nanaimo, Capt. Osgood counted twelve dead Indians—the bodies festering in the noonday sun. The whole party had been swept away without the presence of a ministering hand to comfort them in their last moments.

A French doctor was at Fort Rupert engaged in vaccinating the few survivors of that tribe, and intended to go further North on the same errand. His services are said to be rendered without reward—a striking contrast when compared with the course of neglect pursued towards the Indians in their present distress by the Missionaries.

An American died of small-pox at Nanaimo on the 9th inst. He received every attention from his partner. They were passengers hence from Bentinok Arm on the Hamly, over a month since, and were put ashore there for medical treatment ....

Mr. Speight and party, of the Vancouver Island Exploring Expedition, returned to Nanaimo on the 11th inst., with one of their Indians sick. The Indian died two days thereafter of the small-pox. Speight and party were vaccinated and again left for the North, on the 15th inst.

v. Death on the Beach

It was that image—twelve bodies on a beach, festering in the noonday sun—as well as some other nasty facts, that stuck with me.

It wasn't the main thing I was in the archives to research. It also wasn't a secret, no more than residential schools. It's there in black and white, in the local newspaper, unfolding over a series of months: a smallpox epidemic that decimated Indigenous people and communities, leaving others largely untouched.

In the biographies of the historical figure I was researching—a politician of the time—this episode of mass death is mentioned barely or not at all. Yet it is hardly an aside.

History hiding in plain sight. Again.

vi. Schooled in Death

During my archival encounters, human remains located at residential school graveyards were making the news. Pain was on full display: hundreds of children's shoes, left on the steps of churches, legislatures, schools. Shirts blazing orange. People crying by these makeshift memorials.

Friends circulated petitions, demanding that the missionary orders and churches make available archival records of the schools that they had so far refused to release.

vii. Captionless

If the only picture is a person without a caption or name, maybe a number, person as category, what is it?

I cannot separate such encounters from my sorrow.

Partly, it's fear. That I will go to the museum, the memorial, and recognise the face of family staring back within a wall of anonymous photographs of people starving and subjugated.

Human beings as typology, as record, but of what?

Do I want to participate in that?

No. I do not.

viii. Salvage

What is the difference between extraction and salvage?

A Danish colleague dedicated herself to bringing film and photos back to Inuit communities, showing these anthropological records to people who could recognise great uncles, grandparents, where younger generations might see pictures of relatives for the first time. Someone did a similar thing, though of more recent photos, in a community that I have spent time in. It brought a lot of excitement, good memories for people. And, strangely enough, it was an avenue that documented local climate change: the photos of the land, the same places but different, showed how quickly the climate had altered.

ix. Scholarly Inquiries

I listen to a virtual conference panel of Indigenous scholars talking about decolonising the archive. They talk about the security guards posted at

the museums (where the archives often are) to keep out the itinerants, yet whose presence scares Indigenous people away and signals that this archive is only for people who look and act a certain way. The scholars talk about acting as intermediaries, doing genealogical research so community members can get status[2] or, alternately, they talk about the care work in gently letting someone know that their family lore is not a viable community connection. Community members may not have access to archives, may not know where to start if they did.

They talk of how arbitrary it is, how much it depends on personal relationships: after years of official channels leading only to despair, running into a priest at the airport who knew your family, and his letter finally granting access to the church archives for a particular school.

x. Burn It All Down

After the announcement of the graves, two churches burned in the British Columbia (BC) interior in suspicious fires.

'Burn it all down', tweeted Harsha Walia, the head of the BC Civil Liberties Association.

xi. Who Gets Burned?

The next week, southern British Columbia experienced successive days of the highest temperatures ever recorded in North America at these latitudes, leading to hundreds of excess deaths. A huge surge in forest fires followed. The town of Lytton, BC, where temperatures had peaked at 49.6ºC, burned to the ground.

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[2]Since the passage of the Indian Act in 1876, the Canadian government has granted 'Indian status' to those it determined to legally qualify as Indian. While the Indian Act has been critiqued as colonialist and paternalistic by scholars such as Glen Coulthard, Kim Tallbear, and Audra Simpson, and the general consensus among Indigenous political leaders is that the Act should be abolished, at present being granted Indian status is legally significant and certain rights are associated with it not just for individuals but for communities. For example, the funding for band councils depends on the number of enrolled band membership, who must have status. Throughout North America, various forms of Indigenous governments may also have their own systems for determining who belongs to a community or nation. The discussion the researchers had at the panel likely applied to people seeking genealogical or other evidence necessary to apply to be a citizen or tribal member with a specific nation, as well as to those seeking federal status.

Lytton is where two rivers meet: the Fraser and the Thompson. It figured in the archival records I sought, as central to events surrounding the Fraser River gold rush, and the roads and railway that followed.

When Lytton burned, so did collections and archives from its two museums. The Chinese history museum lost all 1,600 artefacts—remnants of the lives of Chinese miners and railway labourers reduced to ash.

xii. More Death

My favourite thing while visiting Victoria was to go to the ocean: I could just sit at the beach, looking, for hours—watching the islands, the water, the seals and crabs and tiny fish, the ocean beating on the shore, barnacles reaching out their feathered limbs to feed and seaweed swaying.

The week after I left the heat wave killed an estimated one billion sea creatures, largely mussels baked to death in their shells in the interim between high tides. I wondered which of the beaches I loved now stank of death and if we were as indifferent to this stench as the chronicler of the Northern Sloop had been, more than a century and a half earlier.

xiii. Resignation

Harsha Walia resigned in the fallout from her tweet.

'We regret the misunderstanding that was caused by the tweet and apologize for the harm the words caused,' wrote the BC Civil Liberties Association (BCCLA) board.

Three women directors resigned in support of Walia. ' "Burn It All Down" Is a Call for Decolonization, Not Arson' ran the headline of an opinion piece co-authored by Grand Chief Stewart Phillip of the Union of BC Indian Chiefs (Grand Chief Phillip et al., 2021).

xiv. Decarbonise/Decolonise

With the mussels reduced to their carbonite shells, the records from Lytton incinerated, I thought about the Royal BC archives and whom they served.

Because of the pandemic, only five researchers could be scheduled in per day—slots were difficult to come by, and limited. The majority went to the provincial government, with Wednesdays also reserved exclusively for its use.

Thus, archival access was allocated to serve the status quo: government workers seeking evidence for court cases, for land claims negotiations, for justifying government powers and actions.

Throughout the 1990s, 2000s, 2010s, when I protested on legislature lawns, what policies did those researchers search out evidence for? Logging the last of the old growth forests, more oil and gas development, lagging on land claims negotiations?

Talking to the security guard, I learned that public access was to be further foreclosed: the archives were moving from their central downtown location to a suburban/rural location several kilometres away, a place few buses go. Reduced slots for non-government researchers were expected to be made permanent.

How did the infrastructure of records past set the path for the future? How could these choices be changed?

2.3 Pathways Forward: Conversations on Reciprocity and Collaboration

Rachel, Elizabeth-Anne, and Shirley

Transitioning from resource-intensive to lower-carbon methods requires engagement with the power dynamics of research and rethinking the choices researchers make. In the archive, this means confronting the very purpose of these sites. Researchers and practitioners cannot simply switch to low-carbon archival practices while leaving the colonial archive itself intact. In the wake of colonial histories of extraction, researchers and archivists must develop new ethical frameworks for archival practices rooted in collaboration, flexibility, and harm reduction. Climate change and the emerging energy transition opens up possibilities for these new ethical horizons. How might we build more meaningful *and sustainable* collaborations between recordkeepers and users, between researchers, archivists, and communities, to reduce carbon emissions as part of a larger movement towards more ethical relations? In this final section, the three of us reconvene to explore these questions through conversational form. Informed by our own positionalities and experiences with the archive, we propose that collaboration offers a potential avenue out of high-carbon research, while exploring how scholars and archivists might actively work to avoid reproducing existing inequities.

Rachel

Michi Saagiig Nishnaabeg scholar and writer Leanne Betasamosake Simpson's reflections on extraction inform much of my writing about energy politics. In an interview with Naomi Klein in 2013, Simpson states that the alternative to colonial relations is 'deep reciprocity .... It's respect, it's relationship, it's responsibility, and it's local' (Klein, 2013). While a particular archive might be far away, it is helpful to think about archives through this lens of the local. As a place of research, archives can be a site of material intimacy with and accountability to the past. If we think about archives as being part of the fabric of our everyday lives, rather than being held at a remove, then we must consider how the records they hold are also beholden to local communities. Archives—like the academy—have an ethical responsibility to decolonise, and to find ways to model reciprocal and responsible relationships with the surrounding communities.

As an international postdoctoral researcher on contract during the start of the COVID-19 pandemic, I developed several creative ways to substitute long-distance travel (e.g. flying) with more distributed forms of collaborative archival research. Rather than travelling to distant repositories, I hired graduate students as translators and on-the-ground researchers to scan records on my behalf. (In addition to the geographical, legal, and temporal restraints I was operating under, many of the records I needed to access weren't digitised.) One collaborator, an international student, translated digitised records and facilitated communications with European archives. Another student scanned fonds from an archive in the Canadian Prairies, creating a detailed database of the collections to share via Dropbox. A third collaborator visited local municipal archives in Newfoundland and Labrador, using their past working relationships with the archivists to access records not listed in official finding aids. I also drew on my own relationships with archivists over the years. Nourished through phone calls and emails, these exchanges were generative to my work, sparking new research questions and directing me towards relevant fonds I might not have found otherwise.

Elizabeth-Anne

From an archivist's perspective, these kinds of collaborations open up all sorts of possibilities for shared authorship as well as allowing for greater acknowledgement of archival processing work as a research activity in its

own right. These practices can help foreground more ethical and account-able ways of producing knowledge and challenge the model of the solo researcher, invested in high-carbon forms of transportation and academic notions of individual excellence.

Rachel

Yes! While each collaborative relationship will be different, my goal is always to try making these exchanges equitable and mutually beneficial. As a former international student myself, I try to offer opportunities to foreign students facing similar barriers to employment in Canada. Even a short-term contract can offer valuable experience in the archive and create opportunities to test the limits of this method. Collaboration also works to push against academic norms of solo authorship and hyper-productivity that dominate the humanities.

That said, this collaborative method comes with its own considerations and embedded privileges. Collaboration, like any form of relationship-building, requires a lot of time, energy, and empathy to sustain. It takes work to do it well. When it comes to the archive, who is welcome and who has access are also intersectional concerns, wrapped up with class, dis-ability, race, and citizenship. As a settler and immigrant, I enter Canadian archives with a different relationship to their embedded hierarchies than my Indigenous colleagues. Relying on high-carbon (and expensive) forms of transportation like flying is only one of many factors that make conven-tional archival research inaccessible. I also had access to research funding as a postdoctoral fellow, along with administrative support to facilitate my repurposing of travel funds into student contracts. My collaborators and I had reliable access to the internet and data management software, as well as pre-existing familiarity with archives and library science. This facilitated our ease with collaborative remote archival research. Of course, for researchers based in geographically remote areas, issues of access and carbon offsets from air travel predated the pandemic, even as it exacerbated structural inequalities.

Elizabeth-Anne

This kind of collaborative work also helps to decentre the archives and individual archivists as impartial sources of truth: the meaning of archival

material is shaped by its past and the people and institutions who care for it, but its use and interpretation by researchers also add to its significance and provenance.

When it comes to accessing archives that are at a geographical remove from the researcher, it is useful to think about the inverse situation as well: many archives, particularly smaller community archives, are in remote and hard-to-access places. As institutional archives work toward repatriating the material heritage they hold to the nations and communities to which it belongs, they also need to share their knowledge on providing access to these records.

Shirley

Decentring the archive and the repatriation of existing archival collections shifts power. These actions give local communities greater access to materials, and also challenge the idea that archives are the only proper means of preserving cultural heritage. In 'Myth and Medium', Tr'ondek Hwech'in Heritage staff discuss how the most valuable pair of snowshoes in their collection was used in a workshop with elders on traditional snowshoe making (Parsons et al., 2007). The 'myth', or transmission of cultural knowledge that is the essence of making and using snowshoes, was considered most important, even if it risked material damage to the object.

In my experience, as Indigenous communities achieve greater sovereignty and self-government, what might be considered the archival is often nested within a constellation of practices and activities that support the resurgence of lived culture. For example, the Danoja Zho Cultural Centre in Dawson City, Yukon draws on oral histories and other archival materials within the Heritage department to create exhibitions and programming that foreground the continuation of cultural practices such as beading into the present. Displays at the U'mista Cultural Centre in Alert Bay are but one outcome of a decades long process in which Kwakwaka'wakw tribes advocated for repatriation of confiscated/stolen potlach regalia, and then decided how the regalia was to be returned, displayed, and integrated within present-day communities, where potlatching is very much a living practice.

Rachel

I like this language of the archive as part of living culture, as a lived practice in its own right. It reflects the reality that as socio-political landscapes

change, archival practices must shift with them. But these transitions within archival preservation, storage, and use don't equally engage the goals of anti-colonial and climate-justice movements. Even though they are not commensurate, decarbonising and decolonising archival research share some goals and concerns, including how archives should work and for whom.

For instance, repatriating materials to Indigenous Nations in their original and digital forms can help build more reciprocal relations between communities and archivists, and are an important step towards decolonisation. But this isn't necessarily a low-carbon endeavour. Neither is digitisation. As we've discussed, digitising archival records requires a great deal of expertise and energy resources.

In situations where digitisation is not feasible, archives need to be more transparent about the actual availability of the materials in their collections. More than once during my graduate studies, I travelled hours to access an archival collection only to discover that the films I sought weren't available in a viewable format. Instead, I was presented with deteriorating VHS transfers of 16 and 35mm films that played back static—likely made decades ago to facilitate researchers' access but never replaced due to budgetary cuts. It's easy to feel nostalgic about the affective experience of being in the archive. Thinking back to screenings of rare archival prints at my university's archive, I can viscerally recall the clicking of the 16mm projector and soft whomping of celluloid on metal; the heat of the projector's lightbulb on the back of my neck, quickly warming the tiny viewing room. But these material and affective engagements depend on institutions' access to financial resources and skilled staff to manage moving-image collections. The logic of undertaking high-carbon travel falls away when presented with low-resolution media transfers. Records such as these remain inaccessible, regardless of how far one flies.

Elizabeth-Anne

As Michelle Caswell points out, doing restorative work is complicated. In her address to the Association of Canadian Archivists in 2020, she said that

> [l]iberatory memory work is not as easy as putting less-offensive terms into a database built on white supremacist logics or providing cultural competency training for white archivists so that they can then extract knowledge from communities of colour more fluently; it requires a radical repair, a rebuilding, a foundational theoretical shift in support of radical material claims. (Caswell, 2020)

Decarbonising archival practice and the research methods used to explore, study, and interpret archival material requires us to remake and repair energy practices. To decolonise, the North American archival profession also needs to continue to reassess and to change its traditions and practices.

Shirley

One approach could be to radically reimagine the purpose of the archive. What if the goal of the archival was to breathe new life into present-day cultural practice? It could mean significant shifts in how resources are allocated and what archival preservation and display work is prioritised. Language revitalisation is an urgent concern in many Indigenous communities, yet resources are often lacking for the basic work of preserving access to recordings that are physically decaying, or of obtaining proper permissions from subjects or their families so that recordings can be shared. The digital realm can offer so much to language revitalisation—from connecting language learners remotely to giving access for learners to repositories of vocabulary and active use of language. But creating appropriate digital materials takes resources.

The Mukurtu content management system is an example of a digital platform where principles of Indigenous cultural sovereignty shape access to and experience of the archive.[3] It's a free, open-source, mobile digital platform built with the collaboration of Indigenous communities. The incorporation of community protocols is built into the design. For example, differential levels of access can be coded for particular items or collections to ensure that they are accessed in appropriate contexts by individuals who meet certain criteria.

We cannot decarbonise archival research in the Americas without also intervening in the extractivist norms governing settler institutions and intellectual traditions. Central to both these projects is redefining the goals

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[3]The Sustainable Heritage Network offers a broader Digital Stewardship Curriculum that contextualises the use of platforms like Mukurtu (n.d.). The content management system and digital stewardship curriculum are available online at: https://mukurtu.org/.

of archival research and practice. For individual researchers, participating in more collaborative and reciprocal models of work, while redistributing resources and authorship, offers one way of building equity. Repatriating archival records and co-creating new archival management and access protocols with communities is another. We invite you, reader, to consider the ideas we've discussed in this chapter, and to come up with your own as you move forward.

Rachel, Elizabeth-Anne, and Shirley

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3

Textual and Visual Methods: On Humanistic Canons, Mobilities, and Frameworks of Interpretation

Brent Ryan Bellamy, Anne Pasek, and Emily Roehl

Dear Reader,[1] we expect you to come to this chapter with some doubts. This is a volume about the carbon intensity of research methods, and here we are, wanting to talk to you about how we look at films, pictures, and books. You might reasonably ask: What does this have to do with climate change? Are humanistic research methods really a problem worth worrying about?

We could work to bring you an empirical answer, though it would not be one that we—a trio of literary, history, and visuality scholars—have been terribly well trained to offer. Most days our jobs have us searching through texts, images, and journal databases, all of which of course emit carbon in their production and their maintenance. We can imagine how to account for, and mitigate, some of these emissions.[2] Yet, in such conversations and proposals, we act as concerned advocates rather than as experts wielding our own disciplinary tools.

But perhaps it should not be so. Perhaps an empirical focus on our outputs is not the only, or best, place to start. Perhaps we should begin in

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[1]Dear Reader, you are dear to us because we hope to think with you, even though we don't share the same time and space, nor can we even rest assured in the certainty that you even exist. Writing is a hopeful act. It is often more motivated by aspirations towards an imagined audience than by the need to express some inner truth. We write to open up a dialog. We write to think collaboratively with you, in all the thoughts you take, shape, and extend from our chapter.

[2]For admirable trailblazers of these considerations within textual and visual studies, see the fascinating appendix of LeMenager's *Living Oil* (2014) or Sean Cubitt's *Finite Media* (2017).

the middle, with the thinkers and objects of academic study, as well as the investments that hold us together—and sometimes apart.

To explain what we mean, let us begin with a proper introduction.

3.1 A Proper Introduction

3.1.1 What Do Textual and Visual Scholars Do, Dear Reader?

In short, we write about cultural objects.[3] These objects are texts and images, broadly conceived. A text might be a poem, a play, a speech, a novel, an essay, an event, an experience. An image might be a photograph, a film, an advertisement, a logo, a gesture. In much the same way that the definition of text and image is ever-expanding and even unwieldy, the methods of the literary and visual scholar are often diffuse. And so, many such scholars have a very loose orientation to method, which is often guided by individual proclivities or the theory *du jour* (Ahmed, 2006). This lack of concentration can be liberating. We study what we want, how we want, we are tempted to say.

3.1.2 But How Do We Choose Our Objects of Study, Dear Viewer?

This selection of objects and archives is guided in part by the passions of the scholar, but these are not only their own. Taste is often directed by disciplinary expectations, publishing pressures, and supervisory demands (ah, suggestions). An inspiring teacher might point the way; so too might already-existing controversies, or the desire to get a job. But there is almost always desire in our engagement with our objects: an attraction, a repulsion, an obsession, or other affects of attachment.

3.1.3 What, Dear Watcher, Do We Do With Our Objects Once We Have Them?

Though we may at times be tempted to jest that we simply read and watch stuff for a living, we do more than just that. We read and watch *closely*, we use lenses, we wield theories, we describe and interpret, we make value judgements, we categorise, we canonise, we smash icons. We do most of this in writing, whether our objects are textual or not. We publish reviews,

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[3]Presumably our colleagues in music and sound studies are up to much the same, as are those engaging material culture, fashion, and food. We don't ourselves work in those fields, however, and didn't want to speak for them.

articles, books. Sometimes we do this work in other media, but the things that tend to count, at least for hiring, tenure, and promotion, are words.[4]

Our words, at their core, work to replicate. The things we make—the papers, the presentations, the syllabi—are, in part, a re-enactment of our process of looking, reading, and otherwise experiencing our objects. We may describe the order in which one encounters the characters, the brush-strokes, and the many other forms of craftsmanship we find worthy or demanding of attention. Sometimes we narrate this interpreter's progress in the third person ('the reader' or 'the viewer'), though this person is generally just our own experiences made generic through the writerly form. In doing so, we tend to subtly inscribe our own subjectivity into the centre and scale of our papers and all the claims they seek to advance.

Dear Listener, do you think this approach odd? If so, you are right to wonder why we are so invested in lingering so long, and at such cost of time, cash, and energy, with our objects, especially if our descriptions of them so rarely get outside of ourselves. We rarely speak this part out loud, but for you we should.

3.1.4 What, Dear Spectator, Does This Work Achieve?

Put grandly, we think cultural interpretation can change the world. Put bluntly, we *hope* reading and looking and listening does *something* in the world, though scholars diverge on what this *something* is or could be. If, for example, you are a literary scholar who studies novels about climate change, you might believe that heightened awareness of the ecological and social damages of this ongoing process (via plot, characterisation, editing, etc.) will inspire appropriate action in readers. But, if you were to go about actually measuring such impacts, you may not find them (Schneider-Mayerson, 2018). Nevertheless, our liberatory aims remain: that through our research and teaching we might make the world a better place, or at least understand it in such a way that we can be better actors in it. We're stubborn like that. After all, these objects did change our lives.

Though, perhaps not always for the better.

Attachments have costs. Our objects and the promise of a community where we can share in the study of them often drive us, literally and

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[4]This is a colonial inheritance that works against intellectual traditions that operate more primarily through storytelling, art, and/or the body.

figuratively, to unroot ourselves. Whether moving to a new city for a grad programme or a job (such as they are) or spending countless hours of our lives commuting to conferences or classrooms, we seek places where we might share our object-passions. Like Barthes, these objects strike us, arresting and demanding our attention (Barthes, 2010). And so we attend, motivated by our own investments and the worlds our objects might help illuminate, as well as a social horizon composed of the similarly affected.

Yet attachments can also bruise, especially when they bring us more apart than together. Take, for instance, a scene all too familiar.

3.2 Presenting to the Merely Present

A scholar arrives at a conference session full of energy (equal parts nervous and warmly anticipatory). They have spent the previous months writing their conference paper, stealing away their best moments from the obligations of their teaching and home life so that they might draft an interpretive argument about an object they hold most dear. Their paper goes to great lengths to describe this text: how it works, what it might do in the world, and how it could encourage us to think about things a little differently. It is, even if a critique, a kind of love letter.

But alas—our scholar's hopes are dashed. The cluster of peers that receive the presentation have no such investments. They haven't read the book, or they saw the movie but it did not grab them. As the scholar talks on, the audience drifts off. Conference agendas are quietly opened and scanned, emails get answered behind laptop screens, and minds wander towards as many small dreams and anxieties as there are bodies seated in the room.

The talk ends to polite applause. There are questions from the audience, but poor ones. They are comments about other objects that the question asker would instead prefer to think about, or queries about theoretical framing in which the scholars do share a (potentially contentious) investment.[5] The affective life of the object remains entrenched in the world of the scholar, and that world has not been effectively shared.

[5]For alternative formats that tend to support better outcomes, see how Eve Tuck (Unangax̂) proposes an Indigenous feminist approach to academic Q&As (The Change Agency, n.d.).

This scene unfolds thousands of times each year. And we grieve it as a loss. It is a personal disappointment to our scholar character, who has not been able to effectively communicate the ideas and investments that brought them to this conference (and indeed perhaps even brought them into the university); they are left alone and anxious. It also impoverishes the collective conversation that conference sought to support; instead of generating ideas and connections, it has instead produced an uncomfortable and shallow ritual of feigned attention.

Is this worth anyone's time? Is this worth the carbon burned to bring these minds together, yet still apart?

We could count the grams of CO_2 emitted,[6] but it isn't clear that this would, in itself, inspire particularly dramatic or politically galvanising decarbonisation pathways. Especially for scholars who enter conversations about the political economy/ecology of culture as audience members and critics, our individual capacities to intervene on publishing and curating seem slight.[7] Our personal energies might be better spent elsewhere.

And it is on this point—the investment and frustration of personal energy—that we, your Authors, linger. Because it's not so much the object that brought our scholar character to the conference we open with, and which resulted in climate emissions and life trajectories that seem far from ideal. It is the investment therein.

Here, dear Reader, is our shared aim: Let us think about the kinds of affective attachments that hold us individually to objects—and thus to scholarly social arrangements that do not always benefit us, the planet, or the wider communities we imagine reaching—as a subject of low-carbon critique. How does the humanities' investment in objects and personal interpretations lead, not just to a travel schedule full of missed connections, but to a wider gap in the kinds of political and convivial ends we

[6]In their roundtrip flight to the conference—let's say from Toronto to LA—our scholar has emitted about a tonne of carbon dioxide equivalents. This is about as much as they'd otherwise emit in half a year living an average sort of North American life. Love burns more than just the passions.

[7]Though for those engaged in more infrastructural experiments with form, this is far from the truth. For exciting and inspirational explorations in the low-carbon production and hosting of cultural content—and thus the audience and meaning formed thereby—see the Small File Media Festival (https://smallfile.ca/).

might achieve? And, given the frequent failure of our professional norms, what else might we fashion as method and practice?

3.3 Canons, Mobility, and Community

On these points, dear Participant, let's take a longer view of our scene. Our scholar, we suggested, was motivated by a deeply personal connection to their object, and by a set of disciplinary and methodological norms that set such connections as a sufficient and obvious place to begin. This is not an accident of history. It is, instead, a legible remnant of academies past, and a political economy of knowledge production that is decidedly feudal.

To be brief and to be blithe, the humanities has long been a site of powerful people pursuing their ('elevated') personal interests and, as such, a principal place in which cultural hierarchies were made and rein-forced.[8] This is not a universal tendency, but it is a dominant pattern. The importance or relevance of these objects and the people who cared about these objects were, during the academy's most class-stratified periods, often essentially synonymous. It drew a map through culture and history that endures today. We call this map a canon: a group of objects that enjoys a special status as 'high' culture, and which in turn forms the stories we tell each other about the meaning and trajectory of our respective fields, aesthetic genres, or schools of thought.

Geography and mobility, too, are part of the canon's story. Before steam power, bodies, texts, art, and ideas circulated along slower, and much more regional, tracks. This narrowed the pool of possible objects that might make it into disciplinary regard, and contoured the lines through which the canon could be disseminated and taught. Yet as colonial empires grew, junior scholars were increasingly dispatched outwards to fortify interpersonal and imperial affiliations (Gärdebo et al., 2017; Pietsch, 2015). These travels reproduced place-based canons, even as transplants were cut and grafted into different soils and distant minds. This has bearing on our methodological standards (or lack thereof). Method, for a connoisseur, is about an eternal return back to the metropole.

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[8]To name only two thinkers who have charted this dynamic: Pierre Bourdieu and Sara Ahmed.

We have experienced significant ruptures with this past, though not entirely with its legacies. Since the 1940s, academic institutions have, to a great if incomplete degree, sought to serve a much broader public, while new forms of fossil-fuelled mobility and globalisation intensified this demographic shift. This led to canon wars, as students and faculty from previously excluded groups urged a reckoning with the merits and limitations of their discipline's foundational objects. These wars were more abandoned than resolved; instead of synthesis, a thousand subfields have bloomed, building innumerable proto-canons. This in turn has created further mobility pressures: in order to reach the audiences, archives, and objects that make up a niche field, one must seek out distant performances, museums, conferences, and speaking engagements—or at least, this is the wide aspiration. Travel can be a pleasure (expense accounts, sights to see, and an escape from routine) but also, more importantly, a promise (to finally be with the people that understand your work, or who will challenge and support you in ways you do not enjoy at your own department).

To return to our conference scene, we can now view this loss as a very modern one. In centuries past, our travelling scholar's presence would have been a rare gift—an arranged marriage between institutions of learning—and their words marshalled through a common and collectively policed framework of taste and regard.[9] Today, there is no singular canon, region, or other denominator to uniformly return to, just a great many destinations to seek out. And so our ideas, like airplanes passing overhead, often appear as little more than a blip on the radar.

But we aren't by any means the first to identify this problem. Let's take another scene, this one from fiction. Ursula Le Guin gives us a similar moment of frustrated intellectual exchange in her 1974 book *The Dispossessed*.[10]

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[9]As Authors we worry that it is beginning to sound as if we feel a nostalgic attachment to the canon. We do not. Our goal instead is to trace how histories of mobility and hierarchy shaped the social and methodological norms of academia—norms that were unifying for some and excluding of most.

[10]See, Reader, how we are drawn to cultural objects? This book grabs us, asserts that it contains a pattern within its pages that could help us think further, or see more clearly. We hope we will show you this pattern before this essay is done, and that it too will be useful to you, regardless of your investment in or familiarity with the book.

As we are wont to do, we begin by re-enacting the scene to you, our Reader. A boy and his peers in an early-childhood school sit together in a shared 'Speaking-and-Listening' exercise. He describes a phenomenon that sounds very much like Zeno's paradox: if a rock is thrown towards a tree, will it not be endlessly deferred from connecting, if there is an endlessly divisible remainder of distance along its trajectory? This thought experiment—a joke, the boy later insists—is met with a sudden and sharp evaluation: the teacher interrupts, asking the boy's audience (not the boy) whether or not they find this line of thinking interesting. They do not, and the teacher himself is further unamused with the unacknowledged citation. He rebukes: 'Speech is sharing—a cooperative art. You're not sharing, merely egoizing .... This kind of thing is really directly contrary to what we're after in a Speaking-and-Listening group. Speech is a two-way function' (Le Guin, 1974).

This pedagogical scene tells the reader (it tells us) something about the society in which the boy lives: it is grounded on an anarchist, alien moon populated by radical dissidents, collectively organised towards environmental constraints and social freedoms. But it also tells us something about scholarly norms more broadly: that enthusiasm, when it is not shared, is understood as an anti-social act in this society. The goal, the teacher insists, is not to explain, but to collaborate.

We see our scholar character—we see ourselves—in the teacher's rebuke. Is this not advice worth broadly heeding? Given that we can no longer assume that all our peers will have read the same materials, and developed the same attachments as scholars of more class- and mobility-stratified times, then perhaps we need to re-evaluate the terms of our intellectual exchange towards that more cooperative art.

Instead of a given focus on personal interpretations of objects, and absent a common canon of objects for interpretation, we might instead seek common frameworks.

3.4 Frames

To understand how to reconfigure our methods, our objects, and ourselves, we propose a figure to aid us: the frame. How do we decide where to place something? Seeds need a bed. Images need glass and backing. Action or

scenery may need the camera's focus. The term says, 'here is where the work happens'. It doesn't preselect for content, but it does hold objects in a shared plane, available for collaborative work. Frames provide legible places to begin, a finite scope of action, and room for specific and productive disagreement. They may be presented as neutral. But a cautious convener can leverage such tools to provide moments for collaborators to recognise their own interests, limits, and capacities. Most importantly, if designed well, they may provide a space to short circuit personal, individual investments in a given object in order to provide a glimpse of the ways we already work collectively.

Frameworks describe the set of assumptions that are in play in any collaborative event. Identifying and addressing them specifically allows us to evaluate past designs and make better ones. Who are the people meeting? Do they represent stakeholders or are they themselves stakeholders? What are they considering, and what aren't they considering? Where does engagement necessarily begin and end? These questions also contain axioms that are a prerequisite for participation: roles and relations, means and ends.

Frameworks for research exchange already exist. The canon was a framework, but a bad one. It set its boundaries around a group of privileged objects in want of stakeholders, limiting the characters and stories that could be told in ways that built a particularly inflexible unity. You had to love the same objects for the story to matter. Academic conferences are much the same—they assume that attendees share a set of objects and questions, that they are stakeholders representing the field,[11] and that they are, if only indirectly, competing against each other for the limited time and attention of the group. Travel budgets, the fifteen-minute talk, PowerPoint slides, and the static process of listening to personal accounts of interpretation are the frames across which our work is held and bound.

But these are not our only options; the classroom already models much more enriching forms of collaborative inquiry. Take, for instance, a tutorial where students in a humanities classroom are being introduced to environmental and energy humanities processes for interpreting the built world around them: how to read infrastructures and institutions as

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[11]And, perhaps equally unhelpfully, their countries, departments, or mentors.

texts. They have been tasked with studying and representing their institution's carbon entanglements from administration to food services and from the library to the service staff—a monumental task, and one suited to the attention of many minds. Already the framework design has some implicit pedagogy built into it. The axioms here? Students are stakeholders of (and in!) the university. They are in the middle of a shared problem, in want of a collective, but not predetermined, solution. They are asked to evaluate the things they hold dear, as well as the things in need of transformation.

We now have a sense of the group and the task. What framework might we imagine, dear Teacher? It might simply be a list of questions, from basic ones such as 'What do we mean when we talk about carbon emissions?', to 'How can you tell when you are missing information?', 'How should we respond to uncertainty?', or 'What gets omitted from these views of the future?'. Also, these students already have some good research skills, so why not give them a checklist of places they might find this information? They could email their colleagues at the university, investigate sunshine lists, project travel budgets, follow news stories about campus development, calculate energy draw for campus buildings, and so on. For objects (for there will of course still be objects), they might select a photo on the university's website, a carbon-neutral pledge, a story a friend tells to explain away the problem of plastic pollution, or an email from the institution's president. In any case, the framework should be robust enough to handle various styles of reporting and different methods of interpreting information.

As the class sets to work, we can imagine the outcomes: some learners hew close to the big picture and broad answers, while others get hooked on following difficult-to-locate numbers, or the aesthetic tics of green marketing. These different interests stretch across the framework's borders, offering useful information about the nature of the problems and data at hand, as well as the stakeholders it gathers. To complete the framework we need to detail how the students might choose to present this information. The students will need time to reflect on the process and outcomes. They need to summarise and communicate the story of their findings, as well as their process. What did the group learn from working in this way? How would they alter the framework for learners in the future?

Dear Observer, can you imagine what our conferences might achieve if we structured our research exchange along similar lines? Could we gather around shared problems, rather than shared objects?

Our assumption here is that thoughtful collaboration has the potential to better reward our time and efforts and that these rewards are likely to better assist—or in themselves be—carbon-reducing endeavours. In a world of many plural affiliations, far-reaching mobilities, and ever-increasing ppm CO_2, we strongly suspect that there are more meaningful communities to be found in frameworks of collaborative inquiry than in the formulaic exchange of personal interpretations. A research framework suitable to a warming world is one that is less bound to our investments in objects, or which is at least better able to mobilise these investments, skills, and knowledges towards larger provocations and crises that as yet have no conclusion.

While we are unlikely to dethrone the high-carbon conference or the canon's legacies in the humanities overnight, we can advance different frameworks in the classrooms, workshops, and research groups we already have at hand, ones which won't require travel budgets, hotel rooms, and jet lag for the merely present. If we don't share a love of the same objects with our colleagues, neighbours, and students, we do surely share a broad ecological conjuncture. Thinking together about how best to understand and address it means mapping and refining new frameworks. We submit that this work of finding common sites of disagreement, tension, interest, and discovery can broadly lead to more fulfilling, less damaging academic interactions.

Here, then, are a few suggestions to leave you with, dear Colleague. The frameworks that will serve us best will be equitable, open access, and iteratively evolved. Start by assuming that everyone involved is smart and thoughtful, ready, teachers and students alike. Start by assuming that people won't necessarily sense the inequities in the group. Offer room in the framework for a shared understanding to develop, and the rules to shift from one attempt to the next. Think of speech as at least a two-way function. Don't rush things. Value the processes and people that you encounter with your curiosity.

What frameworks for low-carbon research are you interested in exploring?

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A (S)Low-Carbon Ethnographic Invitation

Kim Fernandes, Cindy Kaiying Lin, and Kate Elliott

Dear Fellow Researchers,

We write to you from our vantage point as ethnographers during this ongoing pandemic, as the world is drowning in fire and splitting open across water. Over the course of the last years, our field research plans—and those of our colleagues have also been disrupted due to COVID-19. Across many of our field sites, heatwaves spanning months and regions have also made it difficult to meet our interlocutors who, like us, had to deal with the fallout of COVID-19, often from a place of compounded precarity. Taken together, these accelerated changes to our physical field sites and ongoing global events have disrupted what we typically view as—and how we come to experience—time. They have invited us to think more carefully about the place of temporality in our own work as researchers,[1] especially against the backdrop of university and discipline-specific requirements for field research.

You might wonder, dear Researchers, amid these global disruptions, what brought us—the three voices speaking to you in this chapter—together. Like many of the chapters in this volume, ours began during an international workshop that grouped researchers according to our methods and geography. You might assume our division was based on a

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[1]We owe an enormous debt of gratitude to Baldeep Kaur Grewal, our reviewer, for their expansive comments that have significantly helped sharpen the piece. In particular, as we think and write about time in the piece, we are focused primarily on the way that ethnographers are assumed to experience time as the ones doing the studying. This, of course, is often significantly different from the numerous ways that our research participants experience time, in no small part due to the power differential between the researcher and their research participants.

difference in how 'ethnography' is interpreted in different regions. We'd like to dispel this assumption. First, as you'll see in the next chapter, the ethnographic approaches we employ share similar expectations and constraints as we strive to navigate and innovate various ways of 'being there' (see Kaur et al., Chapter 5 in this volume). Second, we were, in fact, sub-divided purely for reasons of 'time zone diplomacy': the groupings attempted to respect participants' home time zones to allow for synchronous virtual discussions that would not disrupt our sleep. This subdivision rationale is itself steeped in assumptions, including that academics exist mainly within their university's time zone, something which, as we'll share in our stories, is far from reality. But this is how the three of us—scholars at various stages of our academic careers, all based at academic institutions in North America—have found ourselves together, discussing low-carbon ethnography, and writing to you.

We also wonder what, dear Reader, has brought *you* to *us*? Perhaps you come to this volume as researchers interested in what a low-carbon future looks like. Or maybe you have turned to our chapter out of curiosity about the state of ethnography in current times. Whichever path brought you here, we believe that you have come to our letter as fellow writers, some of whom may already be practising ethnographic methods in different fields. You likely have also noted the sense that one *has* to travel, i.e. that travel itself can be seen as integral to the ethnographic project. This makes ethnography a very peculiar methodology, and one that might seem necessarily carbon intensive.

Travel, integral to the fieldwork practices of ethnography, is tied more directly to a linear understanding of time. In the academic centres of Euro-America, travel has become a norm in anthropological fieldwork since the 1920s. Travel for fieldwork presumes a 'practice of physical displacement that defines a site or object of intensive research' (Clifford, 1997, p. 74) and a depth defined by 'length of stay, mode of interaction, repeated visits, grasp of languages' (Clifford, 1997, p. 53). This anthropological legacy of removal from one's university or location of study to spend intense, long durations of fieldwork elsewhere undoubtedly defines the core of ethnographic practice within anthropology. In this understanding, the time set aside to do fieldwork has also disciplined what is deemed acceptable, real,

and 'good' fieldwork.[2] Such practices of travel and co-residence close or near to our interlocutors have serious environmental and political consequences for where we spend time.[3] Here, we are not suggesting that ethnographers should stop flying or stop residing with their interlocutors. Instead, we are inviting you, Fellow Researchers, to disrupt the taken-for-granted temporality and dominant narratives around the fieldwork methodology, and to decentre the ways in which one typically conducts such kinds of research.

Of the range of qualitative research methods that you may know in one form or another, we believe that ethnography is a significant avenue for practising low-carbon research practices. In our experience of ethnography as the practice of spending time with other humans, we have noted that it entails wrestling with uncomfortable truths as we seek other views (even as partial interpreters), thereby also demanding that we take the temporality of our interlocutors seriously. In particular, it urges us to reimagine the temporality of fieldwork such that it is no longer dictated solely by the university and its timelines, but also by the ways in which our own lives and the lives of our research participants have been shaped by numerous upheavals.

As a result of the pandemic, several of us have had to consider alternatives to previously planned in-person fieldwork, many of which have

[2]Notions of good fieldwork have been challenged by James Clifford (1997) who argues that fieldwork is also tied to 'positivist and colonialist historical associations,' where the field is the laboratory and place of discovery for privileged travellers (p. 61). Anthropologists have long engaged in troubling the boundedness of the field site and their participation in the construction of the native Other. For more reading on how to trouble the boundaries of field sites and about exoticising the Other, see Kirin Narayan (1993), Anna Tsing (2005), David Scott (1992), Ruth Behar (1993). Our focus here is on the linear temporality of fieldwork and the act of travel that seeks to reify and construct that.

[3]'An economy-class return flight from London to New York emits an estimated 0.67 tonnes of CO2 per passenger, according to the calculator from the UN's civil aviation body, the International Civil Aviation Organization (ICAO). This amount is equivalent to 11% of the average annual emissions for someone in the UK or about the same as those caused by someone living in Ghana over a year' (BBC, August 24, 2019). Read also Susan Blum's recognition of carbon footprints and the privilege of conducting fieldwork during a pandemic (Blum, 2020) or Fieldwork at a Distance by Elise Hjalmarson, Nina Teresa Kiderlin, and Sonjda Rudd in https://allegralaboratory.net/ethnography-at-an-impasse-fieldwork-reflecti ons-during-a-pandemic/ (Hjalmarson et al., 2020).

included conducting research online. In compressed virtual spaces, as we composed this letter to you, Fellow Researchers, we thought about how both time and travel are crucial elements to ethnography as well as avenues to intervene in for a low-carbon future. As ethnographers, we carve out the time to conduct fieldwork and understand our interlocutors through everyday practices, even as they grapple with the impending climate disaster that would transform many lives and opportunities in differentiated ways. We recognise the peculiarity of travel in fieldwork, in which one 'travels' to learn more about what one hasn't known yet, even as the very act of travelling means releasing carbon emissions through fossil-fuelled transportation. Like the authors of the following ethnographic chapter, we are struck by the temporal dimensions of this method. More crucially, we invite you to think with us about ethnography through the lens of crip time[4]—it is an insistence on non-linearity and non-teleological time.

Crip time is most centrally rooted in the field of disability studies and its move away from medical models of disability as a deficit. Crip theory[5,6] further emerged at the intersections of this critical tradition and queer theory. Fellow Researchers, we are deeply taken by Alison Kafer's argument for crip time as a way of expanding and bending our orientations of time, which are for thus-far-determined normate bodies.[7] It is a shift in mindset and in this context, ethnographic practices, where instead of enforcing clocks, institutional schedules and expectations, and disciplinary norms

[4]Several scholars from disability studies and other related disciplines have provided generative discussions of the non-linear nature of time—see, for example, Ellen Samuels' 'Six Ways of Looking at Crip Time' (2017). Another valuable discussion of crip time is available in Robert McRuer's *Crip Times* (2018).

[5]Although a full discussion of the richness of scholarship within crip theory is beyond the scope of this paper, see as an example Robert McRuer's seminal work, *Crip Theory: Cultural Signs of Queerness and Disability* (2006), as well as Sami Schalk's 'Coming to Claim Crip' (2013) and Carrie Sandahl's 'Queering the Crip or Cripping the Queer' (2003).

[6]Crip theory works from an embodied understanding of disability as central to one's identity, and challenges able-bodied experiences and definitions of time, productivity, achievement, and independence (Kafer, 2021). From within the field of disability studies, the concept of crip time has emerged.

[7]Instead of referring to non-disabled bodyminds (Price, 2015; Schalk, 2018) as healthy, or able-bodied (which in turn reinforces ableist notions of who is considered normal, we draw upon Rosemarie Garland-Thomson's scholarship in *Extraordinary Bodies* (1997) and subsequent work (2002) to describe the 'unmarked, normative characteristics' (2002, p. 10) that people who are not disabled are assumed to have.

on an ill researcher, 'crip time bends the clock to meet disabled bodies and minds' (Kafer, 2013, p. 13).

For instance, if you cannot fly, or, more broadly, if you cannot move at the same pace that the academy requires us to, what is the otherwise of ethnography? So much of what we perceive to be embodied ethnography follows an ableist set of assumptions around who can travel and at what time.[8] Crip time ensures that we aim for deep-rooted relationships, which is what, arguably, strands of ethnography have encouraged us to do. Here, we are not trying to address disability, or suggest that crip time or cripping ethnography can be a solution for a global climate crisis. Rather we find that crip time allows us to take seriously the non-linear temporality of our field sites and provide space to recognise that returning to climate normalcy is no longer possible. What we mean by this is that the pandemic and climate events that strike countless people across the world have forced us, from our often relatively privileged points as the researchers who are doing the studying, to actively confront the fact that we are unable to conduct fieldwork whenever and wherever we want. Further, in numerous locations across the Global South, particularly sites that have historically been focal points for traditional ethnographic fieldwork, systemic inequities have resulted in low vaccination rates. As a result, researchers from (often) Global North locations have been forced to reconsider the possibilities and limits for in-person ethnographic fieldwork. In this way, we also hope to make space for the alterations of our interlocutors' everyday lives exacerbated by climate destruction and the ongoing pandemic. In doing so, we hope that crip time enables us to defy the linear temporality and hyperproductive ethnography.[9]

[8]For instance, it demands that we show up in places, even if those places cannot accommodate us, even if our bodies cannot turn up without possible risks and threats to our health, safety, and livelihood. See also Erin Durban 'Anthropology and Ableism' (2022), for a more extensive discussion of ableist assumptions and practices within anthropology.

[9]Take, for example, the suggestion of Hyde and Willis (2020) that academic pace competes with notions of care for those who participate in our ethnographic research: 'In order to look at the laboriousness of the crummy we may need to reconsider pace in the lives of those with whom we do research, and for whom precarity is a constant bedfellow' (p. 298). However, we recognise the tensions present in the slow academic movement. In an interview about their 2016 book *The Slow Professor* in which they advocate for slower academia, Seeber and Berg illustrate the challenges embedded in 'going against the culture of speed [when that] means going against the grain' (Charbonneau, 2018) in their stories of pushback from within the

We write to you to ask that you, too, join us in thinking about how crip time might reconfigure various parts of your ethnographic process. Cripping time in ethnography means ensuring that we have continued relationships to our field sites. In some ways, cripping time allows us to approach low-carbon research not as a list of directives, but as opening up questions in which we think about time and travel—necessary elements and facets to low-carbon research. Cripping time is not new. It belongs to a longer tradition of work in critical disability studies and crip theory that has centred disability as a way of knowing, rather than an object of research and inquiry.[10] Such an insight has been incisively shared by Melissa Kapadia (2020), who foregrounds the importance of 'centring the ill researcher and their needs' when conducting research, with a recommended set of practices that ensures, first, that the ill body is relieved from the discriminatory structures and norms of an ableist research industry and, second, that all researchers, as a result, benefit from challenging research practices that alienate and punish all of us, ranging from stringent research timelines, to institutional expectations behind what a suitable publication venue is, toward future employment and career stability. They argue that disability is 'not the study of illness and its effects, but the *application of ill lenses* and ways of knowing to the practice of research.' In the same way, we hope that this letter pays homage to Kapadia's work, and the long lineage of critical disability studies and crip theory that they build and draw from in order to extend the same lessons to the design of low-carbon ethnographic research methods.

Those of you who have already engaged in ethnographic projects are involved in work that is often deeply relational, developing knowledge of the various ecologies of your field and the humans and nonhumans who

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Academy, including that their book advocates laziness. Inger Mewburn's blog has explored these tensions within academia—the benefit of slow, but the push for (and pushback to maintain) fast—as 'the Thesis Whisperer', encouraging PhD students to take time for the 'long, slow conversation' needed for their research. (See July 11, 2011, and May 2, 2018.)

[10]In 'Illness Methodology for and Beyond the COVID Era' (2020), Kapadia cites arguments made by critical disability scholars and crip theory including, but not exhaustive of, how these scholars have shown that disability theory should centre disability as an episteme; that advocacy and activism by people with disabilities can sharpen the critiques of disability studies; and that crip-of-colour theory belongs to a longstanding tradition of intersectional scholarship done by queer and feminist thinkers.

move within it. And you have likely often felt that linear time, as a landscape, doesn't offer ethnographers a clear beginning or ending—that, in fact, these ideas might be antithetical to the kind of work we do. When asked if your research is 'finished', you may not always find it easy to respond because of the continued relationships you maintain with your interlocutors, some of whom may have become friends. Unlike other methods, whose beginnings and endings are more clearly delineated, the end of an ethnographic project is often determined only by the artificial boundaries set by funding limits and institutional deadlines.

We've experienced these situations, too, dear Researchers. Here, we offer you glimpses of our own research process, to show you that we speak from the methods we know. As researchers who inhabit different positionalities, we find it important to say that not all of us identify as crip or disabled. We acknowledge that embodying such social identities and experiences may result in us being complicit to ableist and other oppressive societal systems and may take our ethnographic projects further from equity than closer. Yet, we hope that our attempts at foregrounding crip time can help us expand ways of doing ethnographic fieldwork otherwise.

Kate recalls clear disconnects between institutional expectations and the needs and lived realities of her interlocutors:

Kate

In my thesis work, I spent months observing the site where I connected with the informal recyclers who allowed me to work alongside them. During those months, the tent encampment where many slept was slowly dismantled by municipal workers and law enforcement, and the recyclers and their community were scattered, napping where and when they could in spaces that they hoped were safe. Their lives lost predictable rhythms: their day-to-day depended on where and how they had slept the night before, whether they'd been able to answer the needs of their bodies (nourishment, medication, warmth), if they'd been injured or robbed during the night. The idea of 'scheduling' a work-along was an impractical affair. Entering my field site, I entered a space where time was fluid and encounters serendipitous. It was common for someone to say they couldn't work that night—they were caring for a friend or watching over a neighbour's belongings. Someone might tell me, 'I'll probably be at the parking lot when the soup truck comes by after dark. Maybe nine o'clock'. But they didn't have (or need) a watch, and those with phones would often pawn them when they needed money. An

interlocutor arrived running one morning, overflowing with concern about 'being late'. To what extent did 'academic time' affect my research relationships? I longed for the generosity of flexibility'.

While working with bureaucrats might suggest that time is structured fairly linearly, Cindy finds from her own fieldwork that this is far from true:

Cindy

Bureaucrats are busy people—and by design. Not only do some of them put themselves through hours of meetings and social niceties, their WhatsApp discussion groups are overwhelming. These groups, consisting mostly of colleagues across multiple generations and ministerial offices, have member counts to the hundreds. Because licensed collaborative platforms and emails are either expensive or not the common practice among government workers, WhatsApp has become a necessary device for work, life, meals, and money. Bureaucrats, especially mid- and street-level bureaucrats, depended on these online discussion groups for work, new projects, contracts, and gossip. They also depended on them for care. Having spent more than five years with senior scientists crucial to the development of Indonesia's pioneering state research agencies, I know that WhatsApp voice notes have become integral ways to stay connected with others. Mostly hard of seeing or hearing, these researchers, aged above 80, glee in delight at the sharp ping sound of WhatsApp. One of them tells me, hands fumbling across the table, 'It is us oldies again'. This online conversation punctuates the slowness of our afternoon, surpassing the in-person interaction and intimacy that I thought we share. In these scenarios, I learnt that intense participation and hanging out with another can come in different forms. Maybe, the occasional ping is the best way to hold space for another.

Conducting fieldwork in Delhi, India during the early years of the COVID-19 pandemic, Kim also spent a significant amount of time thinking about how learning in and through fieldwork is often suggested as a linear path, i.e. that spending more time physically in the field is one of the surest ways through which to better know one's field site. However, since the sudden and severe lockdown in India at the start of the pandemic, Kim and their research participants chose to continue fieldwork online, shifting both field sites and field methods. While this shift online might ordinarily have suggested that as the researcher, they would not have been

able to observe things with the same 'depth' as they would have in person, they found instead that the spaces generated through virtual fieldwork allowed for thicker relationships with/in the field. In particular, with their participants, they no longer came to think of interviews as having to be conducted over a single hour or two, with both participants in the same room. Instead, their interviews often meandered, going back and forth over voice notes and many months, allowing them and their participants to open up and engage with methods and materials differently—and more generatively—than they might otherwise have been able to.

In thinking about how ethnographic methods might involve a lower carbon footprint, we want to momentarily side-step the narrow issue of travel as a negative contributor to carbon burdens, and to examine the ways in which a focus on time might offer avenues to becoming better ethnographers.

Already, ethnographers are time travellers, moving across the time zones and lived experiences of our research participants, yet having to align such narratives with the growing neoliberal institutional demands of what makes quality and productive scholarly research, including their high-carbon funders.[11] One of these demands is that the longer we are in the field, the more we are regarded as legitimate storytellers of a specific place and community, irrespective of the lives of our interlocutors. Despite the appearance of slowness and commitment, ethnographers have been placed on stringent timelines, precarious work contracts, and limited by artificial endpoints placed on our research. But if we focus on bringing crip theory to bear on ethnographic practice, we allow non-linear time to disrupt the norms of North American universities: deadlines, funders' goals and expectations, expected career outcomes, and predetermined research endpoints, all of which, as a side-effect, lead to research that often has a high carbon footprint. Crip time, as Samuels (2017) notes, can also mean

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[11]As we write this letter to you, calls for divestment are also underway at North American universities, institutions that have long been heavily funded by the fossil fuel industry. Ongoing pressure from student groups drawing negative attention to high carbon investments in higher ed (see, for example, Beeler, 2015 and McCabe, 2021) and multi-stakeholder support from academics and climate scientists (Cohen & Mann, 2022; Harvey, 2022)—often united in groups like Fossil Free Research—despite institutional pushback (Whitford, 2021; Fossil Free Research, n.d.), have finally succeeded in convincing their colleges/universities to divest, if not immediately, then imminently (McGreal, 2022).

that we often move in directions that feel more backwards than forward. Rather than framing these movements, halts, disruptions, and upheavals as counterproductive, viewing them away from a linear framing of time allows us to 'follow the field' and shape our research questions and practices in ways that are most pressing to the field.

There is a connection between the norms placed on North American academic research and the norms enacted in ethnographic practice that we believe can be disrupted by a range of recent thinking and writing that has emerged from disability studies scholarship. Additionally, COVID-19 and the repercussions of climate change have disrupted (in some instances) or made visible (in others) the limits and historical violence of ethnographic fieldwork methods, but also their flexibility and malleability. To this end, we invite you, too, to engage with how crip theory can intersect with ethnography by focusing on non-linearity, shifting how we think about time so that we can question what is normal and natural. It helps us to make visible the structures that emphasise linear and uninterrupted temporality in our field sites; a timeline that follows such linearity is necessarily progressivist, 'a universal, linear arrow of only one unambiguous direction.'[12]

This insistence on cripping ethnography cannot be separated from the project of interrogating long-standing notions of normalcy and naturalness in ecological and bodily repair. In Eli Clare's 'Notes on Natural Worlds, Disabled Bodies, and a Politics of Cure' (2017), he critiques the ideology of cure, which is premised on notions of normality and naturalness. By making the analogy between ecological restoration and bodily restoration, Clare reveals how 'cure's mandate of returning damaged bodies to some former, and nondisabled, state of being' (p. 225) squares the problem of disability within individual and chronically ill bodies. This restoration presumes that there is an original, non-disabled body *to return*

[12]Savransky (2012), p. 216. See also Bailey et al. (2020) who examine how linear constructs of time have been disturbed during and by the pandemic, making visible ways in which the linearity imposed by accepted modes of time-telling ignores other temporalities. See also Michelle Bastian (2012), who explores what Bill McKibben (2003) refers to as 'a fatal confusion about the nature of time and space', exemplified when humans impose unrealistic and inaccurate linear temporalities on environmental/ecological phenomena. As ethnographers, we see in this 'fatal confusion' the roots of temporal restrictions that can severely constrict the ability of our methods to flexibly adapt to and honour our own needs and those who participate in our field research.

to. Clare's critique of restoration and its dependence on ableist and commonly held notions of normalcy as well as naturalness can be read against the emphasis on linear, progressive time demanded for 'real' fieldwork and its completion as an ethnographic piece of writing.

Cripping our understandings of time can come to mean many different things, several of which depend on the ethnographer, their own projects and life circumstances, and the research questions that they are aiming to answer. Thinking of this process (or action) of cripping quite simply as 'a flexible approach to normative time frames' (Price, quoted in Samuels, 2017) makes room for ethnographic processes to be 'beautiful and forgiving' (Samuels, 2017). This call to crip ethnographic fieldwork, therefore, does not nudge us toward a singular understanding of how ethnography can be done differently, nor does it suggest that there is a particular way of doing ethnographic fieldwork that can be imagined as suitably 'crip'. What it suggests, instead, is that as ethnographers, we pay close attention to the various aspects of our process during fieldwork, and imagine how each— or several—might be done differently as we think about carbon norms and their role in research.

Cripping our ethnographic practice can also move us to move away from understandings of fieldwork that necessarily imply that data can only be collected when we are at our field sites. Much of what is considered fieldwork, especially preliminary fieldwork, can also be undertaken through phone calls, WhatsApp, Instagram, or other means that are comfortable to us and to our participants. The ongoing pandemic has also been a time when many of us are unable to access what would have otherwise been our physical field sites, and the asynchronous platform instead allows us to reimagine possibilities for our field sites: it serves as a site in itself, a place where we may meet new participants, interact with groups, etc. As we bring crip theory to bear on the work of low-carbon ethnographic practice, we therefore do not imagine it to consist only of practices that steer clear of flying to one's field site, but rather that we draw upon non-linear time to piece together various components of the fieldwork process in ways that need not be carbon intensive.

Centring non-linear ideas of time through the offerings of crip time also allows us to attend to this time as 'a time of loss, and the crushing undertow that accompanies loss' (Samuels, 2017). As our participants

(and possibly yours too) continue to experience the devastating impacts of climate change and political instability in different ways at each of our field sites, there is much about their lives, routines, and relationships to their homes that is lost. Cripping our ethnographic processes allows us to make space for that which has been lost, to open up a research schedule that does not work primarily according to the dictates of the university, but more so one that makes room for a discussion of how we (as ethnographers, and our participants) might be able to create research that makes room for ongoing, prolonged loss and grief.

Living in crip time (Samuels, 2017) allows us to pay attention, too, to the ways in which crip time is broken time (Samuels, 2017). It generates several possibilities for us as ethnographers to reimagine (largely North American) university mandates of a single, continuous year of fieldwork. It also allows us to respond to the uncertain temporalities of events such as the COVID-19 pandemic, reminding us that that which is ruptured need not be that which we discard. Instead, labouring with care through rupture, brokenness, or places of stuckness, allows us to patch together ethnographies[13] that are significantly different from the ones we may have long upheld as models for/from fieldwork.

Given the ways in which the social and the material come to be intimately intertwined, acknowledging that we as ethnographers may engage with crip theory to shape our engagements with our field sites further reminds us of the possibilities to foster rich, meaningful connections that take their time, even if the time taken is not the same as the time prescribed by our universities. In our letter, we aim to move away from the idea that a low-carbon research practice can look like a single thing; we therefore do not suggest that cripping ethnography might mean only choosing not to fly. Instead, by asking ourselves how we might prioritise our needs as ethnographers and the needs of our research participants in answering our research questions, we are able to engage with ethnographic research in ways that need not be carbon intensive. This explicit choice allows us to centre our collective humanity within our research, and to acknowledge the moments when doing research differently than what we had previously imagined might be a more respectful and generative set of choices.

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[13]For a more expansive engagement with patchwork as an ethnographic method, see Günel et al. (2020).

4.1 Questions

Dear Readers and Fellow Researchers, in our own reflections on how we might apply a single theory across different research projects and field locations, we have found Kapadia's questions toward enabling researchers to centre illness epistemologies in their own projects to be a particularly generative format. In that vein, we offer here some considerations for those of you who seek to undo the linearity of a research project and develop a low-carbon research ethnographic method. The following questions are not prescriptive guidelines for how fieldwork 'ought' to be conducted, but rather prompt us to reflect on how we navigate institutional norms around the fieldwork methodology. The answers might lead all of us, fellow researchers, to care for our bodyminds (and the planet) in ways that the academy doesn't currently accommodate.

– **Travel:** How do I shape my field site? In what ways do my choices around travel mark out what I consider to be a part of my field, and what I leave out? How do I access the kind of data I require from my current location? What kind of data collection requires travel? How does my choice of mode of transportation change how I arrive at a place? How does it change the boundaries of my field site? What do I get to see or unsee from these different modes of transportation?

– **Documentation:** How do I record data of interlocutors? Do I scrape data? What do I define as necessary? How do I store such data, and who profits from such practices? Why collect so much? Or so little?

– **Duration:** How does time shape my relationship with my field site and with the fieldwork that I am doing toward my dissertation? In conducting fieldwork, am I able to choose times that feel comfortable for me, and for my participants?

– **Communication:** How do I maintain contact with my interlocutors? For how long? What does 'staying in touch' look like?

– **Digital modes/tools:** How have platforms become necessary modes of communication with research participants and key interlocutors? How does the usage of platforms enable interviews to be structured differently? How do they align with the urgent and uncertain times that we live in today, where interviews no longer need to be a singular, time-intensive event? Can I use interviews as a series of voice notes, or blocks of text in response to questions? How much might such asynchronous

modes of communication open up participation between participant and researcher?

– **Connections:** Under what circumstances do I have access to my fieldwork? If I am accessing my field site and interlocutors through a partner organisation, did temporal pressures play a role in this choice? To what extent does my mode of connection with my field site allow access to a diversity of interlocutor voices?

– **Residence and Accommodation:** How and where do I stay in my field site? Do I stay close to my interlocutors or far away from them? What are the consequences of such decisions? Are these homes in a precinct that was gentrified? Do I stay in the homes of family or relatives or friends?

– **Financial Resources:** How do funders' preferences dictate the kinds of fieldwork that I do? What kinds of fieldwork are possible with different budgets? What kinds of funding do I have access to? If I am gaining access to research participants through a partner institution and/or organisation, who are the funders of that organisation, and to what extent are they supportive of low-carbon research?

Yours sincerely,
Kim, Cindy, and Kate

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5

Low-Carbon Ethnography: 'Being There'
in a Decarbonising World

Baldeep Kaur, Urmi Bhattacharyya, Pauline Destrée,
and Hannah Knox

5.1 Introduction

For many social scientists and cultural studies scholars, co-presence and
embodied interactions with people and places have long been crucial to
qualitative research. This often involves transnational connections and
long-distance travel to the 'field' that rely not only on carbon-intensive
transport, but also on epistemologies and power relations that remain car-
bon based. How do we commit to 'being there' in a decarbonising world?
And how does an attention to carbon challenge and invigorate our research
methods and data—how do they transform the 'field' and the production
of knowledge therein? In this piece, we suggest that decarbonisation not
only reduces the environmental impact of our research, but also chal-
lenges its epistemological frames.

The practice of doing fieldwork has come under scrutiny and critique
at various points in its history. Recently, a manifesto (Günel et al., 2020)
was launched which advocates 'patchwork ethnography' as a challenge to
'traditional' anthropological fieldwork and the problematic assumptions
of the figure of the 'ethnographer' and 'the field' on which it has relied.
The manifesto points out the limits of doing 'participant observation': car-
ing responsibilities, precarious employment, disabilities, and, indeed,
attitudes to climate change and the carbon footprint of our methods. The
manifesto proposes that we rethink 'data' and knowledge production as a
whole—that we 'expand what we consider acceptable materials, tools, and
objects of our analyses' (Günel et al., 2020). In this piece, we reconsider
these questions through a low-carbon lens. What would 'decarbonised'

data, knowledge production, and participant observation look like? How do we maintain our commitment to holism, long-term engagement, trust and friendships, in a decarbonising world in which the global connections that enabled the rise of the discipline itself need to be radically rethought?

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Three ethnographers and a humanities researcher meet on a Zoom call. Their task is to pick a shared research method and develop its position in the context of low-carbon media and methods. As an internationally distributed and multi-disciplinary group, we feel we need to start by defining a shared question: What methods do we have in common, we ask, and what are their material effects?

This chapter is the result of that discussion. We—Baldeep Kaur, Hannah Knox, Pauline Destrée, and Urmi Bhattacharyya—are workshop participants who formed the 'Ethnography/Non-Americas' group at the Low-Carbon Media and Methods workshop in 2021. Baldeep is a Doctoral candidate in the *Minor Cosmopolitanisms* Research Training Group at the University of Potsdam, Germany and they work across cultural studies and the history of energy, and with theories of infrastructure and discards. Hannah is a Professor of Anthropology at University College London (UCL) who works on infrastructure, technology, politics, and climate change. Pauline is Assistant Professor in Anthropology at the Department of Anthropology at Durham University, and works on oil extraction, energy, and environmental inequalities in Ghana. Urmi is Assistant Professor of Sociology at Sri Venkateswara College, University of Delhi based in New Delhi, and primarily works on issues of visuality, politics of representation, nomadism, and injustice.

So, what *did* we have in common? We listened to the trajectories of each other's work and eventually settled on a shared method as a focus for our discussion. We started by defining this method as 'participant observation'. But as the conversation unfolded, we refined our interests as a concern with the importance of 'being there', and the question of what this meant for each of us as researchers. Whilst not directly a research method, 'being there' appears as a precondition for a range of immersive research methods that privilege direct interaction and embodied presence, including interviews, participant observation, focus groups, shadowing, and archival research.

In its emphasis on physical co-presence, 'being there' poses an important challenge to low-carbon research methods. Being there is central to ethnographic research. Embeddedness in the unfolding of situated social relations is key to being able to see things differently and gain a view on underrepresented experiences of social and political relations. But as our conversations below show, being there also implies high-carbon commitments, questions about access, the right to do research and the mobility of the knowledge that emerges from place-based research. Attending to 'being there' is challenging both within the frame of low-carbon methods and, it turns out, within the frame of anti-colonial academic practice. However, whilst we attend to these challenges, we also want to make a case for staying with the value of the method, for it is in this tension, we suggest, that new possibilities for imagining the future of low-carbon research can emerge.

But first: what do we mean by being there?

Hannah

For me, 'being there' in ethnographic research is about two things. The first is building a depth of relationship with people over time to understand their perspective and point of view, including understandings that are not always articulated verbally but are enacted in embodied and habitual practice. The second is about the researcher's participation in a social/material/physical space in order to be able to know, in an embodied sense, what it feels like to experience life and relations in a particular place (where place could be online as well as offline).

Pauline

Being there in this deliberately immersive way allows us to go beyond the 'official' statements of individuals, companies, or institutions, and observe how these play out in practice and in the ordinary happening of the everyday. The physical aspect of co-presence is essential not only to get access to those sites which would otherwise be inaccessible virtually, but also because part of the data that it seeks to gather emerges from chance encounters, affective knowledge, and relationships that would not be so easy to get through means other than long-term established friendships and presence.

Baldeep

My reading of 'being there' as a method is as an orientation tool. Learning from Sara Ahmed's description of orientation in *Queer Phenomenology* (2006), I think the infrastructure of one's orientation generates multiple questions: who can be 'there'? how did they come to be 'there'? and once 'there', what unexpected encounters occurred? Keeping these connotations in mind, I attempt to think deliberately about the channels available to me to access the field or an archive in my ethnographic research. If the medium of getting there shapes what happens once I am actually there, it needs to be a part of my analysis. Often, processes of getting access get erased but are crucial for understanding ethnographic evidence. Where does the field begin and end?

Urmi

As a researcher involved in exploring the politics of visibility and belongingness in relation to nomadic communities, for me the idea of 'being there' reveals an intimate connection to the 'field', signifying bodily and/or virtual presence as a way of interacting with people and participating in the production of meanings of their lives, conditions, or contexts. The field sites I engage with are not always understood as permanent, geographically bounded. Rather, these are spatial locations of power and visibility and knowledge production, recognised through the correspondence with the interlocutors and the recognition of co-presence.

5.2 Being 'There' Otherwise

As it is practised today in anthropology, 'being there' has often meant 'going elsewhere', although what or where 'elsewhere' is has been challenged by discussions about anthropology at home, by digital anthropology, and by the circumstances of COVID-19 in particular. The idea of a view from elsewhere is important to the logic of being there because seeing things from an unfamiliar point of view remains one of the hallmarks of comparative anthropology. However, this also raises a new question for us: could 'low-carbon', or a newfound attention to carbon, be a productive 'elsewhere' for anthropology? In this section, we identify three key dimensions of 'being there'—embodiment, mobility, and temporality. Seeing

presence, travel, and time through a low-carbon lens, we suggest ways of being there otherwise.

5.2.1 Embodiment

What kind of sensory environment is low-carbon research?

Being there involves putting one's own body into relation with other human and non-human bodies. In this way, the embodiment of research mitigates against a 'god's eye view', and is key in destabilising the idea of the isolated single author (Liboiron, 2021b), as knowledge emerges in those encounters. Long-running discussions about the importance of embodiment in ethnographic research have been cast into new light since the COVID-19 pandemic, which has altered our abilities to be there in a physical sense. In a global context of restricted mobility and enforced lockdowns, the pandemic has confronted us with the public-health, environmental, and indeed planetary boundaries of conducting in-person research at a time of climate crisis. It has prompted us to rethink the material infrastructures and ideologies that underpin ethnographic research— including the fossil-fuel dependencies of long-haul travel, intensive energy use and data storage, and unequal North–South mobilities. We reflected on what we could afford to lose or change, and what we insisted we needed to maintain.

In Zoom fieldwork or interviews, the frame literally is limited, and each meeting is structured. Even so, we hope and are rewarded with leakages (Howlett, 2021). One element of the importance of being there physically comes from the power of the unexpected—the surprise encounters, happenings, or details that often turn out to be key to deep data and understanding. How can we 'be there' for the unexpected in contexts where physical co-presence is limited?

> **Baldeep**
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> A colleague and I have an accountability system to support each other's work during the pandemic. We wake up early and join a Zoom call, talk about what we plan to do in the next forty-five minutes, at the end of that time we share what we were able to do, and then we repeat the whole thing until one of us is done working for the day. It started off business-only and then slowly the care grew and grew—one morning she 'took me along' to

the grocery store on her first trip in months. Having me with her on her phone helped her get her errands done, while I was able to glimpse a lovely early spring morning in Berlin (I am terrified of the Outside) without leaving my desk. This made me wonder if we can develop strategic virtual 'walking-with' methods, when possible, in ethnography where research emerges out of reciprocity, care, and learning across vast distances. Sounds naive and idealistic ... but I just can't let go of the thought.

A discussion of sensory embeddedness and the experience of interruption as aspects of being there brought up several emerging narratives. If embodiment is key to being there, what happens when the normal experience of embodied research is interrupted—as with COVID-19 or a demand to fly less? This is also a question of altered haptics; the field is not just a space of data but also a rich sensory experience. Touch is a complicated sense to manoeuvre in ethnography—one that weaves together notions of presence and interpretation. When access to the field is interrupted, posed with difficulty, or even denied, there is a disjunction in the location being researched and the place it is being researched from. This is palpable even more when the two situations unfold in different time zones.

Virtual methods for fieldwork have reframed our connection with the field, challenging conventional ideas of distance, and the need to travel (Knowles, 1999) and 'be there'. Although questions concerning the neutrality of such digital spaces remain important, these technological devices have also contributed to the possibility of 'multi-sited ethnographies' (Hine, 2000), addressing long-standing concerns related to in-person presence and mobility. These are research methods where the use of innovative visual techniques that incorporate the interlocutors (as well as the researcher) occurs alongside conventional ethnographic methods. Methods that retain the importance of sensory engagement open up the possibility of engaging in a creative dynamic of interpretation but also challenge the manner in which the 'field' is defined in relation to the physical presence and perspective of the researcher in it.

5.2.2 Mobilities

If 'being there' implies the mobility of the ethnographic researcher as they move into spaces of research, then what other mobilities might an

attention to low-carbon reveal? Firstly, rethinking fieldwork from the perspective of low-carbon methods can remind us that ethnographic fieldwork as a method emerged before the advent of international air travel and so its practice—spending time in another place—is not necessarily dependent on air travel. One might even argue that early ethnography was powered by wind because international travel occurred mostly via sailboats. People used to get to field sites through other means and would spend longer periods of time there than they do today, or were forced by circumstances to remain in the field. The effect of fossil-fuel extraction in the form of cheap(er) air travel, the ubiquity of transnational connection, consumer capitalism based on images/desire around consumption of the elsewhere and circulated through mobile devices, has probably contributed to the idea of travel as easy, ubiquitous, non-exceptional. Carbon intensive or otherwise, the research trips are usually justified and legitimised as objectively vital to research projects. However, this does not account for the subterranean currents of academic tourism where the desire to visit 'exotic' sites drives the intention to research them. Unpacking this requires a closer look at how researchers come to choose research sites abroad rather than examining more local contexts. This does not have to be a choice between the local and the foreign—especially within contemporary value chains, sites are often entangled across vast spaces and large spans of time. As transitioning away from oil involves understanding the ways we have come to derive pleasure from petromodernity, the transition away from carbon-intensive ethnography needs to also acknowledge that traditional research is sustained by much more than objective inquiry. Since fieldwork is participatory, the entanglement with fossil fuels required by any kind of research will in part be a function of the people with whom a researcher spends time.

> **Hannah**
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> Fossil-fuel entanglement is a function of the world that you are doing research on. For my PhD I did research in the UK in brightly lit offices, swanky bars, and with high-end computing equipment, whereas the people I did research with were working in European networks, flying around Europe to bring about an ideal of economic development. In a later project in Peru, I worked both with people who were living very low-carbon

lives as agriculturalists in the Andes, and with a transnational engineering firm whose road construction project was opening up swathes of forest for extraction (gold, uranium, wood), sometimes heading up and down the road for hundreds of miles in 4x4s. More recently I have been working back in the UK—driving my own car, living in a house which is badly insulated, with three kids—so not very low-carbon—and doing research with policymakers who live in big houses and fly, but also with scientists who have made a stand not to, and eco-activists who are thinking about these contradictions all the time in their own work. My activities have been profoundly different depending on which of these projects I was working on. As a UK-based researcher working on the study of climate policy-making, which often externalises environmental impacts through cost–benefit accounting, for me there has been a specific politics to making a public stand not to fly—a push back against the economistic idea of offsetting which is highly problematic for all kinds of reasons—and against the idea that people need to be 'nudged' to change their behaviour. It has been a specific response appropriate to the circumstances I find myself in and the aims I hope my work can achieve, but I don't advocate it as a universal tool for tackling climate change as clearly this would be naive and runs the risk of being counterproductive to the ends we might want to achieve.

Research engages various researcher mobilities like moving across spaces, following our subjects, and mapping the field. How do we maintain that sense of mobility in our research when we can't be mobile in familiar ways? Ethnography is very conditional on the circumstances of research—the process depends on what the people you are doing research with do. Especially right now, the researcher–researched dynamic is being brought under question by the dilemma of requesting someone's time in a pandemic when people's time is stretched, or they themselves have been rendered immobile. This new immobility challenges the researcher–interlocutor power relations, in which we often assume the people we study are relatively more immobile than we are—it turns out they never were! This makes us realise that mobility is not just central to research but also to people and communities at large. This helps remind us that low-carbon methods don't hold relevance only for the researcher, but also for the relationship between the researcher and the mobility of the research subject.

Finding alternative ways of doing sensory ethnography becomes important when access to the field is not a given. For instance, for Urmi, who works with nomadic communities, 'being there' is never a stable category: it is continually on the move.

Urmi

With the new rules of contact that came with COVID-19, my chances of initiating fieldwork in distant geographical locations became fraught with restrictions. Reflecting on the 'location' of research, I redirected my dilemma to explore how sketches, illustrations, and photographs could be put to use to redefine the relation between being, presence, and ethnographic description. While illustrations have been utilised as a mode of translating the ethnographic field beyond written text (Bonanno, 2019) in anthropology, their potential as a source of visuality and communication assumes newfound significance under contemporary circumstances, when physical presence for research purposes is severely limited or absent (Svasek, 2020). To overcome distance therefore, Svasek painted her interlocutors in their home environment, using Skype and WhatsApp, also allowing them to sketch her in return; thereby engaging the field without bodily presence, and highlighting the generative possibilities of online research.

Thinking about fieldwork mobilities through carbon is also about entrenched patterns of exclusion and underdevelopment. It means recognising the carbon disparities and inequalities in our field that are produced by specific geopolitical histories. These have been most pronounced in the era of 'fossil modernity', underpinned by extremely unequal carbon-intensive and extractive economies, but they do not necessarily disappear in a switch to low-carbon technologies. Low-carbon mobilities[1] are supported by transnational connections and global supply chains that often reproduce extractive violence associated with hydrocarbon exploitation. At the same time, identifying where they diverge from carbon

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[1]What counts as 'low-carbon transport' is debatable. Here, we suggest that low-carbon forms of transport should not simply be considered quantitatively according to their carbon footprint, but qualitatively in terms of the kind of mobility (and their inclusiveness) they take part in and enable.

infrastructures provides important sites of intervention. In addition to this, the sociocultural context and norms of carbon in any given field or society are also a major influence.

This raises the question: Who loses out from low-carbon elsewhere? Is there an alternative to the imbalanced 'offsetting' that currently character-ises many low-carbon solutions? And what happens when high-carbon is the aspiration rather than the problem?

Pauline

Doing research on new oil producers in Sub-Saharan Africa, in countries that are positioned (often by the industry itself) as 'low-carbon nations' bearing little historical responsibility for global GHG emissions, has raised important questions for me about the political implications of a low-carbon world—not just about who stands to benefit or to be excluded from this new world order, but about what low-carbon authorises and justifies. Around the world, low-carbon is mobilised politically to advocate for different ends that both seek autonomy from and remain steeped in fossil-fuel extraction. Carbon emerges as a contested moral compass that shapes new relations between North and South. We need to think more creatively about address-ing carbon inequalities and their historical roots—through, for instance, debt cancellation and compensations for low-carbon that can help finance a green economy.

Urmi

Working with migrant labourers in India, low-carbon possibilities in my research are also defined by the limited knowledge about technology in terms of how it can be used by the interlocutors. These workers have sea-sonal contracts in brick kilns, and/or construction sites, with erratic work-ing hours. To arrive at a contextual understanding of their lifeworlds—their mobility, precarity, belongingness, exploitation, and agency—would require 'thick description' structured on bonds of familiarity and trust. Most of them carry mobile phones, but many are not comfortable with questions being asked over a phone or video call. In this context, how could we decar-bonise research methods without diluting and oversimplifying the nuanced meanings of the contexts and experiences that come with ethnographic presence and contact?

5.2.3 Temporalities

Distance and travel are notoriously hard to decarbonise. But 'what if the problem is *speed*, not distance'?[2] Can an attention to carbon attune us to the temporalities—some of them unsustainable—of our current research methods? What are the temporal expectations and politics of the field in neoliberal academia, and how do they map onto decarbonisation ideals?

> **Baldeep**
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> The publishing industry is organised around a particularly high speed of work and imposes the pressure of 'firsting in research' (Liboiron, 2021a). At the same time, an article might take two to three years to be published. Zooming into the process of publishing research, we see several unpaid professionals processing high workloads within very short spans of time. Additionally, most research fields are highly competitive and there is massive pressure to churn out numerous publications on a vast range of topics. In this scenario, academics who have shorter work commutes, fewer interpersonal obligations (activism, community, family), or residence in cooler climates have greater ability to comply with the high speed of academic industry. In 2023 I already have to write off June and July as low-work months because my ADHD medication makes me prone to overheating during increasingly hotter summers. As extreme weather events increasingly disrupt business-as-usual and temperatures rise, what could the future of academic work look like?

A low-carbon framing provides new questions to the worry which many anthropologists feel, that the neoliberal university has led to a whittling away of the idea of long-term immersive fieldwork. While the recovery of such research practices is possible through an attention to patchier (Günel et al., 2020) forms of academic research, the issues of relative elitism of anthropological knowledge persist. Rethinking low-carbon methods goes alongside rethinking the parameters of 'traditional fieldwork' itself—inscribed in gendered, raced, and ableist bias, often reinforcing postcolonial geographies of privilege and im/mobility, and aloof from the pragmatic, emotional, and physical needs and responsibilities of its undertaker(s) (see Chapter 4 for a more extended discussion of the temporality of fieldwork rethought through the critical disabilities lens of 'crip

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[2]We are thankful to Anne Pasek for bringing this question to us. See also Virilio (2007).

time'). Having an expectation of long periods of fieldwork can be disruptive to family life and has gendered and classed implications. Time in the field is constrained by environmental concerns (e.g. repeated visits), the precarity of short-term work contracts and limited resources, funders' requirements, and questions of access and caring responsibilities. Decarbonising research, then, involves critically revisiting existing pedagogies and theoretical frameworks on ethnographic research that tend to distinguish between 'field' and 'home'. The key phrase of 'being there' expands into academic pressures of being there on time (politics of publishing) and being there but out of time (exploitative work contracts). What kind of time is low-carbon research? Questions of time in a low-carbon context can also draw attention to the politics of speed and temporal narratives of carbon-based infrastructures.

Pauline

A key tenet of energy justice and 'just transitions' is time. Energy transitions will happen on different timescales in different countries and sectors. Fossil fuels, it has been recently suggested, should be phased out gradually to allow emerging and developing economies to grow (Calverley & Anderson, 2022). 'Developing' nations, it is argued, need more 'time' to develop their standards of living and industrial base. Time, here, is seen as a direct function of oil as a benchmark of prosperity and development; yet as climate activists, scientists, and indeed anthropologists have argued, this 'inevitability' of oil is worth interrogating. Low-carbon transitions often problematically reproduce a linear trajectory of progress and modernity that remains preconditioned upon fossil fuels, and erases non-Western histories of energy and outlooks for energy transitions that are not primarily based on the burning of fossil fuels.

Urmi

Temporal constraints become apparent when travelling for fieldwork is met with uncertainties at the destination, characterised by long hours of waiting, or the unavailability of some interlocutors. For my doctoral research in India, the difficulties of travelling to remote locations were compounded by the absence of basic infrastructural facilities, public transport, and drinking water in these places, which required me to commute long distances daily. Time spent in the field also draws attention to the daily consumption

involved at the site, and its carbon-intensive consequences. While visit-ing Belgium to identify my ethnographic field, having a limited budget in the absence of funds, my stay involved consuming cheaper food products packed in plastic and buying single-use plastic bottles of water.

5.3 Low-Carbon Data and Knowledge Circulation

Acknowledging the carbon-intensive realities of ethnographic research not only challenges conventional interpretations of the field and fieldwork, but calls for an attention towards, even transforms, the data produced and its possibilities of circulation. Decarbonisation facilitates in confronting the existing epistemological frameworks that contribute towards the oth-ering of the human subject.

Hannah

Since researching and writing about climate change I have been involved in various collaborative research projects with members of an environ-mental cooperative called the Carbon Co-op. Projects we have worked together on include a performance walk exploring the history of electricity in Manchester, a 'hackathon' to unpack questions of equity in the energy system, and a project exploring how energy data might be used to inform engagement with low-income communities and to open up new possibili-ties for grassroots initiatives that wed low-carbon concerns with the need for connectivity, income, and social renewal. These collaborations are not just 'low-carbon' in that they are both close to home, and concerned with climate change at a local level. They are also explorations of how a newfound shared attention to low-carbon infrastructures can bring new knowledge both to academic researchers and to communities, activists, and policymakers.

Travel is only one method of carbon-intensive research. Even research that happens in one place—like a lab or a faculty office—could be taking place at high environmental costs. In *Pollution Is Colonialism*, Max Liboiron (2021b) demonstrates a method of low-harm lab research whereby they choose to diverge from the usual battery of tests for detecting plastics by not performing experiments that require certain chemicals. This is also an initiative towards low-carbon work because the lab is additionally refusing

to participate in the global supply chain that brings shipments of chemicals to them.

The decarbonisation of methods of research enables the recognition of the centrality of carbon in structuring the nature of the data collected, which shapes the lifeworld of the interlocutors, as well as the material and normative contexts of inquiry. By challenging narratives that exclusively hinge on linear temporality, bodily presence in the field, and the global trajectories of mobility, the data produced through low-carbon research therefore contains the potential for a reflective and critical appreciation of intersubjectivity through the identification of structures of power that favour private accumulation and consumption, and contribute towards the structural reproduction of inequality. Data collected through carbon-conscious methods also facilitates going beyond spatial ideas of 'here' and 'there', and reimagining fieldwork along lines of care, friendships, accessibility, and collaboration.

Urmi

My disciplinary expectations prioritise my bodily presence at the field site. Without my ethnographic presence in the field, I am not sure of securing a grant. But without a grant, it is not possible for me to pay for the expenses incurred.

Hannah

Journals can act as a low-carbon version of research as opposed to conferences. These publications are increasingly providing spaces alongside traditional papers for grad students and brief lines of thought. For the sake of low-carbon research and the wellness of researchers, we must think academic communication beyond conferences. Moments of transition like now are always opportunities for possibilities.

The question of being there does not only affect fieldwork but can also be a useful framing for thinking about the dissemination of research. The relationship between academia and carbon intensity deepens when we expand our focus to include the place of being there in framing and justifying how academic research circulates. For instance, this

commonplace practice: flying long-haul to international conferences that are only a few days long while presenting the same material in multiple distant locations. This is a symptom of an academic culture that places a high premium on in-person presence and perpetuates a system where researchers will choose to travel—whether to fieldwork or to events—even when other alternatives are viable. Too often, carbon-intensive hypermobility masquerades as academic authority. What are the other ways that maintain academic authority apart from physical travel to conferences? How do we identify and dismantle hypermobilities that concentrate academic authority within specific sites and individuals? A high carbon footprint has become almost a precondition to being a successful researcher who travels extensively, is present in person at major conferences, and publishes extensively. Here a commitment to the idea of single authorship, which we linked above to the experience of being there in a field site, inhibits collaborations that could otherwise have made research less carbon intensive, especially reducing resource consumption and resultant emissions in countries that are already ill-equipped to absorb them.

Baldeep

Normalising low-carbon methods of fostering care and collaboration can enrich research that happens close to home as well. During the pandemic, I was lonely and felt isolated from the Sikh community. I did a Google search trying to find a way to connect with people in Berlin and instead I found out about the Indian prisoner-of-war (PoW) cemetery just outside the city. I also found out that there was an entire archive of unethically produced sound recordings made by German Berlin-based researchers who visited the PoW camps during the First World War. I wanted to interact with this sound archive and write something about it but three years passed and I simply couldn't bring myself to do it. Access was not the problem—I knew researchers who were familiar with the archive and a lot of the sound recordings from Sikh soldiers were available online. And yet, access was the problem because the idea of listening to these recordings felt unbearable. I decided not to follow the conventional rules of researching audio/visual objects. I started interviewing Berlin-based researchers who had written about the archive, translated the records, and cared for them in the long term. The project became less about individual originality and more about building careful bridges between the different strands of research that had

both disclosed the recordings and protected them from harm. My point is, care and collaboration are good to have regardless of the carbon intensiveness of a project.

Academic cultures are entangled with high-carbon ways and conference performativity, while academic precarity constantly raises the stakes for researchers at a given career stage in attending or missing a conference. At the same time, it is also important to recognise and indeed celebrate that academic scholarship, teaching, and learning involve forms of co-presence—for example in the classroom, which could be argued to make it a 'low-carbon' job: as a mode of knowledge production and dissemination, it has as ecological economists would put it, a 'high-value to low-carbon ratio'.[3]

Finally, we also want to note that 'being there' in our research, dissemination and teaching, draws our attention to the infrastructures of any particular place—be they high carbon or low—that we have little control over. Our lives as academics rely on hydrocarbon extraction in fundamental ways that we often cannot do anything about because fossil fuels remain a key infrastructure of modern life and are often completely invisible to us. Additionally, the entanglement of our personal and professional selves is a distinction that has always been problematic and blurred, in ethnographic fieldwork as in academia. How can our research contribute to making this, as well as its immediate and long-term implications for people around the world in terms of climate change, more visible? This is an argument for examining the social impact of our presence as researchers who are also active consumers in the places we travel to. What would decarbonising our consumption during research visits look like? Where can we make a difference as academics? At which points does a researcher connect to questions of waste and pollution? With its roots deep inside colonial history, knowledge production via research is intertwined with capital accumulation.

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[3]Although the dependence of universities on large numbers of overseas students does raise the question about whether even teaching at contemporary universities is that low-carbon.

Urmi

While on a pilot visit to identify my ethnographic field, I was casually advised not to visit Roma neighbourhoods in Belgium, as these places are continually under police surveillance and are also deemed 'unsafe'. Since I am not a citizen of any EU member state, it was implied that I might be asked for additional documents, or even denied entry to these areas as an outsider or because of visa restrictions. I had to travel across the city to different organisations, to inquire for permissions to ensure my access to the 'field'. Coming from the Global South, what conditions would then authorise my entry and define my access to research in the Global North? If knowledge production is shaped by colonial geography and the researcher's location, decarbonising remains contingent on decolonising methods of fieldwork and the field.

Baldeep

It is important to acknowledge that low-carbon research methods, much like the effects of climate change, have always existed in Global South scholarship. This means that switching to low-carbon methods is not inherently anti-colonial or subversive; in fact, the allocation of these methods elsewhere has helped in the maintenance of power and privilege in Western academia. In the push to digitise academic events and archives, how can practitioners who have benefited from early and in-person access (to research, events, influential colleagues) maintain good (reciprocal) relations with academics in the Global South who have always had to devise strategies for long-distance research and learning? What would genealogies of low-carbon methods look like if we trace them to people working in poorly funded universities, under repressive governments, or without disability support?

The danger here is making sure knowledge—its production and circulation—does not become one more commodity to participate in a consumerist spiral of growth.

Assessing 'low-carbon' possibilities in research also requires redirecting attention to the relationality and interconnectedness that characterises the landscapes of capital flow, accumulation, and resource allocation in diverse contexts of the Global South and North. Acknowledging the different meanings of low-carbon research, and its limitations in diverse

contexts, should not translate into reinstating the North–South divide, and reconstituting these categories as geospatially and temporally distinct.

5.4 Conclusion: Toward Low–Carbon Research

By drawing out the implicit commitment to 'being there' in ethnographic research, and tying it to debates and discussions about low-carbon methods, we have tried to think about low-carbon not only as a metric and pragmatic means to an end (which is sustainable research data), but also as an intellectual and research space that forces us to 'stay with the trouble' (Haraway, 2016) and interrogate the limits, compromises and difficulties of research in a high-carbon, decarbonising world. An important insight for us, particularly in light of what has unfolded since the COVID-19 pandemic, is that constraints are also generative and productive. They establish resilience and the courage to let go of entrenched ways of being for us as researchers. Decarbonising fieldwork means thinking about not only the carbon intensiveness of our methods, and the mobility and energy that underpin them, but also the relations of power and structural inequalities that make certain kinds of research, researcher and research outputs possible.

By thinking about decarbonising research methods through the lens of 'being there', it has become clear that decarbonising methods is also a matter of decolonising methods. This has left us with a broader question about how a turn to low-carbon research methods might enable a broader reckoning with questions of justice and decolonial knowledge production? Low-carbon discussions draw attention to how methods emerge out of particular commitments and histories while acknowledging the presence of power and inequality and other contextual particularities within which the researcher as well as the field are located. Collaborative research as a low-carbon method could make way for strengthening participation and visibility of the interlocutors by identifying local volunteers in the field, in consultation with whom the narrative is prepared. 'Fieldwork Collectives'—a cooperative of researchers based in the same sites—could help to address this, but raises questions of data ownership and authorship. Such research could reduce travel on the part of the researcher who can keep in touch through virtual platforms. Also, keeping in mind the

actual 'purpose' of the method, such low-carbon research alternatives would prevent the researcher from writing from an objectifying perspective, and again would facilitate the acknowledgement of care and vulnerability in knowledge production. Ethics committees in universities and grant bodies could even have a section on environment ethics that asks for an approximate carbon assessment of all the proposals received and asks whether the applicant has thought of alternative options.

In short, we want to acknowledge that decarbonising will always achieve more than just a reduction in carbon emissions. This process must be seen as an opportunity to rethink 1) the gendered, raced, asymmetrical logistics of fieldwork and research dissemination; and 2) the consumerist logic of academic knowledge production today. At the same time, we want to recognise that the knowledge produced by ethnographic fieldwork is valuable, compatible with, and indeed essential to the overall goal of creating a fairer, more inclusive, and sustainable world. And that its overall aim of championing a diversity of voices and the importance of empathy and difference is itself a 'low-carbon method' of achieving greater wellbeing, equity, and respect on a global scale—and that this should be emphasised and retained, even as it entails its own contradictions and compromises. Reflecting on how personal choices of being environmentally conscious may not necessarily carry over to professional decisions, especially when these could endanger one's academic position, we strive to not focus simply on 'how to be low carbon?' Rather, we ask 'who has the agency and the desire to be low carbon?' and who gets to define the concept of 'low carbon' as a framing device? Are there other views of climate change from elsewhere that should be fed back into discussions about low-carbon research? And crucially, in the context of low-carbon discourse, who can opt for the politics of refusal and bear the repercussions while attending to different versions of state governance? The institutional incorporation of low-carbon alternatives may also reflect a university's intention to cut costs or redistribute funds. By mandating environmental ethics and low-carbon options in research, we then argue that the idea of sustainability can be directly built into the infrastructural, material, and epistemological contexts. Some sort of university-based offsetting fund could be useful to support academics in their sustainable practices, or in decarbonising projects in the communities that they work with. Finally, we advocate for the

recognition of mixed practices of online and in-person research methods in research, which would facilitate recovering the importance of place and vantage point, where one does not try to be everywhere but recognises the value and inherent challenges of being somewhere. This is a radical shift in how one follows or moves with the field. The result would be networks of people who are somewhere rather than one individual ethnographer being everywhere. A delightful epiphany here is that our little group is demonstrating this possibility—four researchers Zoom in from four different countries and time zones, connect their ideas together, or place them in productive tension. At the same time, this 'Ethnographies/Non-Americas' group is only one cluster in a wider network organised around the Low-Carbon Media and Methods workshop.

5.5 Future Directions: A Low-Carbon Wish List

Now that we have a sense of the nuances of 'being there' and an expanded vision for decarbonising this method, we are attempting a low-carbon wish list. This is a hopeful, lower-carbon repertoire of things that we could do while conducting ethnography that still enables the core precepts of embodiment, mobility, and temporal nuance. The purpose of the list is to generate a more materially reflexive form of research practice that acknowledges our disciplinary entanglements in fossil-fuel infrastructures whilst going beyond carbon accounting as the only way of tackling carbon emissions. This is not exactly a proposal because we are unsure whether the conditions of possibility for these actions exist uniformly in academia at this point. We opt for the format of a wishful list because it has the tentative character of recognising that this might not be actionable right now, as well as the clarity of knowing exactly what sort of emergent practices we would like to have. With this wish list, we intend to draw attention to how anthropological research or ethnographic work can advocate for the development of post-fossil-fuel ways of working while moving beyond the narrow confines of the carbon footprint of our own methods. Low-carbon research demands special attention to the body—breaking the illusion of research as an intellectual, cerebral activity carried out over an erased body (Brennan, 2001). Even as we support these collaborative research projects and teaching initiatives, along with

preference for local and virtual hubs for networking and knowledge circulation, we stress the need for proper financial support and institutional recognition. Instead of perpetuating old patterns of accumulation, we must therefore develop new paradigms of redistribution of academic privilege and wealth (Tsing, 1995).

This wish list includes:

- Developing ways of conducting research through collaborative networks of people who are somewhere rather than one individual ethnographer being everywhere.
- Reimagining fieldwork through the internalisation of mixed practices of online ethnography and in-person research.
- Redistributing academic privilege and challenging knowledge production and dissemination through the inclusion of low-carbon collaborative projects. For example, conducting jointly coordinated teaching practices with people from communities connected with our research.
- Promoting low-carbon modes of participation in academic events: e.g. privileging local and virtual hubs rather than international conference destinations, financial support for low-carbon modes of transport to seminars/conferences.
- Encouraging sustainable academic practices by institutionalising environmental ethics and the recognition of low-carbon possibilities in funding applications, choice of data servers, creation of data storage facilities and the provision of public transport allowances and bike schemes as transit options for university employees.
- Making room for the consideration of citizen science as a viable mode of research and experimenting with its limits and potentials in the field.

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6

The Temporal Politics of Decarbonising Academic Work: Mobilising Decolonial and Global South Perspectives

Riyad A. Shahjahan and Nisharggo Niloy

Nisharggo

Every day I (Nisharggo) wake up and rush to my workplace, a research organisation at Mohakhali, Dhaka, Bangladesh. I don't know how much time it takes to reach my workplace. On good days, it may be twenty to twenty-five minutes. On bad days, I impatiently wait in traffic for more than an hour, watching the never-ending line of motor vehicles emitting so much heat that the air above the vehicles shimmers. I also observe buses exerting black fumes and people breathing that same air without blinking. I feel the bitter air inside my lungs. I feel half-asleep due to the lack of oxygen. The fatigue lingers in my body for the whole day. After I reach my workplace, I open my age-old laptop computer and wait for it to be turned on. These 'pc hung' moments are so frequent in our working lives that a smoothly running computer is a blessing to us. Traffic and computer or internet lagging is the story of our working lives here in Dhaka, Bangladesh.

I breathe carbon every day like every other fellow human living in this densely populated city. I come back home while watching plastic waste piled together on sidewalks and lit with fire. Pungent burning smells and black fumes fill up our surroundings, but nobody blinks an eye. There are not enough places to dump all the waste produced everyday. I come home and take up my smartphone to call my friends, talk to my partner, and scroll the news. I read that people in north Bengal are eagerly praying for rain to end the drought, despite knowing that the rain can bring unexpected devastating floods that perhaps never occurred in previous years. I also read that in the 'land of dream far far away', a family wins $50,000 for 'reducing household carbon emissions'. I also come across news that schoolchildren in the Global North are protesting because their lives are 'at risk' due to

their predecessors' carbon emissions causing global warming. Such world news on 'climate anxiety' makes me laugh hysterically. In Bangladesh, most people surrounding me are concerned with how to afford food the next day because of high inflation and political unrest. We don't know if the devastating floods are occurring because of global warming or unplanned infrastructural development by killing hundreds of rivers. The news looks like a dark comedy. At one end of the world, some are neurotic about how to solve this climate problem, while on the other end, I, as a Global South person, am inhaling carbon everyday and thinking how funnier it could be to stop using smartphones to 'reduce carbon emission!'

While I was excited to collaborate on this chapter because it would allow me to think deeply about climate justice, I was simultaneously concerned because I was unsure if my real-life experience would align with the 'global' (North?) understanding of climate politics, carbon emission, and life itself altogether. However, as Dr. Shahjahan and I started meeting online to write this chapter, using my age-old digital devices, which often lagged, froze, or showed 'poor internet connection' on screen while I (im)patiently waited to be there in time, it became apparent that I have an important perspective to share about decarbonising academic work.

Riyad

I (Riyad), in contrast, do not feel rushed to go to work when I wake up. I live and work in the suburbs of a Midwestern college town in the United States, residing on the traditional territories of Anishinaabeg—Three Fires Confederacy of Ojibwe, Odawa, and Potawatomi peoples. I am a tenured professor in a predominantly White research university that considers itself world class. I have the privilege to work from home. My internet access is relatively stable, so I can easily work from home. When I choose to work from my work office, my commute time to work is very predictable, and it takes no longer than fifteen minutes. As I am writing this, I am surrounded by beautiful fall trees, green grass, and my surroundings give me very little concern about carbon emissions. The only time I hear about carbon emissions is on the news, or when we are considering recycling our electronics, and/or garbage. Furthermore, given the car culture where we live, we drive everywhere. Public transport may be affordable, but it's inaccessible, and many choose to drive given its convenience, particularly in the cold winter months. Beyond working from home, I usually travel for my children's 'football' games, and occasionally travel internationally to visit family, who are situated in different continents. I also occasionally travel for work

for conferences or taking students on study-abroad trips. Since my work is mostly conceptual, I rarely travel for empirical data collection. Given I hold multiple citizenships from the Global North (UK and Canada) despite my family's Bangladeshi origins, I seldom worry about being mobile globally, as visas are rarely required when I travel. On the unusual occasions when it's required, I can get a visa at the borders, or apply online. Like Nisharggo, when I was invited to write a chapter on this volume, I was excited about the possibility of learning about this phenomenon called low-carbon research methods and/or decarbonising academic work. Yet, I felt guilty or shame, as I did not think too much about the carbon impact of my personal or academic work. I saw the opportunity to work on this chapter with Nisharggo, to think about carbon-reduced academic work.

We start this chapter with our personal vignettes to situate ourselves in the decarbonising debate and signify how we come from various social positionalities and geopolitical contexts. Despite our similar Bangladeshi origins, our experiences with the frontiers of climate change are significantly different due to our class, citizenship, and/or position in the global academic hierarchy. However, we do not intend to share these vignettes so we can be cannibalised for our differences, or to steal the pain of others. Instead, our narratives illuminate the contrasting temporal standpoints we bring in terms of climate crisis, academic work, spatial mobility, and use of technology. Although our vignettes demonstrate two opposite realities at first glance, they share one invisible, and often understudied theme: time. To specify, the two vignettes demonstrate how our present life is shaped by our shared past (i.e. sharing same origin and keenness to explore the perspectives of climate politics) and our perceptions of the future (i.e. impact of the academic work privileged by geopolitics of knowledge and the politics underlying the climate-justice movement).

What is common in our narratives is not only the role of temporality, but our connections to the Bengal delta region. Indeed, whenever anyone mentions the climate crisis or climate justice, Bangladesh emerges as the poster child for climate change (Paprocki, 2021a). Bangladesh is considered the most adversely affected nation due to increasing sea levels and is thus regarded as a 'hotspot' of climate vulnerability and action (Paprocki, 2021a, 2021b). Such a climate status is used domestically by Bangladesh's

own 'climate mafia', a collective of researchers, policymakers, and advocates whose prominent role in global climate negotiations draws attention to the threat of rising seas particularly to the country's vulnerable coastline (Paprocki, 2021a). Consequently, Bangladeshi climate-related academic research mostly focuses on climate-change indicators, climate-change impact, resilience measures, and adaptation strategies (Ahmed & Khan, 2023; Hoque et al., 2019). Therefore, we draw on our experiences and research in Bangladeshi academia as an entry point to explore intersecting questions of climate politics, academic work, and a Global South context for climate justice.

While there has been a growing literature on climate justice and higher education (HE), remaining under-theorised are the temporal aspects of decarbonising academic work. While some have critically examined the role of HE in climate change, through interrogating its purpose, curricular reform, and the role of students and faculty in the current climate crisis (Grady-Benson & Sarathy, 2016; Kinol et al., 2023; Le Quéré et al., 2015; McCowan, 2023; Rae et al., 2022; Reyes-García et al., 2022; Stein et al., 2023; Williams & Love, 2022), others have interrogated the climate-change consequences of internationalisation of HE (McCowan, 2023; Shields, 2019; Shields & Lu, 2023). Most of these discussions have taken place in the context of the Global North, and rarely apply a temporal lens. We believe a temporal lens is pertinent in the debates about HE's role in climate justice for several reasons. First, we echo Facer's (2023) suggestion that we need to ask temporal questions in the climate crisis debates, such as: 'Who is telling the time in this situation and how? … What are the histories and habits that shape my own temporal assumptions, where do these come from, and what sustains them?' (p. 64). As such, we can raise tough questions about how the problems and solutions towards climate change are embedded in dominant paradigms of knowledge (Stein et al., 2023), including time. Second, climate change is an unfolding temporal phenomenon, and not a singular event, which interconnects larger macros processes with the everyday, including academic life. Finally, incorporating a temporal lens further helps nuance the role of HE in the climate crisis by illuminating the ontological variance in framing the climate crisis, the inequities in Global North/South academic mobility, and the role of clock time in academic work.

Overall, in this essay, we offer a temporal lens to open new ways of conceptualising decarbonising academic work. Drawing on recent scholarship on decolonial and Global South perspectives on climate justice, and our research and experiences in Bangladesh, we aim to tease out the temporal politics underlying the possibilities and challenges of decarbonising academic work. We argue that a temporal lens helps us illuminate the temporal politics underlying the possibilities and challenges of contemporary decarbonising of academic work globally. By temporal politics, we mean the inherent social-power relations, assumptions, and biases of social action (i.e. advocacy, decision-making), related to the way we make sense of, connect to, and experience time, which goes beyond, but also includes, clock time. As such, we offer a temporal political reading of the common solutions offered in decarbonising academic work, namely reconsidering a) aeromobility, b) digitisation, and c) futurity. We will conclude briefly with some implications for interrogating decarbonising academic work from a temporal lens.

6.1 The Temporal Politics of Aeromobility

Most discussions about decarbonising work focus on academic researchers' and students' mobility, such as travel for conferences, data collection, or study abroad (Williams & Love, 2022). Many agree that travel is the major contributor to carbon emissions from academic research (Reyes-García et al., 2022; Tseng et al., 2022). Indeed, many in this volume have highlighted the privileges and barriers of academic aeromobility. Evidently, such mobility discussions have ignored the temporal dimension. We would suggest that a temporal lens helps raise questions about the directionality of such mobility—i.e. who travels where, why, the temporal investments involved, and who benefits from such academic aeromobility?

A temporal politics of academic aeromobility cannot ignore the coloniality of power informing the current geopolitics of knowledge in global HE. By geopolitics of knowledge, we are referring to the existing hierarchical global HE system, which privileges certain White world regions (e.g. Anglo-Euro-American contexts, etc.) as metropolitan centres of knowledge and learning, while allocating Others to the periphery, reproducing coloniality. As such, scholars in White metropolitan regions need

not worry about the social or global mobility of their learning, research, or credentials (Schöpf, 2020; Shahjahan & Edwards, 2023). For instance, peripheral Global South scholars need to literally travel to metropolitan centres to validate or disseminate their work. As such, peripheral scholars need to invest more time and resources to engage networking opportunities, and thus lose time and resources that could be invested toward their research productivity (Schöpf, 2020, p. 19). Given the geopolitics of knowledge, academic aeromobility also entails crossing linguistic and academic cultural borders when presenting one's work in writing or at conferences to gain legitimacy and prestige (Schöpf, 2020). As such, academic aeromobility tends to entrench White aspirations, investments, and malleability (Shahjahan & Edwards, 2023).

Tied to such racialised geopolitics of knowledge, such temporal investments are structurally evident in Bangladeshi academia. Due to the geopolitics of knowledge and present precarity within the HE sector and the labour market, future study-abroad aspirations preoccupy Bangladeshi academics' and students' temporality (Shahjahan, 2022). Like others in the Global South, many Bangladeshi academics have to leave their home country on extraordinary leave or sabbatical to learn or teach, and such long-term study abroad is built into one's academic career trajectory, unlike Global North contexts (Garomssa & Yasmin, 2016). Many Bangladeshi academics also migrate for other reasons, such as a better life for children and their schooling, lack of transparency in academic promotional structures (i.e. inbreeding), and low salaries and remuneration packages (Abdullah & Hossain, 2014; Anwar, 2015; Rahman, 2010; Shahjahan & Grimm, 2023). As such, for Bangladeshi academics, academic aeromobility goes beyond simply short-term economic and career rationales but involves long-term relational and personal journeys. Such temporal journeys signify how academic aeromobility satisfies a researcher's personal (and to some extent temporal) desire to visit different parts of the world (Le Quéré et al., 2015). While academic mobility to the Global South represents stuckness, aspiring to move to the White core for Global South subjects, conversely, elicits feelings of freedom (Shahjahan & Edwards, 2023). The opportunity and barriers to spatial mobility are also tied to one's ethnicity, gender, class, and positionality in the Bangladesh academic hierarchy (Shahjahan et al., 2022). By foregrounding the flux nature of academic mobility, a temporal

lens helps illuminate multiple temporalities in academic mobility, which are interconnected with relational goals of future of others, service to the nation, being closer to loved ones, etc. (Shahjahan, 2022). In other words, the question of academic aeromobility is a temporal concern, as these forms of mobility relate to questions of geopolitics of knowledge, social positionality, precarity, futurity aspirations, and relationality.

A temporal politics of academic aeromobility would interrogate the temporal infrastructural privileges afforded to some. By temporal infrastructures, borrowing from Sharma (2014), we mean the national mobility policies, institutional programmes, and resources facilitating spatial mobility. In other words, who can afford the necessary temporal resources (economic, cultural, social, and relational) to engage in academic aeromobility? Gross inequities underpin who can attain travel money, visas, time off from work, and necessary accommodations. For instance, while a Bangladeshi researcher navigates the unique temporal landscape of their university while planning to travel abroad, they simultaneously experience the temporal constraints of visa machinery—local passport offices, notary centres, or legal organisations—devouring time from their personal and academic lives. As our research on Bangladeshi academic mobility illuminated, one's family dynamics can constrain whether, how, and when to travel abroad (Shahjahan, 2022; Shahjahan et al., 2022). Furthermore, once they reach their destination (e.g. during a conference), a Bangladeshi academic is expected to align their circadian rhythms (body and sleep clock) to the temporal rhythm of the Global North to be 'punctual' to attend the conference 'in time'. In other words, the embodied consequences of academic aeromobility are uneven, whereby peripheral scholars often need to synchronise their embodied rhythms to the temporal rhythms of the metropolitan core.

In short, a temporal politics of decarbonising academic work needs to interrogate the intersecting roles of coloniality and geopolitics of knowledge informing the necessity of academic aeromobility for some compared to others. Furthermore, a temporal lens would foreground the directionality, physical distances, and myriad borders (cultural, linguistic, and relational) one needs to cross to feel seen, validated, and belonging in the global academic community. The extent to which one has temporal agency to choose to engage in academic aeromobility is uneven due to

colonial histories and geopolitics of knowledge. So, while some academics can engage in 'luxury emissions', others have to engage in 'survival emissions' for academic aeromobility (Sultana, 2022, p. 5), in the global structure of academia.

6.2　The Temporal Politics of Digitisation

Some suggest that digitisation of academic research and collaboration may be a move forward in decarbonising academic work. As such, digitisation may help reduce the carbon footprints coming from travel (Le Quéré et al., 2015; Pasek, 2023; Reyes-García et al., 2022; Teufel & Sprus, 2020). Indeed, digitisation can help close the distance between people across various spaces to collaboratively teach, or research, or network. Indeed, since COVID-19 the number of virtual conferences, virtual methods utilised (virtual ethnography, digital archives), and virtual networking have increased, alleviating the carbon footprints of travel. Yet, a temporal lens helps to tease out the possibilities and constraints with digitisation to decarbonise academic work.

　　'Clock time' underlying digital technology is important to unpack in decarbonising academic work as it regulates the digital 'traffic' underlying our work. While one can experience how CPU or internet speed mitigates the tempo by which academic work is done, clock time is much more pervasive than what meets the eye, and hovers over the clouds (Rooney, 2021). Electronic and atomic clocks embedded in our digital technologies have replaced the bell or clock tower or the railroad's station clock that historically regulated people's lives (Mondschein, 2020). While clock time is individualistic (displayed in our smartphones, wrist watches), it is also communal through airline schedules, class schedules, and electronic systems. To ensure that different components work together seamlessly and that data is processed accurately, clocks provide the common reference for the timing of operations in digital devices (i.e. computers, cell phones, and our cloud storage infrastructures). While many typically use GPS (Global Positioning System) as a navigation system, the latter is actually a precision timing system, run by atomic clocks. To this end, the atomic clock time transmitted via GPS synchronises servers across the globe, deploying atomic clocks in individual data centres to preserve synchronisation when

the transmitted time is not available (Chandler, 2022). Thus, our digitally mediated academic work in teaching, research, service, and networking—e.g. videoconferencing, media streaming, online teaching, learning platforms, and digital research methods (digital archives, ethnography, and so on)—is all mediated by clock time.

Hence, the temporal politics of clock time underpinning digitisation should be at the heart of the decarbonising academic work debate. Clock time dictates and privileges the supremacy and priority of the Global North, particularly with respect to tempos of academic work and collaboration. We need to ask who has access to 'smooth' digital traffic resources (e.g. electricity, internet, and data centres), given these are globally unevenly distributed. As our earlier vignettes highlighted, access to technology is uneven, which impacts not only the 'speed' of academic work, but whether collaborative work can smoothly occur. Lack of access to resources such as uneven production and distribution of electricity often leads to the unique digital traffic constraints in Global South contexts caused by power outages or load shedding (i.e. deliberate electric power shut downs ensuring power distribution). Most of the data centres, facilitating our daily knowledge storage and exchange, are concentrated in the richer Anglo-American and European contexts, while BRICS countries follow. For instance, while numerous data centres are found in the USA (2,701), Germany (487), the UK (456), China (443), and Canada (328), African countries accounted for less than 1% of world data-centre supply in 2022 (Minnix, 2023), and Bangladesh only had nineteen data centres (Corner, 2022). Such uneven digital temporal infrastructures impact digital collaborative academic work. For instance, as we were collaborating between Lansing, Michigan and Dhaka, Bangladesh during COVID-19, we had videoconferencing difficulties because many in Dhaka were experiencing 'internet traffic'; there was such an upsurge of using the internet for virtual teaching and so on that it drastically slowed down data sharing. Similarly, as I (Riyad) was collaborating with colleagues in India, our virtual calls were interrupted due to power outages and load shedding. Again, when we were virtually presenting our work during COVID-19, our South African colleagues could not share their videos on Zoom calls, because of load shedding. These 'no-electricity' events introduce precarity and impact both immediate collaborations (e.g. meetings

and conferences) and long-term ones (e.g. writing a collaborative article while meeting mutually agreeable deadlines). In other words, many in the Global South do not have the digital temporal infrastructures allowing them to *smoothly* engage in academic work, including collaborative work. Furthermore, one cannot also ignore the racialised, gendered, classed, and dis/ability- and family-status-related temporal constraints underlying digital collaborations. The temporal possibilities and constraints of decarbonising research via digital methods will also vary across one's discipline of work (i.e. social sciences vs. science and technology) (Rae et al., 2022; Williams & Love, 2022). Our experiences with digital collaborations also raise questions about whose deadlines, calendar, and time zones set the tempo of academic work and collaborations. In short, digital infrastructures are plagued with temporal resource inequities related to who, where, and what discipline we work in, shaping how knowledge can be accessed, produced, and disseminated.

We cannot ignore the 'grind culture' underpinning digitisation of academic work. Technology is also embedded in capitalist grind culture, where our bodies and devices are seen as disposable to benefit productivity and profit, as our individual and collective worth are tied to doing more, producing, and making a difference (Hersey, 2022). Grind culture informs academic work. While we are 'grinding' the shelf lives of our technological devices (i.e. the physical breakdowns of our laptops, computers, screen, cell phones, wiring, and so on), we are also 'grinding' our biological selves. Our digital devices have temporal lives. While digital devices may improve efficiency, they increasingly embody precarious shelf lives given the role of *planned obsolescence* (e.g. Apple or IBM products), mobilising us to continue upgrading and consuming 'newer' devices. Indeed, digital devices are marketed to us to provide temporal flexibility in terms of when and where we can engage in this work. Yet, the paradox of such temporal autonomy is that digital devices flatten the temporal barriers between academic work, and other temporal containers in our lives, such as personal, family, sleep, or simply time off from work. Furthermore, using digital devices has profound consequences for our bodies, such as our eyes, hands, arms, backs, shoulders, legs, and so on. Thus, a temporal lens helps highlight the paradoxes of using digital methods in decarbonising academic work. While digitalisation may

free us from travel, increase the speed of our work and/or collaborations across borders, it also requires larger investments in temporal digital infrastructure not available to many. Furthermore, a temporal lens foregrounds the lives of actants in our digital methods (i.e. clock time, our devices), and the temporal consequences of digital academic work on our embodied being.

6.3 The Temporal Politics of Futurity

While decarbonising efforts in academia have focused on questions of mobility and digitisation in academic work, the ontological framings of futurity mobilising climate-justice efforts remains unpacked. By futurity, we are referring to the state of being tied to an imagined time that is 'yet to come', or how the 'yet to come' is invoked (Baldwin, 2012). A temporal politics would raise questions about the Gregorian calendar, teleological, and dystopian standpoints underlying climate-policy solutions. Such solutions presume that all humans embody a universal trajectory, and are equally implicated or impacted by the climate crisis. For instance, the Paris Agreement suggests 'emissions need to be reduced by 45% by 2030 and reach net zero by 2050' (United Nations, 2023). First, such futurity-oriented solutions take for granted the Christian Gregorian calendar year framing, as the years '2030' and '2050' are based on the Western Christian Solar-Lunar Calendar, not the Muslim, Hindu, Chinese, nor the Bengali calendar, to name a few. Second, such climate policy discourses ignore the colonial temporal logics tied to control and futurity (Bandera, 2022; Ramachandran, 2021). Andreotti et al. (2017) caution us that a Western temporal logic seeks to 'imagine something ahead of them and all steps they take are planned to achieve the imagined *teleological* standpoint' (p. 4) (e.g. emissions need to be reduced by 45% by 2030). In other words, a Western temporal logic presumes the future is controllable, hence futurity is something that is manipulatable and can be planned, and not a *mystery*, as it would be, say, from a Maori temporal standpoint (Andreotti et al., 2017). Third, a dystopian futurity is often used to mobilise against the climate crisis. Such trends beg the question: whose futuristic dystopia is being mobilised to address climate change? As Whyte (2018) argues, the Eurocentric notion of 'impending crisis' plagues climate-change

discourses, so they suggest 'a futuristic dystopia if action is not taken now, rather than "situate the present time as already dystopian"' (p. 224). For Indigenous peoples, the *climate apocalypse* has already taken place, and it is called settler colonialism (Whyte, 2018). Overall, such temporal assumptions prompt the development of academic climate-justice work questioning and seeking alternatives to temporal perspectives driven by Eurocentric assumptions.

Many from decolonial and Global South perspectives suggest shifting the temporal logic of the climate crisis from the future towards the colonial past. They suggest acknowledging how colonial exploitative and extractive practices have contributed to the present-day climate crisis (Bandera, 2022; Guerrero, 2023; Sultana, 2022). The Bangladeshi example is a clear example of how coloniality is tied to the current climate crisis. Climate precarity in Bangladesh derives from the global political economy of development dating from British colonial governance. Colonial governance reshaped the Bengal delta's coastal regions, and, as such, the agrarian communities in such regions are today ecologically vulnerable (Paprocki, 2021a). Post-independence neoliberal development aid further reinforced these colonial ecological susceptibilities (Paprocki, 2021b). 'Climate change' has only recently become part of Bangladeshi mainstream discourse as it dominates domestic development policy, English-language daily newspapers, and national expenditures of climate finance (Paprocki, 2021a). Climate change has also become a great foreign-aid source. For instance, the World Bank provided $858 million to improve climate resilient agriculture growth and road safety (World Bank, 2023). However, for local environmental social movements, decolonisation is a more apt political act as environmental change cannot be delinked from colonial political dynamics shaping local ecologies. Local Bangladeshi environmental activists focus on power dynamics across scales (from the local to the global scale) impacting ecological change trends (Paprocki, 2021a). Overall, a temporal politics of decarbonising academic work necessitates reimagining the dominant temporal framings of futurity tied to particular calendars, universal teleological standpoints, and dystopias. Instead, a temporal politics suggests interrogating whose temporal assumptions inform such climate-change narratives, and more importantly, what they obscure.

6.4 Concluding Remarks

So far, we have argued that a temporal lens offers us a nuanced view of decarbonising academic work. We highlight how decarbonising academic work is implicated in temporal politics which have been largely under-theorised. A temporal lens helps highlight the ontological, relational, and colonial constraints of decarbonising academic work. As our analysis suggests, decarbonisation is a temporal phenomenon and is intimately connected to decolonising climate politics. Our temporal lens highlights how decarbonisation is relational and we cannot conceptualise decarbonisation without considering Global North–South dynamics and geopolitics of knowledge, informing academic aeromobility. Relatedly, our temporal lens complicates the digitisation efforts in decarbonising academic work. Indeed, a temporal lens allows us to view digitisation as a form of modern 'traffic' of seemingly invisible things (i.e. electrical speed) and implicates us all differently. Those of us with fewer material and technological resources experience more digital traffic jams (i.e. temporal constraints on working with or sharing data). Finally, climate politics is also connected to questions of futurity, particularly how one's anticipated dystopia is actually someone's contemporary reality.

However, we want to be clear that our temporal analysis is not meant to denigrate the problematic nature of carbon emissions, nor stifle the possibilities of developing low-carbon methods. Rather, our analysis suggests incorporating diverse critical perspectives, including the question of time, to clarify our roles and social positionalities as knowledge producers in the overall geopolitics of knowledge. If we desire low-carbon knowledge production to benefit all, we need to raise tough questions, whether it is for the benefit of the racialised and gendered global majority of the world, who are often represented as unnamed and as mere numbers of 'affected population' in climate-justice research. For instance, we need to ask: Whose ontological, epistemological, and methodological assumptions and values inform climate-justice efforts, such as decarbonising academic work? How do climate-justice efforts presume or perpetuate universalised human life, solutions, relationality, and linear temporality? In response to these questions, we suggest incorporating more temporal critical perspectives, particularly from decolonial and Global South standpoints, to further tease out these issues.

Finally, given our space limitations, we could not explore how a temporal lens is also helpful in that it helps recognise that immanence is present in all living or non-living things. Here we provide some brief thoughts. Such a decolonial temporal approach would also decentre anthropocentric approaches, without assuming that all humans are equally implicated in the climate crisis. In other words, decarbonisation efforts need to interrogate their own anthropocentric assumptions and consider other actants in the world. This would entail acknowledging the intimate relationships between human beings and other-than-human beings, and the role of the latter as actants. This immanence is tied to our own biological rhythms, or the rhythms of lives of our devices, the sun, the moon, and so on, that also govern our lives as we engage, for instance, digital methods. Bennett (2010) echoes the questions we want to raise in this regard, that apply to decarbonising academic work:

How would political responses to public problems change if we were to take seriously the vitalism of (nonhuman) bodies? … What difference would it make to the course of energy policy were electricity to be figured not simply as a resource, commodity, or instrumentality but also and more radically as an 'actant'? (p. viii)

While evoking such questions, we are also critical of a universal Anthropocene, often mobilised in climate-change discourses, as it unintentionally silences the historical and contemporary power imbalances, and the various social differences and racialisation of the planet (Sultana, 2022). Finally, we need to recognise that climate entities are constantly transforming (e.g. river cycles, cyclones, deforestation) and as such decarbonisation is not a unilateral end point, but is nevertheless in a constant flux. Peace!

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7

Reimagining Networks: Speculative Thinking for Low-Carbon Research Networks

Dawn Walker and Yani Kong

7.1 Introduction

As academics with a desire to lower the environmental impact of our research, a common first move often is to swap out carbon-intensive forms of travel for online conferences, meetings, and group collaboration. In this approach, networked forms of relating at a distance are understood as counter to dominant academic practices of in-person conferences, fieldwork, and the personal textual interpretation of the humanities and social sciences. Subsequent choices change how we (more or less) use certain digital networks in the name of low-carbon research methods. Contributions to this collection explore strategies of digitalisation (Jekanowski et al., Chapter 2), novel collaboration (Kaur et al., Chapter 5), and intentional disconnection (Mehta & Sutherland, Chapter 8), while critically nuancing how time and presence are differently abled and globally articulated (Fernandes et al., Chapter 4; Shahjahan & Niloy, Chapter 6). When we drafted this chapter, we followed this pattern; however, as we wrote together, we were struck by the reliance on existing networks—in almost all cases part of one large network of computers called the internet—in these attempts to enact low-carbon research methods. That led us to more explicitly draw our inspiration from decelerated media and alternate networks to trace out a practice of remote collaboration that took place offline.

In a moment of global crisis, we witnessed a rapid shift toward online interactions as a replacement for in-person presence during the COVID-19 pandemic (noting this model was not without iniquities and unjust impacts). Popular videoconferencing programs like Zoom tripled in use

and served as a critical tool for academics experimenting with remote research and knowledge dissemination (Carl et al., 2021). Yet this rapid growth and the energy demands of ICT, particularly data centres, networks, and devices, demonstrated yet again that 'going virtual' is not an immaterial practice, but instead produces real material impacts on our Earth. Streaming over networks cannot happen without drawing energy, and while it is difficult to fathom the material strain of electrical intensity, there remain physical consequences. For instance, in South Korea, popularly considered 'the most wired country in the world', streaming media comprises one of their top energy uses, yet Korea's energy is coal reliant, so a streaming film requires burning coal to power this activity (Feiganbaum & Nelson, 2021). Even where electrical grids run on renewable energy, such as in British Columbia, where we are both based and where hydroelectric energy is widespread, there are still environmental and social impacts including the displacement of Indigenous Peoples and disrupted sacred ancestral territories (Matsui, 2009; Schapper & Urban, 2021). The global reliance on fossil fuels for electricity means that ICTs are responsible for over 4% of global GHG emissions—more than the airline industry—and these numbers are projected to rise to 7% in 2030 and 15% in 2040 (Belkhir & Elmeigli, 2018; Bordage, 2019; Marks et al., 2021).

Before we can truly consider these impacts and other consequences of the digital turn, we note there has been a sharp rebound to in-person work and associated international air travel, which as of September 2023 has hit 84% of pre-pandemic levels with projections for future growth (United Nations World Tourism Organization, 2023). This poses a dilemma for academic networks and networking in general: a choice between in-person presence, air travel, and the material impacts posed by these methods, or instead the growing consumption pathways carved by remote media on digital networks. In-person conferencing is critiqued for the carbon intensity of travel required, yet, given that digital alternatives have their own carbon intensities, we are in the difficult position of dreaming other pathways for low(er)-carbon research. We know we need to network better, and we understand the current state of networking is insufficient, but our options appear limited.

We sit with this dilemma, examining our own speculative practices and other projects that develop new paths forward through creative

interventions to the 'always-on' network of digital platforms and 'efficient' data centres of the contemporary internet. Writing this chapter together was an occasion for us to speculate on viable alternatives offered by present technologies through an exploration of constraint. We opted to use lower bandwidth technologies for collaboration prompted by our conversations in the Low-Carbon Research Methods workshop that first gathered us, we wrote offline in relay rather than working in parallel from a Google Doc, and planned our collaborations over the telephone rather than Zoom. Our chapter begins by assessing networks as they relate to research methods before characterising the carbon intensity and trends in oft-posed low-carbon solutions for academic networking and research—ICTs and digital networks—in order to make tangible the physical impact of invisible media. We then examine the pull we felt to speculate and reimagine networks as objects of study and sites of research rather than taking up network(ing) as a method itself, highlighting tensions that we see operating within the concept of networks at the intersection of low-carbon research. We conclude with some first steps that academics can take to enact their own speculations and areas we hope to develop further.

7.2 On Networks and Method

The word 'network' is shorthand for an expansive set of material arrangements and a diverse set of research methods and practice ranging from network science to actor–network theory, spanning messy complex social relations to computers sharing resources connected by protocols, wires, and waves. This diversity of contexts all referenced by the same term means that it is common to speak abstractly when trying to work through issues regarding specifics. The term 'network' suggests an actual thing, an object of study or place of research, more readily than a concept ripe for methodological reflection and development. When we refer to networks in this chapter, we almost always mean digital networks—interconnected computers using protocols to communicate.

It is with the invective from Pasek and Mehta in the introduction that 'methods make worlds, in and beyond academic research' that we investigate the possibilities of networking as method, and we consider the limits of the term network and how networks function in the contemporary. What new

low-carbon strategies or renewed interpretations could arise if we distance our inquiry from the present-day popular conceptions around networks and networking? To aid us with this inquiry, we rely on speculation, arguing that low-carbon research requires us to think beyond present circumstances and work towards a reality that is as yet unknown, by anticipating and enacting the conditions of a post-energy-transition world. In this vein, we seek creative interventions to 'always-on' networks, ones that create longer cycles and slower rhythms of connectivity and that consider the ways in which speculative discourses—often fabulated narratives that are grounded in real-world knowledge—utilise imaginative practices to craft a world that is yet to come. We can remain aware of looming catastrophe and continue to seek new potentials (Fuller & Goriunova, 2019). Thus, our efforts in this chapter and those described by the other authors in this book, aim not only to lay bare the conditions of the present, but to invite participation in the creation of possibilities, even as the questions that these possibilities pose may remain unresolved (Gil'Adi & Mann, 2021). Speculation is a method used by many who write from positions of constraint and foreclosure. Speculative thinking as an environmental practice invites people to expand action beyond our current reality and imagine possibilities for preservation, renewal, and the creation of entirely new methods and actions for a future yet to come.

7.3 Characterising Carbon in Digital Networks

In 2021 one of our research groups monitored power outputs for Simon Fraser University's (SFU's) data servers, which host all institutional moving-image works, to gauge fluctuations in relation to remote teaching and learning (Kong et al., 2022). Graphing usage from the onset of the pandemic in March 2020 to August 2021, we noted that the power output remained roughly the same despite the mandated turn to digital learning, online teaching, and use of videoconferencing platforms.[1] Our data determined that servers at SFU and elsewhere maintain a constant operational base maximum: these servers are always running. Because of this consistent outputting flow, the university IT department suggested that it is more efficient to utilise the server capacities to their fullest capabilities.

[1]We note that most platform-specific bandwidth for cloud-based services such as Zoom are hosted on Zoom's (or Microsoft's, or Google's) servers despite some institutions hosting

Accurate measurements of ICT energy consumption do not typically involve separating the power consumption of specific data applications from the overall consumption usage of data centres, networks, and devices (Andrae, 2020; Hinterholzer & Hintemann, 2020). From our data gathered from IT partners at SFU, we were only able to measure total power output but could not split off the hours that individuals spend streaming across various platforms, nor could we see how much power certain platforms were comparatively drawing.

High-consumption behaviours are normalised and expected, so government and institutional efforts focus on making these existing ICTs and practices more efficient which means they can be used in greater frequency, rather than expend resources on alternative low-energy practices. The management patterns that reinforce high-consumption behaviours reflect a broader solutionist and efficiency mindset, one that favours novel solutions (often technical) to resolve present difficulties and in the interim only tinkers with and optimises existing ICT practices (Reich et al., 2021). Rather than reconfigure what is at hand, this mindset belies a belief that we can invent ourselves out of the present circumstances. We can't only invent ourselves out of this problem (Wajcman, 2018).

There is some recent agreement from engineers that reduced data-consumption practices do not correlate to reduced energy consumption, precisely because of the continuous maximal operation of networks and data centres. Laura U. Marks notes that ICT infrastructures are 'engineered to anticipate future use and spur consumer demand', contributing to over-engineered networks, naturalising high data-consumption patterns, and necessitating the increasing expansion of infrastructural networks (Marks, 2021). Demand for computationally intensive data accelerates growth of new infrastructure, and this overall expansion contributes to a supply-and-demand chain that has harmful environmental effects. These findings

courseware, email communication, and other institution-specific learning platforms on their servers, and even with org-specific domains for specific applications of Zoom. On Zoom's website they describe their architecture as relying on 'their servers' and a hybrid cloud. So, if there aren't corresponding reductions in either existing IT infrastructure on campus or energy usage on campus, then Zoom use (for instance) is in addition to the observed metrics. Further, different video-call platforms can have radically different data usage. The MobileHCI 2021 conference sustainability statement talks a bit about those differences: https://mobilehci.acm.org/2021/sustainability.

alongside our own research point to the need to clarify where ICTs are 'always-on' and which 'stubborn' emissions are a legacy of our current networks.

Marks and engineer Stephen Makonin (Marks et al., 2021) produced a briefing for their SSHRC project, 'Living Within the Earth's Carrying Capacity: Tackling the Carbon Footprint of Streaming Media', in which they develop a measurement calculator[2] that illustrates the Jevons paradox at work with digital steaming media: as a process is made more efficient, this efficiency is negated because of the increased consumption enabled by the new proficiency. In this case, they argue that streaming-media usage demonstrates a rebound effect whereby less sustainable activities, such as travel to in-person meetings and events, are replaced with more sustainable ones, such as Zoom, but their accelerated usage reduces the environmental benefits. The rebound effect produced by streaming media is still being determined across research, but there is a benefit to examining increased consumption behaviours that have become normalised as streaming media are now more widely available. For instance, streaming a single video certainly consumes less electricity than driving to the store to rent a DVD, but the rampant availability of streaming platforms has created a new consumption pattern of binge watching and content addiction (Marks et al., 2021). Arguably, the idle time of scrolling drives device use and electrical consumption, more so than the adoption of academic videoconferencing. Platforms such as TikTok, YouTube Shorts, and Instagram Stories dominate device use and fuel audience demand for low-attention media.

Data that confirms the carbon footprint of ICT is generally received in mixed ways. From a survey conducted by Kong on remote-learning

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[2]Their report corroborates findings produced by French think tank, The Shift Project, that attributed over 1% of GHG emissions worldwide to streaming video (The Shift Project, 2019). The original report generated controversy, with critiques noting the model either over- or underestimated statistics or overlooked the impact of variables like bit rate, wattage, device type, and screen size (Carbon Trust, 2021; Jancovic & Keilbach, 2023). However, Marks et al. (2021) surveyed 22 studies by ICT engineers on the electricity consumption of ICT and found a wide range of resulting figures including those that support The Shift Project's findings, noting that the debate among ICT engineers is because there is little consensus on the 'system boundary' of the internet: 'whether production, data centres, production, disposal, and mining of metals should be included'.

habits and behaviours among students in fine-arts courses, we understand that high-resolution video is normalised, driven by an increasing hunger for quality video and a desire to test the capacities of new technologies. Students champion high-bandwidth access to their educational materials: some said that clarity helps them engage better with the content; one wrote '4k or bust'; and another, 'Why would I be happy with a low-resolution video when my equipment can yield higher?' The expectation for swift and seamless high-resolution video is at odds with current sustainable best-practice recommendations and underlines the popular mindset in at least the Western world: information should be constant and highly available. The students' mentality signals that while quantitative figures are important in showing the material consequences of ICT, this information on its own is not enough to motivate behavioural shifts.

Demand for data boosts the production of highly refined infrastructures to support demand, which in turn enable more data to be used. To counter this circuit, if data-centred practices are decelerated, perhaps growth may in turn slow. It is challenging to envision how tempered behaviours can accumulate over time, but it is possible to connect a commitment to slower digital networking to the low-carbon practices of individuals, for example those who choose not to fly and the broader anti-flying social movement of *flygskam* or 'flight shame'. Aggregate individual practices don't have a clearly traceable impact, however, as Chris Preist states:

With current network technologies, if you send less data along it, in most cases it doesn't reduce the energy use. It's like an airplane: if you don't fly, the plane flies anyway, and so 'not flying' only reduces emissions if it leads to less airplanes flying in the long term. (Quoted in Burgess, 2019)

Ideally, if fewer people fly, it may reduce the number of flights in general because there is less demand; likewise, if there is an accumulated push towards slow media, we speculate that a similar effect might be realised. Taking fewer flights and moderating streaming practices and network use sound like small-scale interventions, while their impact to convenience requires actors to make large-scale sacrifices. No wonder we are unsuccessful when we ask individuals to take these types of actions, given the unclear impact of these suggested practices.

We recognise that this discussion raises questions that move us beyond the binaries of travel versus Zoom, physical media versus digital media, or material versus immaterial that we point out in the introduction of this chapter. Rather, it suggests new areas for exploration and a need for nuance when approaching low-carbon interventions. We are also aware we have asked streaming and video calls to 'stand in' as a proxy to think about a range of network traffic and carbon emissions from ICTs more generally and want to be sensitive to how that frames our thinking.

7.4 On- and Offline Collaboration and Knowledge-Making

Writing this article together was an occasion for us to engage in our own practices of speculation and decelerated media. Rather than a series of prolonged Zoom calls (though we had one of those at the beginning too), we opted for text messages as our primary medium, with our discussions taking place as phone calls rather than using a message app like WhatsApp or Signal or a video platform. We began our draft in a collaborative Google Doc with prompts from the workshop, but soon switched to writing on our own computers and in our preferred local programs before sharing sections of text. Near submission deadlines we reverted to a shared copy in the Google Doc to handle reviews and manage different versions, but we kept our writing offline until the last moment.

This approach is not necessarily different from others whose collaborative writing practices aren't centred on being 'low carbon' or 'decarbonised': we made use of the same networks used for always-connected apps and platforms yet interleaved in less data-intensive forms of connection. What we found was that as a result of this imposed constraint, this approach was generative in ways that gestured towards future acts of world-making; discussion turned to how amateur radio devices and networks of repeaters allow operators to talk to someone miles away, and ways that these older models could be repurposed for academic workshops. As we discussed above, it was a challenge to interpret the salient differences between intangible actions but also to navigate the ambiguity of experimentation. We are still speculating whether our intuition and inclinations towards slower media can be characterised accurately as less carbon-intensive practices. For example, SMS/text messages are apparently less

carbon intensive than chat-app messages or emails (Gonçalves, 2019). With our crude rubric of limiting data we made a distinction, albeit an ambiguous one, on our devices where we can seamlessly move between the two forms, and where both kinds of messages are sent in similar ways or even sometimes from within the same application.

The practices we describe below reimagine forms of networking which retain the function of community but, moreover, experiment with non-resource-intensive models that are slower, indeed clunky, and surely less fashionable, pulled from technologies that may be considered tired or outdated, that do not subscribe to the mindset of efficiency. Many of the examples we describe are not likely to be applied in a wider sense, but we argue that, even if a truly sustainable horizon is not possible, experimental practices bear a kind of enunciative function—we call new practices and relations into existence. Alternatives exist and no less take up space, a metaphorical slowing to the otherwise rapid stream of information.

Speculative genres can guide us as we navigate impossible questions and political conversations by enacting imaginative gestures towards 'what might be there'. As Maia Gil'Adi and Justin Mann (2021, p. 242) ask, 'what are the horizons of speculative thinking', and 'how do those horizons map on to the geospatial and socio-political realities of past and present?' Speculative fictions often centre on race, colonisation, and empire, intervening to create non-White agencies. In our speculations we hope to honour, and undertake in parallel, the inclination towards making, building, or otherwise revealing new worlds, or methods for living, which may motivate how we relate to our current state. We want to understand what these forms of making and building are. We look to already-existing projects that reinterpret networks and enunciate alternative forms. Many clearly suggest possibilities for low-carbon futures and rethink the relationship between on- and offline in communities of practice.

Open Weather (Dyer & Engelmann, 2021) draws from feminist approaches to sensing to knit together lower-cost amateur radio with open data, in order to rethink collaboration and knowledge of meteorological data and weather systems. Through 'nowcasts', including one for COP26, multiple participants operate DIY ground stations that they can set up

without prior experience in order to capture satellite images of weather data and stitch them together to produce an image of Earth's weather system. They document extensively the ways to join their collaborative practice through a wiki (Engelmann, 2021) hosted on the Public Lab platform, where communities and individuals can document and investigate issues in their local environments.

LOW←TECH MAGAZINE (2024) has also revisited ways to share and publish online. In addition to a more traditional website, they publish their magazine on a solar-powered website hosted on a more affordable and lower-power single-board computer (an Olimex Olinuxino A20 Lime 2). During extended cloudy periods, the site goes down. In writing about the process of redesigning their site to work on less power, they reveal that reorienting their publication around this design constraint and breaking from a notion of constant availability led to rethinking a series of other aspects: they must audit and reduce the resources and software libraries that compose and serve their website; they adapt which technologies they use to favour less energy-intensive tools and less energy-intensive tool ecologies (e.g. rasterising images, using a static site generator, removing bulky framework libraries common in front-end development) (Abbing, 2021; De Decker, 2018).

Finally, while providing volunteer audio/visual support for an in-person conference, the Toronto Mesh collective developed a homebrewed open-source approach to streaming live video for an Our Networks conference to a distributed storage protocol called IPFS (or InterPlanetary File System) (Yurko, 2018), rather than using platforms like YouTube or Twitch which host the streamed video on their servers and make technical implementation decisions about streaming and storing that data. The result was successful but required specific hardware at the event: remote servers to host and broadcast the stream, and a website that could be heavily customised. It also required in-depth knowledge at each stage of its planning and execution, knowledge of niche protocols, and software engineering and network administration skills. When individuals wanted to access the livestream on the conference website, they were prompted to choose whether to watch over IPFS or 'HTTP' (Hypertext Transfer Protocol, a key web protocol), both accessed seamlessly through the browser.

7.5 Speculating on Networking Without Networks

How we understand carbon in our current digital networks and our own speculative interactions reveals tensions on the path to low-carbon research. The examples in the previous section highlight those sites of academic connection and knowledge-making we mentioned at the top of this chapter: collaborative data collection, publishing, and presenting at conferences. One way forward is for low-carbon researchers to speculate on alternative networks from their own distinct context (whether metaphorically, infrastructurally, or somewhere in between), to navigate the uncertainties that will emerge, and share their results.

A key framing we seek to move beyond is the oppositional dynamic of individual sacrifice (e.g. watching lower resolution video) versus the accumulation of systemic change (e.g. phasing out fossil fuels). Individual actions are regarded as ineffectual in popular culture or as behaviours encouraged by industry-led greenwashing initiatives. Despite this pessimism, however, it is also the level at which many forms of climate action are pitched. Individual actions like taking fewer flights and moderating streaming practices are small-scale interventions, yet their impact on convenience and availability frequently requires actors to make large-scale sacrifices or cascading changes. Worse, as we have seen with ICTs, individual digital actions might not correlate to the kinds of reduced energy consumption that we assume and need. In the case of networking, individual actions don't always accumulate because networks and data centres operate continuously regardless of volume or demand. If the scale of the individual is ambivalent for the levels of change required to limit global temperature rise to 1.5°C, how do we work at the smaller and larger scales of our academic networks and collaborations with our peers? Networks' interconnected nature can help link individual sacrifices to how they move across groups and cause impacts at different scales.

While the number of internet users continues to grow rapidly and internet traffic sharply expands, the current energy-use trends in the data-centre industry show signs of decoupling growth from emissions (International Energy Agency, 2023). Whether this increased energy efficiency leads to a sustained decoupling or just defers the material challenges of carbon into the future is perhaps more open to question than many realise (Pasek et al., 2023). This trend prompts us to ask what the

role of our small-scale speculations should be, as there can be real trade-offs in emissions and carbon intensity between emerging industry best practices and speculative experiments. If our speculations into alternatives to in-person meetings end up requiring the purchase of a bunch of new hardware and to set up and host our own services or servers, how does this added demand and embodied energy reconcile with low-carbon methods? It is hard to imagine speculative experiments like we describe in this chapter advancing on the efficiencies of green ICTs 'centralised' management. Above we highlighted the importance of alternatives in taking up space, and at least metaphorically slowing an otherwise accelerating discourse. For us a question remains, however: what room do we make for exploration and collective speculation?

7.6 Conclusion

Throughout this chapter we have explored the value in reimagining the concept of networking in academia and speculating on new networks we could create together. We are living in an age of computing and ICTs where we are always online and available, connected over networks and ready to stream from more places. Even in the background, our phone applications constantly check for updates or share data about us. These practices emerge from Silicon Valley and Big Tech paradigms that do not serve us as we try to develop something new: the 'design-thinking' approaches that promise replicable innovation by positioning Palo Alto at the apex of global tech labour (Irani, 2018); by popularising metaphors like 'in the cloud' that mislead and refuse to locate our data commodified by online service providers (Hu, 2015); or promoting accelerationist imaginaries of how mobile networks should operate that result in ever-increasing power and data to achieve the 'enhanced' connectivity of 5G for example (Mattern, 2019). We move to our conclusion with few thoughts 'wrapped up' and, rather, seem to end with more questions: What do we need to rework to achieve low carbon footprints in our [research] networks? Are there new concepts we need to develop? Which existing ones do we need to drop, remap, or renew?

To counter this prevalent mindset and approach, software developers, designers, artists and researchers are developing principles and patterns

often driven by new concepts that offer possible avenues for low-carbon research methods involving networks. 'Local first' and 'offline first' are two related concepts, whereby software is made against the grain of assumptions of a universal web user that is 'always connected' and 'steadily powered', which has led to bloated web applications or larger-than-needed custom applications, and to constantly moving goalposts of minimum requirements, contributing to accelerated data, energy, and, by proxy, carbon use (Kleppmann et al., 2019; Offline First, n.d.). The default these concepts challenge is bad for the same reasons that imagining universal users is insufficient—it reflects the conditions and implicit biases of the designer and builders (Hamraie, 2017). We notice other emerging networking idioms in peer-to-peer and distributed computing, where new protocols and data structures account for temporal uncertainty and the lack of a single authoritative record in novel ways.

We also seek greater possibilities to rework, rethink, and retire dominant forms of networking that are a barrier to decarbonisation. From our own work we see potential places to start, rooted in the material form of the current internet but also by re-storying the internet and the web's history to redistribute resources closer to people who need access while publishing and syndicating content that accounts for slower rhythms and longer cycles between connectivity (Ing & Walker, 2021). Alongside these, we want our approaches to more accurately reflect the multi-various conditions of going online experienced by the global majority of the existing 5.45 billion internet users (and remaining 2.6 billion unconnected) (Arora, 2019).

What could adapted practices look like for academics? One first step could be to map the various platforms and services used in one's current collaborations, identifying where and who is providing each platform or service. From there, the possibilities unfold. Perhaps the next step is to remove one service from your standard repertoire, or to swap out one specific platform or service for another one to honour a slower cycle. You may even take up alternative platforms for publishing and archiving and walk through a sort of 'implosion project' (Dumit, 2014) as you highlight the connected dependencies and infrastructures to re-create together.

After all, our networks are a potent place of accumulative practices. On the one hand, the current carbon realities of digital networking are one

of intensifying electrical usage and streaming media in remote teaching and learning. On the other hand, as techno-political practices and methods themselves, networks are open to change and able to produce new formations in our present that can transmit and reflect back new futures. The actions those methods point us to are not guaranteed to work, nor, as of this moment, do they seem likely to. Rather than settle for individual actions with uncertain impacts, we must find methods to engage in world-making for a world that may never be, unmaking the stubborn legacies of our current networks with what we have on hand.

Acknowledgements

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8

Dis/connected Digital Networks as New Forms of Connection

Swati Mehta and Brian Sutherland

8.1 Introduction

This chapter proposes experimenting with dis/connection as a low-carbon method of digital research. In the process of defining dis/connection as a method we pay attention to debates in disconnection studies, especially critiques of the dominant ideas in the subdiscipline. Critique challenges frames and, in doing so, illuminates edges; for example: protest, island or disability studies (see Fernandes et al., Chapter 4). Our own positions as researchers studying digital media and environment allow us to bring different theoretical and methodological perspectives to imagining dis/connection as a low-carbon digital research method. Moreover, conceptualisation of dis/connection is grounded in our relationship with digital infrastructure and culture, as well as the positions we occupy in the world. Swati is a citizen of the Global South, completing doctoral studies as a temporary resident of the Global North. Brian is an early-career researcher and a citizen of the Global North. These different positions we occupy in the world and within the academy bear upon what we propose as low-carbon digital research method, and how we think about sustainability and the questions of equity and mobility laid out in the introduction to this book.

Affordances of existing and emerging networked technologies provide a rich field for interdisciplinary and valued research, where we might consider how new, widely accessible digital methods used at moments and in extended intervals of research address *the carbon problem*, which is to say, the high environmental cost of academic research in generating carbon by means of air travel (Conti, 2021; Knox, 2021). On the surface, digital networks and associated research methods do not always necessitate

extensive air travel and are thus considered a legible face of low-carbon methods. It is believed moving online (as the research community did in the initial years of the pandemic) or a turn to digital is 'a key component to visions of green conferences and a more equitable playing field therein' (Pasek, 2020). There is some truth to this belief, some of which is reflected in Swati's experiences as an international student and her choice of research methods. So far, she has only attended international conferences or events that were online. Costs of travel and vagaries of visa processes mean that unlike her domestic peers, she will not be able to jet off to Europe, the USA, or any other country other than her own at short notice. Similarly, conducting online interviews and workshops in different continents for her research is much easier, more affordable, and less carbon intensive, than having to take multiple flights within and across these locations.

The digital turn has piqued our hopes for low-carbon potentials because it takes out jet fuels and travel budgets from research methods. However, computational networks as infrastructures tend to reside in the 'background' of common user experience in everyday digital cultures, particularly as they become ubiquitous, 'just as a well-balanced hammer "disappears" in the hands of a carpenter' (Weiser et al., 1999, p. 695). So, when earthly connections of digital networks are un-obfuscated it becomes clear that they are not entirely a low-carbon dream. A reassessment of the digital turn within academia, accelerated since COVID-19, shows that 'going virtual is not an immaterial practice' (Walker & Kong, Chapter 7 in this volume). These are carbon-intensive technologies and with high environmental costs. As we elaborate later in this chapter, social inequalities, limitations of access, and control over connectivity also complicate the digital turn's ability to create an equitable research environment. Therefore, it becomes imperative to ground the positions these networks occupy, physically and culturally, within processes of public knowledge production.

When foregrounded in processes of knowledge production, digital networks assume the duality of epistemic cultures (Cetina, 2007, p. 65) and infrastructures (Hedstrom & King, 2006, p. 1). The larger knowledge society, according to Knorr Cetina (2007), is characterised by epistemic cultures or the 'cultures of knowledge setting', where

the notion of epistemic culture ... refers to those sets of practices, arrangements, and mechanisms bound together by necessity, affinity, and historical coincidence

that, in a given area of professional expertise, make up how we know what we know. Epistemic cultures are cultures of creating and warranting knowledge. (Cetina, 2007, p. 67)

Epistemic culture, therefore, includes not just the larger process of knowledge creation, but also knowledge as practice. In this context, epistemic practices are the processes that organise and assimilate knowledge. Therefore, while being inherent to disciplines, epistemic culture and practice also span out of their disciplinary confines to determine the broader mechanisms, specific materials, and instruments of knowledge creation.

Practices to create, preserve, and acquire knowledge are well recorded throughout history. Knowledge has been preserved pre-historically on cave walls, stone tablets, animal hides, and papyrus scrolls with the intent of making it accessible in future. This need to preserve and pass on knowledge eventually took the form of libraries, archives, and museums and other spaces which, as Hedstrom and King say, are places which enable people to 'know what they know and do what they do' (2006, p. 1). These facilities support the knowledge economy and have thus been accorded the status of epistemic infrastructure (Hedstrom & King, 2006). Epistemic infrastructure can be defined as a culmination of a variety of collections and practices that influence their contents, accessibility, organisation, and use (Hedstrom & King, 2006). It is the logical corollary to epistemic culture. Just as epistemic culture reflects the mechanisms, practices, and organisation of knowledge, epistemic infrastructure enables and connects these practices to each other (Munn, 2020). They work simultaneously to define each other and the processes of knowledge creation.

Understanding digital networks as field sites (Burrell, 2009) considers this duality, i.e. epistemic cultures enabled by networks, as well as their material and physical presence as epistemic infrastructures, acknowledging that the implications are often different at different times for different actors and communities. Accordingly, decarbonisation pathways offered by this turn to digital methods also suggest an epistemological shift. Social networks and digital methods, on both an infrastructural and an ecological level and in relation to epistemic culture, are conjoined. Connection within the scholarly community and to fields of research is mediated and shaped by networked infrastructure owned and managed by a few, but influential, tech platforms. Our climate and scholarly fates

are therefore contoured by large tech companies such as Google, Amazon, Microsoft, Apple, and Samsung. As such, developing low-carbon methods cannot solely be an exercise of personal preferences, but one in which we address problems together. This will require speculative thinking that moves away from the narrative of growth and techno-solutionism (Walker & Kong, Chapter 7 in this volume).

In this chapter, we propose dis/connection, as conceptualised by Lim (2020), as methodological strategies for 'undoing networks' (Karppi et al., 2021) that are neither external to the network nor reliant on individual responsibility. We suggest dis/connection as a low-carbon research method that engages (Natale & Treré, 2020) with the entanglements of epistemic culture and infrastructure that surround knowledge production and dissemination, much the way water surrounds the insular and colonial cultural structures of islands. We situate dis/connection as focused on post-digital labour, focusing on disconnection as a matter of work, 'disconnective work', and intentional 'disconnective workplace design' (Fast, 2021), rather than defining dis/connection as leisure or self-care, as in some disconnection studies (Harmon & Duffy, 2023). We also consider strategies of dis/connection as low-carbon research methods, helpful in illuminating what is otherwise obscure about contemporary network society, to contest its power/epistemic captures, as in protest studies. Dis/connection in this frame will be a useful transitional strategy, even if it is not a permanent or desired condition amid our ubiquitous attachments to digital platforms and their affordances.

8.2 Networks as Infrastructure

Digital networks and the platforms they power have many implications: of interest to the low-carbon research question is how they are portrayed as ethereal objects. For instance, the connections they make possible are 'wireless', and the information they produce and process is preserved in a 'cloud'. The digital is perceived as an alternative to physical: a replacement for technologies and processes that are rooted in physical presence and infrastructure. This obscuring of its physicality and materiality also contributes to the notion of digital being a 'green' alternative and thus a solution to the climate crisis. This narrative also contributes to the problems

of determining the environmental cost of networked technologies. The general scheme of obfuscation rooted in technical complexity makes digital networks a difficult field site for evaluating social, cultural, and energy consciousness.

The infrastructural turn in media studies, however, provides a clearer view of the environmental impact of digital networks. Research in this area for the last decade or so (e.g. Lally et al., 2019; Starosielski, 2012) has foregrounded networked technologies' socio-material and environmental embeddedness and their implications at different sites for different actors and communities. Among other things, these studies reveal the carbon realities of digital networks, the environmental impact of these technologies, and challenge their positioning as green alternatives to existing energy-intense technologies, illustrating the importance of systematic and standardised carbon accounting.

Different approaches have been used to make visible the otherwise obscure global network infrastructures. For instance, Starosielski (2011) established a 'visual lexicon' of the otherwise invisible communication infrastructure: deep-sea fibre-optic cables, primarily responsible for running the internet. Though more visible than undersea cables, hyperscale data centres are another example of carbon-intensive infrastructure. Mostly hidden away in remote warehouses, data centres are extremely disconnected from everyday socio-technical experiences of the internet and the cultures it creates (Hogan, 2015a, 2015b). The data centre is always on (Hogan, 2015a), thus constantly consuming, processing, and storing data for large tech conglomerates. It consumes not only material resources—minerals to make computing devices—but also natural resources: electricity and water, where fresh water is used both in the generation of electricity and in cooling data centres (Li et al., 2025; Mytton, 2021).

Interestingly, the mainstream depiction of technology structures draws heavily from the metaphors of ecology, the digital cloud being most prominent among these (Carruth, 2014). In the late 2000s, cloud storage was proposed as an eco-friendly alternative to locally hosted servers and large and ecologically harmful storage devices like external hard drives and CD-ROMs (Cubitt et al., 2011). However, the high costs of cloud storage become apparent when connected to the physical server farms and data centres that sustain this technology (Carruth, 2014). High energy

consumption and exploitation of limited natural resources are among the many physical and material realities of technological innovations, be it blockchain or generative AI tools, that are often positioned as solutions to humanitarian crises, including climate change. For example, the annual carbon cost of sending and receiving a year's worth of emails for a single individual was estimated to be 0.62 tonnes (Richards, 2018). While estimates vary, streaming video presents a significant expenditure as well, where the question of carbon intensity is conflated with the type of electrical grid which supplies the system (Kamiya, 2020).

Though not definitive, attempts to account for the high energy and carbon cost of these technologies show that the promise of speed, efficiency, and the ability to be live and always connected has significant environmental impacts. These calculations of GHG emissions from different applications of networked media ground the energy-intense infrastructure required to run each of these processes. The visibility of these infrastructures also challenges the tech industry's narrative of eco-friendliness. Evaluations of the carbon intensity of different networked technologies and their infrastructures establish that a) digital networks when connected to their physical infrastructures are high carbon emitters; b) technologies that are forwarded as solutions for reducing emissions often come with extremely high emissions and are not sustainable in the long term; and c) digital networks and their associated infrastructures are owned and controlled by a few large tech platforms. This has direct implications for digital research methods, both qualitative and quantitative.

Quantitative methods in digital humanities use different computational programs to study everything from the texts of ancient manuscripts to trends on social media such as TikTok. They often involve a dependence on platform APIs (application programming interfaces) and third-party, proprietary data-collection tools which help researchers study specific digital objects and artefacts as well as archival data. Qualitative methods, such as digital ethnography, study communities or analyse digital content. These methods involve the use of media and storage technology that are primarily digital.

As the architecture of digital and networked individuals is dominated by large technology companies such as Google (now Alphabet), Facebook (now Meta), and Twitter (now X), access to these platforms and the

experiences they offer is also processed through their carbon-intensive infrastructures. As epistemic infrastructure for the creation, maintenance, and circulation of public discourse and knowledge, technology corporations can limit researchers' access to the field. This became particularly evident when Twitter (now X), which previously dominated studies on social-media platforms, modified its API, thus reducing the possibilities for accessing public data (Stokel-Walker, 2023). Similarly, Texas' statewide ban on TikTok (Gimbel, 2023) raised concerns for researchers using the app as their primary field of study. In fact, the state has been sued by a consortium of tech researchers for a breach of rights under the First Amendment (Maheshwari, 2023). In addition to concerns about politics of access, digital methods and research such as narrative media sites, surveys, and webinar-calls are also enmeshed with the carbon and environmental realities of the infrastructures and the connections these platforms afford for their users. As such, the ethics of digital research, knowledge, and scholarship rely and depend on the policies of these influential technology platforms and their energy choices.

8.3 Networks as Culture

The study of networks often assumes two primary modes. Networks are either studied infrastructurally, as discussed in the previous section, or semantically, as in digital humanities. These approaches look at digital networks as socio-technical objects and explore their manifest or obfuscated materialities. There is, however, another more colloquial understanding of 'network as a verb'. We consider this sense of the word, i.e. to network, as a practice integral to the epistemic culture of research.

Networking as a social activity is entwined with the methodological norms of 'being there' (Kaur et al., Chapter 5 in this volume) and 'on site' (Fernandes et al., Chapter 4 in this volume) that privilege ability, mobility, and access, which in turn determine success in the academy. To network research is to maintain a constant flow of publications, collaborations, and presentations in remote sites. The demands may be different for early-career researchers and graduate students who are building their networks and scholarly credentials vis-à-vis senior researchers who are well connected. For instance, graduate students and early-career researchers

network to build their CV for a highly competitive academic job market. Researchers who have navigated the job market need to keep building their credentials for a tenured position. For scholars with additional responsibilities, such as those of caregiving, the demands of networking add to the already high and unrealistic expectations of productivity. The situation is vastly complicated for international students and marginalised scholars, who may not have pre-established networks or equal access to funding. Structural inequities and border considerations of visas and permits can act as barriers to entry in the job market or the ability to travel to conferences. Precariousness of varying degrees prevails for researchers at every stage. This is expressed by the anxious need to remain connected and expand the network while not missing out and maintaining existing networks.

Networking as media and technical infrastructure takes the form of platforms and interactive technologies which afford constant connection across geographies and time zones. Connecting through these networks finds other researchers constantly curating their presence on multiple social-media platforms like Twitter (now X), Mastodon, and Instagram, in addition to appearing at Zoom conferences. Maintaining presence both within the conference and on social media by engaging with the conference organisers and specific hashtags presents the entangled and simultaneous existence of networking as epistemic culture and networks as epistemic infrastructure. As in the case of digital methods, connections mediated through platforms are also affected by them. For example, when Twitter transitioned to X, many established networks among scholars and institutions were disrupted as academics transitioned to other networks. Many have left the platform, some maintain ghost accounts, while others have stayed on while hunting for reliable alternatives.

Attending to the carbon intensity of digital networks in academic contexts should then consider the technical and social epistemic cultures, i.e. 'practices, arrangements, and mechanisms' (Cetina, 2007). What different activities rely on networked technology in academia? As social and environmental stakes of networks have shared outcomes, contesting either aspect allows for challenging the other. The paradox of developing low-carbon methods is common to networked infrastructure and the social act of 'networking research' through these infrastructures. While some

emissions associated with networking research might be addressed by personal choices of the researchers, others might be restricted by more formalised institutional and/or structural constraints of academic norms and tech platforms.

Therefore, considering and imagining lower-carbon forms of networking research should also be understood as an invitation to rethink and reimagine how we would like to 'network' research within academia. What forms and forums would we like to utilise and participate in for knowledge creation and exchange? How do they reflect deep and wide realities with contextually imbricated cultures—which might also imply dis/connecting (Stäheli, 2021a) and considerations of not only 'networking' differently, but tactics and strategies of dis/connectivity.

8.4 Dis/connection as a Method

Scholarship within the sub-field of disconnection studies tends to focus on dis/connection in the context of 'digital detox' practices, i.e. the individual's need to self-regulate their consumption of media and improve quality of life (Moe & Madsen, 2021). However, some approaches consider dis/connection as resistance—i.e. users taking an ideological stance against the economic and political implications of digital media technologies (Moe & Madsen, 2021). While these studies privilege the users' choices, others have made linkages between disconnection and the political economy of media platforms. For instance, focusing on Facebook, Karppi (2018) argues that the platform offers connectivity as an ideal, thus making disconnection from it a threat to its users. Moe and Madsen (2021) propose a typology consisting of five categories of digital disconnection beyond media studies: disconnection as health, concentration, existentiality, freedom, and sustainability. Dis/connection, envisaged as a low-carbon digital research method in this chapter, can be perceived as an approach inspired by concerns of sustainability.

The narrative of individual choice and responsibility often dominates the understanding of disconnection within the subdiscipline (Moe & Madsen, 2021). This is consistent with digital detox industries, a primary focus for many studies in disconnection (Harmon & Duffy, 2023). When situated in digital detox camps and luxury getaways from technology,

disconnection is framed as self-care, even leisure. We make a departure in our approach to dis/connection by defining it as a method that connects in alternative ways rather than severs connection (Terre, 2021) in processes of knowledge creation and dissemination. In this way, we approach dis/connection as work rather than leisure (Fast, 2021), framing social rather than individual choices.

The approach to disconnection as an empowering choice universalises and privileges the West (Treré, 2021). Disconnection is often marked by complex socio-economic inequalities, access, and politics of power. These are manifest in the various ways disconnection is experienced in the Global South (Lim, 2020; Treré, 2021; Treré et al., 2020). Disconnection is often not a choice in the majority world. It can be a deliberate imposition of disempowerment rather than empowerment, in the form of regional internet shutdowns (AccessNow, 2023), takedown notices, or bans on specific apps or platforms. Imposition can be a systematic strategy of repression by the state, a stringent expression of state control over its people (Tawil-Souri, 2012), and enforced at times for political violence and war (Treré et al., 2020). Moreover, theft, poor power grids, connectivity, lack of access, and other such infrastructural limitations can make disconnection just as common as connection in many regions of the world (Graham & Thrift, 2007).

Lim conceptualises dis/connection 'as the interplay between connection and disconnection that is formed through a constellation of things, each paving their own pathways but can cohere at certain events or moments before dispersing again' (2020, p. 623). We find this conceptualisation of 'dis/connection and dis/connection assemblage' particularly helpful for our own formulation of dis/connection as a low-carbon method. Dis/connection assemblages 'break down some of the binary thinking around the scale/spatiality (local vs. global, online vs. offline) and temporality (long term vs. short term) of resistance and making of the resistance movement' (Lim, 2020, p. 623). This approach addresses the contradictions of repression and resistance and visibility and invisibility; it is grounded in a recognition of territorial, temporal, and political barriers and inequalities that are characteristic not just of the digital society but also of academia. We imagine low-carbon digital research methods as an assemblage of dis/connective strategies that challenge institutional

controls around carbon use and generation of GHGs, finding alternative sustainable pathways to work with and within digital networks.

Keeping these complexities in mind, we move towards strategies of dis/connection as a method that practises what Karppi and colleagues define as 'undoing networks' (Karppi et al., 2021). This approach consciously avoids the voluntary switching-off routed in individual responsibility or going completely analogue (Stäheli, 2021b, pp. 14–15). Instead, it sees disconnection inhabiting a 'conceptual space between connectivity and nonconnectivity: the creation and experimenting with practices that are indifferent but not external to networks' (Stäheli, 2021b, p. 6). In a post-digital academy, technology is not an optional aside, but something that is embedded within most processes of knowledge creation and dissemination. The ability to switch off or switch on to non-digital modes may depend on the position of the researcher and reflect existing inequalities within the system. Moreover, even switching off a computer or managing a personal online carbon footprint may not be enough to mitigate large-scale industrial emissions of energy-intensive data centres that are always on. When configured as undoing networks, dis/connection as a low-carbon research method recognises these socio-technical entanglements with networked technology. It also pushes against tendencies to shift the burden of climate action from institutions to individuals, embracing more collectivist approaches to enquiry.

8.5 Strategies of Dis/connection

Based on these varied ideas, strategies of dis/connection as a low-carbon digital research method may be defined as methodological approaches that engage in alternative knowledge creation, dissemination, and networking—from within the network. These strategies can include a broad array of dis/connective assemblages (Lim, 2020) that disrupt the spatio-temporal rhythms and pressures of being always 'on' in academia. They presage an undoing of networking and networked research by exploring alternative practices that are distributed, decentralised, or hybrid and low carbon. Strategies of dis/connection, therefore, are not a fixed set of methods, but an evolving experimentation rooted in values of sustainability and equity.

Physical or electronic dis/connection strategies are enacted by individuals, social collectives, or systems. Devices and systems, as networked actors and agents, and as facilitators of consumption can enact useful low-carbon behaviours involving shared use, dis/connection, advanced sleep, and reconfiguration. Individuals might direct their personal devices to low power or dis/connect them to consume less, or alternatively, to reduce their connection and reliance on them. Collectively, we might reduce certain activities, for example, suspending email service after the workday, not only to reduce the stress of constant connection but also to reduce carbon expenditure. Companies in France and Germany have done this voluntarily and the 'right to disconnect' was recently legislated in Ontario, Canada (Government of Ontario, 2021).

Structurally, the physical infrastructure of the internet might also be enacted differently for public dis/connection. The Cuban approach, for example, favours 'internet service over universal access' with public hotspots and connectivity in places of work and educational facilities rather than individual residences (Uxo, 2010). The natural flow of energy might also provide for a sustainable alternative. Solar Protocol (Brain et al., 2022), for example, is a small research network of mirrored internet hosts powered by solar panels with limited energy storage. As the sun sets on one host, internet traffic is served from a different longitude by a host illuminated by the sunrise, in a cycle of dynamic dis/connection aligned to ambient energy. This approach is discussed in more detail elsewhere in Brian Sutherland's following chapter.

While dis/connection from the network to conserve electricity or in response to energy availability are measures to reduce the otherwise significant carbon impact of networks, in their functionality networks offer some mediating capabilities that offset higher carbon activities. Email does generate carbon, but less than delivering a physical letter; telecommuting is less carbon intensive than vehicular commuting; local fabrication may eventually produce less carbon than global manufacturing and distribution. It is important to also consider low-carbon methods involving speculative tinkering with the ways and means of digital networks—reconfiguring practices, disciplines, systems for the energy transition.

Digital-network approaches that favour *local self-determination and universal access* often align with energy-justice concerns and are

a significant area of interest and enquiry. The One Laptop Per Child project may not have been a huge success in crossing the digital divide but it did support the development of network architectures which have evolved to provide urban community-run digital services at substantial scale, systems with names like Freifunk and NYCMesh (Ames, 2019). Where previously research communities were engaged in open software development and computer-aided design, increasingly they are doing local fabrication and custom manufacturing, often foregrounding low-carbon concerns involving recyclable materials, interoperable standards, and improved upgrade and repair. These concerns are of interest to researchers investigating local infrastructure, material extraction, and the circular economy, concerned with alternative, low-carbon research work.

Climate change is all around us and physical infrastructure affects and is affected by it. Hammersmith Bridge, London, built in 1887, for example, was recently wrapped in tin foil to prevent cracks in the cast-iron chains due to an extreme heat wave in London (BBC, 2022). Digital transit infrastructures are comparatively *much* easier to change, having fewer chains, and in this effort we can also make them more equitable, more inclusive, more sustainable. Two digital-network affordances that were widely adopted in response to the exigent circumstances of the pandemic are of interest. One was in local manufacturing: significant quantities of disposable medical equipment were produced locally during COVID-19 by means of 3D printing within hospitals and their communities: face shields, respirator parts, and swabs (Oladapo et al., 2021). The second was in distributed digital systems—a hyperscale research computer for the first time achieved *exaflop* performance and in the process rendered specific medically relevant research findings. This latter achievement occurred with *no addition of physical infrastructure* (consumption, writ large), by means of millions of networked individual users donating their home-computer time to researchers (Zimmerman et al., 2021). Besides triumphs of technical creativity and digital networks, these two scenarios illustrate the willingness of designers and citizens in unaffected areas to buffer the emergency needs of local populations in crisis using digital networks, open standards, and without regard for personal gain. These kinds of communities of care will be increasingly important as large regions experience

climate stress with more frequency, and new, alternative, forms of connection are required.

The corollary to rapid digital evolution is slow scholarship. Taking time to think, write, engage, teach, and network can be a strategy of dis/connection, especially for researchers who are in a position to create slow-scholarship work environments for their less privileged colleagues and mentees. It can be an extension of calls for 'slow scholarship' in academia by Mountz et al. (2015) that adopt the ethos of slowness as resistance to the capitalist demands of productivity. The authors define slow scholarship as strategies of resistance centred in feminist politics of collective, collaborative, and communal action; 'slow scholarship is about making the university a place where many people—professors and students, from multiple places of privilege or marginalisation—can collectively and collaboratively thrive' (Mountz et al., 2015, p. 1240). Building such equitable and sustainable research communities with high engagement and low-energy investments, as one of the fundamental calls for imagining low-carbon methods, opens up many possibilities and pathways.

To incorporate concerns for environmental impacts alongside those of equity and care requires multiple shifts in existing structures. The DIY Methods conference, organised by members of the Low-Carbon Research Methods Group at Trent University, in Canada, attempts to combine the shared goals of social and environmental justice through its experimental format. It is an 'annual, juried conference-by-mail. It takes the form of a zine exchange between researchers discussing experimental methods (predominantly but not exclusively in the humanities and social sciences)' (Rayner et al., 2024). Zines are small-circulation publications that are self-designed and self-published (University of Texas Library, 2023). Their design and format embody the DIY ethic, with styles that include but are not limited to mixed-media collages, hand-drawn sketches, and unconventional text orientations. The DIY Methods conference invites participants to submit zines that represent their experiments with methodologies in their respective areas of research. Selected submissions are printed by the organisers who then mail a pack of zines to all the participants. The resultant format is at once an asynchronous, remote-participation-based conference and an academic publishing ring. The final conference proceedings are digitised and uploaded on

H-commons with dedicated DOI reference links (DIY Methods, 2023; Rayner et al., 2024).

With this experimental format, the organisers attempt to make an intervention in a crisis of 'publishing and conferencing in academia' defined by concerns of inequity and environmental impacts (Rayner et al., 2024). The DIY Methods conference pushes the norms of epistemic cultures of knowledge mobilisation. It tackles academia's dependence on energy-intensive travel as well as the default alternative of energy-intensive digital technologies by being a travel-free and mostly screen-free conference. In this way, dis/connection as a method for networking research is enacted through multiple, alternative modes: mails, emails, and printed zines. Such experiments with dis/connected methodologies allow for an imagining of research engagement and sustainability that is not focused on giving up or switching off. Alternative texts and maga'zine' scholarship can, however, struggle with engaging diverse audiences and a wider legitimacy in the academy. The work of shifting the norms of academic discourse is to move from resistance to legitimacy. This is a challenge integral to making a shift towards low-carbon research methods.

8.6 Conclusion

Experimenting with low-carbon methods is recognising academia's energy-intense reality. It is a timely intervention to address the ongoing climate crisis. Technology, especially digital or networked technology, has been at the forefront of discussions on alternatives to existing high-carbon methods. The COVID-19 pandemic highlighted the ability to conduct research remotely through digital means, thus replacing the need for extensive air travel or research practices that involve high energy consumption. While digital methods are less carbon intensive than flying, their energy intensity is obfuscated by the remoteness of their grounded, physical infrastructure. This poses a challenge for their consideration as ideal low-carbon methods.

It is clear that a low-carbon trajectory in scholarship is not entirely a matter of a scholar's individual choice. The norms of research methods are often entwined with legitimacy and scholarly progression within academia. Some of these norms involve high-carbon methods that need to be

challenged and replaced, such as those that necessitate extensive air travel or fieldwork practices which are regarded and rewarded within academia. Digital communications, the networked alternative technology that currently dominates epistemic infrastructure and cultures, are managed by private tech corporations with questionable energy choices which have further implications for ethical research.

Acknowledging these challenges reiterates the need to adopt a speculative and experimental approach to finding low-carbon methods, and a tolerance and broad support for investigating alternative research methods. In this chapter we suggest new forms of dis/connection as a means to challenge the energy-intense networked connections of epistemic culture. The method of dis/connection does not necessarily mean switching off, but instead implies switching to local, sustainable, unplatformed, and open technology. Dis/connected digital networks can define new epistemic cultures that are grounded in communities of care, collaboration, and acceptance. As communities share their research in new ways, communities can change trajectories, grounded in sustainable connections with the resilience to navigate the increasing stresses of the climate crisis.

Acknowledgements

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9

Making Hay While the Sun Shines: Strategies for Low-Carbon Generative Computing

Brian Sutherland

9.1 Introduction

Computers do useful information tasks quickly. Research problems, however, often take significant time. Back in 1987, a computer model of an electromagnetic field produced by power lines took three days to render on a six-year-old Unitron, a type of Apple II+ 'clone' situated in my university dorm. At the time I was surprised that I could program any problem that could take a computer more than a few minutes to solve, let alone days, or indeed one that generated so much heat. However, there are a large number of research problems of critical importance that take an inordinate amount of computing power and time. These are known often as 'generative'. In 2009, if you ran a fast computer for an *entire day* for example, it could simulate just *20 nanoseconds* of protein folding (Beberg et al., 2009). This is not nearly enough time to discover what happens in the human body, where protein interactions play a role in Alzheimer's and Parkinson's, diseases scientists believe develop over decades. Enter computer clusters: large, usually shared, banks of computers designed to make progress on research problems with in silico modelling. This chapter asks: how could they be more 'low carbon', and consequently more ethical research tools, reflective of the common good? The question is situated within cultural practices involving research and low-carbon with the goal of building a greener, more inclusive academy, explored in Pasek (2020).

9.2 Top and Green Computing Power

Like internet data centres, research clusters, constellations and massively parallel processor systems (MPP) of the kind which do generative computing have a significant material footprint as physical infrastructure, comprised of thousands, even millions of CPUs. The 'Top 500' list, at the time of writing (2023) in its 61st edition, ranks these installations by the number of floating-point operations per second they support, a performance benchmark for computing systems, somewhat but not precisely correlated to the number of CPU cores. After the Government of Canada's 'Shared Services' cluster installations, the 'Top 500' list identifies Calcul Quebec's *Narval* as the most powerful compute cluster in Canada, with 76,320 parallel cores and a peak calculation speed of 12,165 teraflops per second. *Narval* ranks as 108th in this public list of the world's 'most powerful' systems (Top 500, June 2023b). At the very top of the world's 'most powerful' is Oak Ridges National Laboratory, a cluster named *Frontier* with 8.7 million parallel cores. Second is the ARM (open hardware) cluster *Supercomputer Fugaku*, with 7.6 million parallel cores, in Japan. Both have about a hundred times more cores than *Narval* and these top systems consume 20–30 MW of electricity while in operation, enough power for about 30,000 homes. While the *social* cost of computing is starting to be considered in more detail, it is clear that 'the IT artifact itself tends to disappear from view, be taken for granted, or is presumed to be unproblematic once it is built and installed' (Orlikowski & Iacono, 2001).

The '*Green* 500' list, distinct from the 'Top 500' ranks computer clusters by performance *efficiency*, in computing power per unit of energy consumption, or gigaflops per Watt of electricity. After *Narval*, Canada's *most energy efficient* research cluster is *Cedar* at SFU. *Cedar*'s 67,584 parallel cores return 10.874 gigaflops per Watt, ranking it 62nd in efficiency, and 195th among the 'most powerful'. Toward the top of both scales is *HiPerGator AI* at the University of Florida, with 138,880 cores, 120,960 associate cores, returning 29.521 gigaflops per Watt: it ranks number 20 for energy efficiency, and number 40 in the 'Top 500' list at 21,314 teraflops per second (Top 500 June 2023a). It is useful to note *some* drifting and sparking in the lists reporting these comparative figures: the Research Computing website of the University of Florida suggests *HiPerGator AI* has only 66,000 cores (University of Florida, 2021), about 50% of the 'Green

500' report, while Compute Canada, the technical group that operates *Cedar* asserts that that has 94,538 cores (Compute Canada, 2021), about 50% more than the 'Green 500' report. Regardless of the variation, it is clear that generative computing methods require significant computing resources, and that optimising return on computing power for the expenditure of community material and energy extraction is a matter of growing social and environmental concern, particularly as climate-change effects become more acute and generative-AI-supported research applications become more sought after.

9.3 Low-Carbon Energy

Power efficiency is a significant dimension in relation to assessing these large cluster-computers that do academic research. Environmental economics tells us that the energy savings which result from increasing the efficiency of a system tend to result in more consumption rather than savings—i.e. more processors will get added to the supercomputer and more rather than less energy get used, a phenomenon known as Jevon's Paradox (Jevons, 1865) or the 'rebound effect'. The electricity provided to *Narval* in Quebec and *Cedar* in British Columbia is generated almost completely (>90%) by low-carbon hydroelectric power (BC Hydro, n.d.; Canada Energy Regulator 2021). The electricity for the University of Florida's *HiPerGator AI* is generated almost completely (>80%) by discharging carbon into the atmosphere, specifically by burning natural gas and coal (United States Energy Information Administration, 2021). Aspirationally, the University of Florida has installed some solar generation, but it's not nearly enough to offset the consumption from this facility, 582 kW (Top 500, June 2023). So the question of low-carbon generative-computing research methods is situated at least partially in a discussion around low-carbon power generation. Some strategies involve live carbon accounting, such as Google's correlation of energy generation to computational use in context, tCO_2e (tonnes of carbon dioxide equivalent) per megawatt-hour for its data centres, assessed hourly (Google, 2021). Other strategies involve co-location of low-carbon sources: Microsoft, for example, has been exploring the incorporation of small modular (nuclear) reactors or SMRs into data centres (Shilov, 2023).

9.4 Energy–Autarkic Computing

Further to the idea of co-location, as large computing cluster systems consume large amounts of electricity, the carbon produced at a distance in generation might become a significant factor in their consideration or assessment as ethical research tools. Bringing generation into proximity with the computing has some potential to increase the correlation between the environmental cost of generation and computing. Energy autarky is the idea that a local or community system runs energy independent (Müller et al., 2011). Autarky as a concept can describe self-powered information systems of various scales (Sutherland, 2021). The simplest energy-autarkic system, for example, is a solar-powered calculator: while the light makes electricity, the calculator can solve research problems. Generative-computing research problems, however, consume hundreds of kilowatts, even megawatts of power on computer clusters: it would take on the order of 100,000 dedicated solar panels on many hectares of land, or a couple of large wind turbines to produce the electrical power to render one research compute cluster system energy autarkic. The intermittent cycle of generation in these methods would also tend to produce an ebb and flow of computing power, without a significant additional investment of energy caching, such as hydro reservoir, also known as 'pumped hydro'. Along this line, we might imagine an international network of computer clusters, situated in different longitudes, each powered by sustainable, low-carbon energy, connected by high-speed networks, where computing problem-solving shifts to systems which are actively producing sustainable electricity. The project solarprotocol.net, for example, dynamically shifts web hosting services to small computer hosts actively producing sustainable electricity at different longitudes (Brain et al., 2022). That being said, some varieties of research computation may be more sensitive to heterogeneous hardware and availability than others.

During the international geophysical year in 1957, just after carbon-dioxide-induced climate change was being presented by Canadian physicist Gilbert Plass (1956) and other scientific authorities, several world data centres were set up: one in the US, one in the Soviet Union, and others in Western Europe, Australia, and Japan, to keep track of observations of shared interest about the earth. This organisation continues as the World Data System. We might imagine a set of computer clusters which

do research-oriented, generative computing, coordinated as shared pro-duction sites, like shared archives, each powered by renewable, ambient low-carbon energy sources at different longitudes. Generative-computing research might proceed ethically, collaboratively, and in a low-carbon way with some potential to address inequalities in the global science research system, disparities between developed and developing countries in the Global North and South. For example, in a machine-learning-aided review of 100,000 climate-change studies, Callaghan et al. (2021) identified 30,000 which looked at climate-change impacts in North America, while only 10,000 looked at Africa, which has double the population.

9.5 Community Information Batteries

Flexible computing is an emerging paradigm that involves 'geographically-distributed, large-scale, zero-carbon compute infrastructure using renew-able energy and older hardware' (Switzer, 2021; Switzer et al., 2021). Flexible computing is considered a potential demand-side answer to the intermittent power characteristics of wind, solar, and other sustainable energy-harvesting systems and their potential to damage the grid during peak generation (Bakke, 2017). Unlike regular energy application-loads, computing jobs in this regime can be scheduled intelligently as a demand-response to weather conditions, to coincide with generation peaks for a peak-shaving load. 'Opportunity' power is processed into information storage, or 'information batteries' (Switzer & Raghavan, 2021) rather than being wasted. As these authors point out, generated energy above demand is surplus and carbon-free, so high efficiency in a computing platform is not a significant consideration: less efficient computers, such as from old data centres, might be utilised for research computation work to ensure the embodied energy in their investment provides an additional return, before the hardware is retired and recycled. So, in addition to enhanced carbon accounting around the circumstances of electricity and computa-tion generation, we might consider the carbon savings of using physical computers for a longer period.

Indeed, making better social use of the embodied energy of already-manufactured computers has been shown to be an effective low-carbon strategy. According to a study of public institutions, over 80% of computers

destined for recycling were in working order (Franquesa et al., 2015). In Spain the ereuse.org organisation redistributes these to social organisations as required resulting in them being used longer. Harwood and Yokokoji (2010), in their 2010 British exhibition 'Coal Fired Computers', suggested that 81% of the energy utilised in the entire lifecycle of each of 300 million computers produced annually occurs in their manufacture and in countries where electricity is predominantly generated by burning coal. So, an effective low-carbon strategy is to maintain *older* computing devices in service—to benefit from past social investment of energy in their manufacture and to avoid disposing of them prematurely.

Better use of *contemporary* computing devices is also an effective low-carbon strategy. Stanford's citizen-science Folding@home project involves users volunteering their home computers and gaming platforms to run research calculations when they are not using them. These constellations of shared contemporary machines allow researchers to bring *petaflops* (thousands of teraflops, millions of gigaflops) worth of computing power to bear on generative-computing problems (Beberg et al, 2009)—similar to dedicated facilities, but with a whole army of volunteer maintainers, and no additional manufacturing of physical devices. Folding@home was actually the first research computer cluster ever to break the exascale barrier on COVID-19 research (Zimmerman et al., 2021), illustrating what a strong approach shared computing may be toward constituting research infrastructure. It points, perhaps, to a more routine incorporation of time-sharing strategies in private computational hardware as a systematic degrowth strategy. If shared use seems unnatural in this age of personal devices, consider that private computation is only a recent phenomenon: time-sharing and collaboration have a significant history from the earliest days of computing, when there were few mainframes and demand for calculating power was high (Bemer, 1957). At this time centralised computing ('public tele-data processing') was conceived as a general-purpose information utility with significant government involvement, like the other shared networks—electricity and telephone (Parkhill, 1966).

9.6 Computing as Public Infrastructure

In considering these low-carbon strategies, particularly the extension of the working life of *old* devices and the greater use of *contemporary* devices,

it is important to also consider devices *not yet built, and not yet regulated* where we might proactively set expectations, enact technical standards, and pass legislation. Individual self-driving cars, for example, have the computing equivalent of 200 laptops of computing power (Johnson, 2021) while they spend the majority of their lives parked. With appropriate legislation, privately owned high-consumption computing devices like these might only be licensed for use on public roadways of a region if their computers were made available for public research—as a tax on consumption. While the argument is sometimes made that sharing private computing devices presents a security challenge, manufacturers are already planning to turn these devices into networked engines of private consumption for mining cryptocurrency: for example, the 2023 Daymak Spiritus electric vehicle (Globe Newswire, 2021). Areas of new technology are frequently subjects of regulatory capture—in this case the government might do more to establish norms for the public use of high-consumption lifestyle computing devices to reduce carbon. It is certainly socially desirable to reduce the manufacture of computers and use the natural wealth of the world to try to improve the lives of everyone; it should not be socially acceptable to utilise computers and vast quantities of community-subsidised energy to generate private information tokens and avoid paying tax. We therefore need legislation around the manufacturing standards of new computing devices—that they are engineered to be used for shared computing when they are not in use by owners. While shared computing applications might favour research applications, the subject of this chapter, any computing application that reduces the number of computers being manufactured would be an effective low-carbon strategy.

One of the implications of computing devices operated in a flexible way is that they would require enhanced operating systems and software methods to ensure the ebb and flow of power does not disrupt critical calculations from either their owners or their shared users. In this connection, the emerging field of *intermittent computing* has a lot to contribute to stabilising computation processes which rely on energy harvesting (Majid et al., 2020). As a core assumption is frequent power failures, intermittent computing systems have specialised hardware and software affordances, enabling devices to recover state quickly so operation can continue immediately with the flow of electricity. This capability was recently demonstrated by a prototype non-networked energy-autarkic device: the

Battery-Free Game Boy.[1] After a power outage, 'the Tetris block will be in the same place' (de Winkel et al., 2020) because of the special non-volatile low-energy FRAM memory it uses, and a software checkpointing strategy.

In internet-of-things sensor applications, computing devices are frequently subject to intermittent operation via their 'exotic power sources'. These devices are often deliberately designed to be non-networked for long periods of time and run in parallel. Some of the power sources which we might now deem exotic, even poetic, include: harvesting the energy of falling raindrops (Chua et al., 2016), the movement of branches (McGarry & Knight, 2012), or the metabolic reactions of microbial fuel cells (Dewan et al., 2014). One prototype system is even powered by the metabolic functions of trees (Himes et al., 2010). While somewhat farfetched at the present time, we might further look to reimagining the basis for computation in silicon, where, alternatively, biological organisms are grown which are designed to do research calculation (Adamatzky, 2023).

The basic idea of ethical, low-carbon computing in a distant future is that research might be constituted and supported by a great many time-shared smart devices of small computing capability, networked in very large quantities, situated in their energy relationships within low-carbon frames, and minimally disruptive of the natural environment. The regular jobs of these computers could, for example, involve supporting the public in smart cities during peak periods, after which they work supporting researchers with *their* computing challenges.

9.7 Generative Artificial Intelligence

Generative computing has recently drawn significantly more interest with the advent of artificial intelligence and the automation of physical research laboratories. Whereas previously large computer clusters were used for *theoretical* molecular modelling (e.g. Aspuru-Guzik et al., 2004), these systems are now attracting significant social investment to hypothesise solutions and automate *both theoretical and physical* creation and testing, for example the $200 million 'self-driving' generative artificial-intelligence material science/chemistry lab at the University of

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[1]See https://freethegameboy.info.

Toronto (Mannie, 2023). Self-driving research lab systems have a significant potential to accelerate the discovery of useful materials—by even a factor of one hundred (Aspuru-Guzik, 2023)! Imagine if we could find a new molecular basis for photosynthesis, for example, which allowed for a simpler way to manufacture solar panels, or accelerated drug discovery. Similarly, large language models, or the application of generative artificial intelligence to natural language processing, has resulted in a significant, even urgent, demand for generative computing in the social sciences.

In as much as generative-computing tools have a significant ability to accelerate research discoveries, measuring carbon emissions and consumption of energy and equipment, GHG accounting methodologies have emerged as key considerations in the evaluation of research products from generative computing as ethical scholarship. Yet these ethics questions are often complex. Researchers have calculated that the ChatGPT 3 foundation model represents 1,287 MWh of energy-computation, or about enough electricity to power a thousand homes for a month (Patterson et al., 2021). However, once foundation models are developed, they can be remarkably efficient, requiring relatively little calculation and electricity to provide useful information. For this reason, in addition to transparency about consumption there is a strong ethical reason, as with the publishing of scientific discoveries, to share foundation AI models openly with the world community, to take advantage of our collective social investment in the common good, even while we examine and critique them for egregious errors, changing contexts, and systemic biases. Ongoing critique and re-evaluation will be necessary to get these systems right.

9.8 Conclusion

Tethering large generative-computing systems more closely to low-carbon methods of sustainable electricity, along with enhanced GHG accounting methods, can make future research involving generative computing use more ethical. Aside from use, the significant social investment in the creation of physical computing devices and networks might become more low-carbon by improved software and hardware design around public use

of privately held computers, heterogenous citizen-science systems, shared computation, and flexible computing architectures and hardware systems which respond well to the ebb and flow of green power generation and human demand—to take advantage of natural energy. Given that global warming induced by the burning of fossil fuels has been known to research communities since before 1958, when, for example, it was discussed in the Bell Labs documentary film *The Unchained Goddess* (Scudchasers, 2015), it behoves computational modellers to pursue better methods that reduce the carbon generation of these research tools, for a more sustainable future, the 'making hay while the sun shines' of the article's title. Only then will we *really* benefit the people we are creating research discoveries *for* with computational modelling.

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10

Sustainable Publishing

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We begin this chapter with the land. In writing this, we acknowledge that we are speaking as visitors and settler scholars on the traditional territories of many Indigenous Nations. This includes Treaty 6 Territory and the homeland of the Métis and the lands of the Mi'kmaq and Beothuk of Ktaqmkuk (to use the Mi'kmaq name for the island of Newfoundland). In the area known as Tkaronto, we acknowledge the current treaty holders, the Mississaugas of the Credit First Nation, and the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat as its caretakers.

Acknowledgement, itself, is not enough. Following Theresa Stewart-Ambo and K. Wayne Yang (2021) and Chelsea Vowel (2016), we use the acknowledgement as a starting place from which we might imagine the *beyond* as a political strategy of accountability and as a site of decolonial intervention into our own practices (Stewart-Ambo & Yang, 2021, p. 23; Vowel, 2016). As academic writers, publishers, and editors, stepping *beyond* includes reflecting on our own positionality and the intersecting power relations underpinning scholarly publishing.

The ethics of doing and sharing research within extractive capitalism and settler colonialism are central to the ideas about sustainability that we unpack in this chapter. While we ground our exploration of sustainable publishing practices in the context of climate change, the systems responsible for this crisis cannot be so easily separated from its effects. They are interwoven with Anglo-American academic norms and working conditions as much as other sectors of society and the economy. We hope this chapter follows the spirit of this land acknowledgement, pushing us

[1]Authors are listed in alphabetical order in recognition of our shared labour writing this piece.

to imagine more just and replenishing ways of relating to one another, to environments, and to the project of decolonisation.

* * *

Faced with the reality of the climate crisis, the concept of sustainability is again being debated as governments, institutions, and societies seek to reduce carbon emissions and adapt to increasingly extreme environmental conditions. Sustainability, however, has many differing meanings to those who utter it, depending on one's disciplinary training, ideology, political goals, and practical experiences. Within the realm of academic publishing, taking a sustainable approach may include everything from developing reasonable and equitable working conditions so as not to exhaust the editorial team, to considering the carbon footprint of an online journal's web hosting or the sourcing of recycled paper for printed issues, to maintaining healthy revenue streams that can keep a publication's finances out of the red. Sustainability (and its sibling, green transition) has even become a catchphrase in the energy sector and corporate world as 'going green' goes mainstream.

For our purposes, we understand sustainability as a framework for staging practical and conceptual interventions into dominant practices of scholarly publishing. Sustainable publishing, we propose, is a necessary and intrinsic part of a low-carbon approach to research. Part thought experiment, part methodological intervention, this chapter shifts focus away from the practice of 'doing research' to the editing, publishing, and circulation of research findings.

We write from our experience as editors of three digital, open-access journals, housed (to varying extents) at Canadian universities, supported by Canadian funding agencies, with global readerships. Anecdotes and lessons learned from our work with *Imaginations: Journal of Cross-Cultural Image Studies*, *Engaged Scholar Journal*, and *The Goose: A Journal of Arts, Environment, and Culture in Canada* pepper this chapter, offering practical insights as well as a means of grounding this work in a specific time and place. Like the other contributors to this edited collection, this chapter also responds to and builds upon preceding efforts to develop less extractive, less carbon-intensive forms of scholarly research (Conti, 2021; Jekanowski et al., 2022; Pasek, 2020; Starosielski & Walker, 2016).

In what follows, we introduce key approaches to sustainable publishing and outline how structural changes within academic publishing can help decarbonise scholarship and challenge entrenched inequities in the academy. We situate these interventions within the context of mainstream scientific and humanities publishing, dominated by corporate publishers and aggregators, and consider some of the ways that institutions (universities, publishers) continue to entrench resource-intensive norms. In the second half of the chapter, we turn to *social sustainability* as a specific model for undertaking more equitable, more replenishing forms of publishing. Here, we dive into specific components of the publishing workflow, including funding, peer review, copy editing, and mentoring practices, as well as how authors and readers might become co-creators of knowledge. We conclude with a collection of specific calls to action for fellow writers and editors seeking to reimagine publishing norms and practices alongside us.

10.1 Defining Sustainability Within Scholarly Publishing

Affordance, durability, and persistence tend to characterise sustainability as a working concept. When defined in respect to systems theory, sustainability is the carrying capacity of a system and its internal dynamics including how it bounces back from disruption (Gallopín, 2003). From a network theory perspective, sustainability can be defined as an emergent property of a network that makes it last and is transmitted in a metabolic way such as through passing information or resources from one connected entity to another when needed (Crojethovich Martín & Rescia Perazzo, 2006). In ecological contexts, sustainability is a process of socio-political construction with stronger sustainability reflected in our prioritisation of the conservation of a subject's attributes in the most pristine state possible, and weaker sustainability centring on our economic systems that use nature as a stock to generate human activity, products, and wastes (Shi et al., 2019). Overall, sustainability is generally accepted to imply that a system or subject can be maintained without a long-lasting, depleting impact on the biosphere or society–nature relationships (Ruggerio, 2021). As a concept, sustainability is broadly applied to everything from industrial activities, such as resource extraction and agriculture, to objects (bamboo

picnicware or upcycled furniture), to individual decision-making and labour practices. Within low-carbon research practices, sustainability can be emphasised at varying points in the pre-planning, production, and mobilisation of knowledge. Our aim, here, is to argue for more expansive and intersectional understandings of sustainability within practices of curating and distributing research for fellow academics, policymakers, and the public.

Conceptualising sustainability within academic publishing cannot be separated from the context of the ongoing climate crisis: the rising temperatures leading to increased frequency and power of natural disasters, weather extremes, food and water insecurity, economic disruption, conflict, and unspeakable physical and psychological distress. Given contemporary publishing's predominant digital form, it may be tempting to see academic publishing as being removed from ecological systems; in this context, sustainability may be understood in primarily economic terms (Solow, 1993; White, 2013). However, a deeper examination of the supply chain for academic publishing uncovers the material imprints of knowledge sharing: aspects such as electronic servers that store and curate digital information; wood pulp for paper products like books, theses, courseware, and conference proceedings; agricultural products for ink; minerals for microchips; water for the production of these manufactured products; and fossil fuels for powering everything from personal computers to data servers. All of these have costs for the biosphere, as well as societies and cultures (Meschede & Henkel, 2019; Monserrate, 2022). Furthermore, the human labour needed to produce these publishing inputs, and the ecological harms of their production, are inequitably distributed across communities and geographies (Caraway, 2018; Cubitt, 2016). These impacts, alongside those of submarine cable networks, data centres, power stations, and mineral mines, must be accounted for within a definition of sustainability.

So what *would* sustainable academic publishing look like? This guiding question leads to several others and indeed, we hope, to your own thoughts on the subject, readers. Would it mean that the big publishing houses simply source their energy from non-fossil-fuel sources such as wind, solar, and geothermal, thereby eliminating (some forms of) resource extraction? Might it mean that websites and online repositories for storing

information visually depict the stocks and wastes they produce across their entire supply chain and demonstrate progress towards circularity (e.g. an economic system where the economic growth is decoupled from the resources used, through the reduction and recirculation of natural resources, as per Corona et al., 2019)? Perhaps these electronic platforms would only operate intermittently, when they could produce their own renewable energy sources (through, for instance, the power of the sun)? Would it mean that workers in the academic publishing world have access to what is termed the *Buen Vivir*: that is, a 'space' where nature and society are inseparable and respect for Mother Nature leads to enhanced wellbeing and intergenerational equity (Chassagne, 2019)? Would workers be paid a living wage that considers individual needs such as child and elder care, educational opportunities, and health benefits; provided job security and lasting shelter, food, and transportation, which are locally available and equitably produced?

Currently, academic publishing in North America is a system that relies on the human labour of authors, reviewers, editors, publishers, copy editors, typesetters, proofreaders, database managers, librarians, and consumers. The system thus adheres to exploitative *unsustainability* (Bonnedahl, 2021) through its unlimited use of stocks of human intelligence, electronic space, and the devices and power needed to maintain digital realms, while expecting the very labourers involved in producing that stock to pay for its hosting services, and curatorial and editorial work, or, at best, offer that work voluntarily.

While we follow Janneke Adema and Gary Hall in acknowledging that not everything can be radically reinvented or reconfigured at the same time (Adema & Hall, 2016), in what follows, we try to outline a definition and vision of what sustainable scholarly publishing and communication could look like from our own perspectives and contexts, which might or might not provide tactics and strategies for sustainable academic publishing on a wider scale.

10.2 Corporate Publishing and the 'Big Five'

Academic publishing is often considered a 'universal good': beneficial for students and early-career scholars developing their research programmes

and seeking secure employment, as well as for later-career scholars (Mewburn, 2012). However, this belief belies the operational realities and ethics of contemporary corporate publishing. Well-worn phrases like 'publish or perish' refute the idea that publishing's merit can be decoupled from capitalist pressures or evaluation metrics in an increasingly corporatised university system. The reality of scholarly publishing in the Global North is that it is incredibly resource intensive, relying heavily on academia's 'gift economy' of volunteer time and 'hope labour' (Kuehn & Corrigan, 2013). Both universities and publishers benefit from these practices and contribute in various ways to entrenching them. Alternative efforts to sustain the curation and dissemination of diverse, multilingual, and specialised forms of knowledge have to contend with such hegemonic forces of publishing regimes—defined by for-profit companies and the relentless promotion of neoliberal market logics of competition, impact metrics, and artificial scarcity models.

Academic publishing has become one of the most profitable business sectors in the global digital knowledge economy. Following capitalist logic, it has become heavily oligopolised (Larivière et al., 2015; Reisenleitner, 2020), with a rapidly accelerating shift from scholarly associations and university presses towards commercial publishers, who now dominate a highly concentrated global market that relies on the English language and privileges knowledge areas that guarantee a wide readership. This system is buttressed and fuelled by the ever-increasing role of metrics such as impact factors, which are conveniently generated by assessment instruments provided by the same companies (Aspesi et al., 2019). Publishing expertise and professional tools, as well as paywalled websites and databases as distribution channels, have limited access to scholarship to the most (economically, socially, and linguistically) privileged users who are, for the most part, in the Global North. Benefitting from the move to digital distribution, the business models of the 'Big Five' in social sciences/humanities publishing—Elsevier, Taylor & Francis, Wiley-Blackwell, Springer, and Sage—reap large profit margins by privatising public funding paid to university researchers to conduct research and write up their results (Mewburn, 2012). This is coupled with the use of unpaid peer reviewers, the global outsourcing of editorial work such as translation, copy editing, and typesetting, and the tight integration of

quality assurance and research assessment regimes (e.g. Scopus, Web of Science, etc.). Taking advantage of traditional academic reward regimes that make (increasingly less) public knowledge production a condition for employment and career progress, the profit margins in academic publishing were nearly 40% in 2015 (Larivière et al., 2015). As Larivière explained to the CBC: 'The quality control is free, the raw material is free, and then you charge very, very high amounts—of course you come up with very high profit margins' (CBC, 2015). In Canada, this largesse is ultimately subsidised by taxpayers and students, as the majority of universities' budgets come from public funding and international student tuition.

This situation has had discernible consequences for the working conditions of academics and for the potentialities of curating and circulating diverse forms of knowledge across languages and cultures. Coupled with a concentration of providers of publishing services, metrics regimes of quality assurance have normalised extractive publication and assessment practices in a system in which market indicators have come to serve as the ultimate arbiter. These dynamics jeopardise the sustainability of plurality and diversity in academic publication: topics that might only be relevant for a limited audience in academia—not to mention academic engagements in and with languages other than English—cannot compete in terms of readership numbers, impact factors, and market reach. Often, translation into English becomes a means to tick a linguistic or geographical diversity box, rather than a means of creating greater access to diverse knowledges. Almost twenty years ago, Australian feminist cultural studies scholar Meaghan Morris engaged the 'tyranny of the refereed article' by emphasising the epistemological, theoretical, and political importance of 'parochialism' (Morris, 2005) in the context of Hong Kong, Australia, and Ireland in order to counteract the institutionalised normalisation of academic output and ensure that diverse knowledge practices for specific contexts and communities remain sustainable. The normalisation pressures have certainly increased with the oligopolisation of academic publishing as a profit-driven industry since then, making it even more difficult (and less sustainable for individual careers or research groups) to commit to diversity and plurality in academic knowledge production and curation.

Commercial publishers cite labour, technology, and expertise requirements in the production process to justify their operations and business

models. At the same time, their corporate structures serve as justification for high profit margins because of their fiduciary responsibility to increase shareholder value. From a capitalist, market-ideological perspective, commercial publishing is certainly a 'sustainable' model. Minimising labour costs, while not socially just or equitable, is inherent to this model. Reviewing, copy editing, design, translation (understood as engagement with multilinguality), and proofreading are labour-intensive processes that are crucial for the quality assurance setting scholarly communication apart from other forms of publishing, but commercial publishers can minimise those labour costs through outsourcing, casualising, and arbitraging wage differences in a global market while relying on, and profiting from, a legacy of pre-competitive, prestige—and gift-motivated labour that predates the knowledge economy and commercial academic publishing by two centuries (Fyfe, 2020).

Sustainable scholar-led models need to come up with alternative workflows and funding models in a landscape where academics themselves are increasingly casualised and/or overworked. While resistance to global academic publishing being run as a commercial enterprise is often based on ethical concerns about oligopoly capitalism, many of those who seek alternatives also struggle to develop more equitable practices for stewarding diverse knowledges. Responsible and reparative stewardship of a multiplicity of knowledges in plural languages requires balancing mentorship, care, lived and scholarly expertise, cooperation, fair wages, and social diversity. This model facilitates the curation, communication, and care for specific communities, languages, and academic traditions rather than a homogenising global market defined by readership metrics and a tyranny of ill-defined meritocracy.

So, let us return to our thought experiment. The *who* of sustainable publishing has already been identified: on the one hand, there are for-profit aggregators and publishers; on the other hand, there are the publications, editorial teams, and readers (and the networks and infrastructure supporting them) who seek to make knowledge accessible and low-impact. If this description seems polarised, that's because, from a number of vantage points, it is. The model aggregators have long benefited from relying on poorly or unremunerated labour of academics as authors, editors, readers, and reviewers. Early-career and precariously employed scholars work

for cultural capital, recognition, and greater research impact to be seen as hireable. Yet, as academics all know, the race does not end with stable employment. There are other positions to apply for, tenure files to cultivate, wage increases to justify–all of which may determine to which publishers (and how quickly) authors submit their work. Thus, the system of scholarly publishing incentivises its reproduction.

10.3 Equitable and Sustainable Scholarly Publishing: Who and How?

We feel the pressure to publish. What we want to do, and what we ask you to do, is to slow down and consider for whom we are pursuing and publishing this knowledge. *Who do you work with to share your research with the world?* Consider the previously outlined division between for-profit aggregators worth billions of dollars and small, volunteer-run publishing outfits. To us, it flags the entrenchment of exploitative labour practices, dominance of normative publishing models, and hegemony of the prestige economy in academia. By outlining the roles and processes of academic publishing, we hope to start a conversation about how to make the structure and workflow of this sector *both* environmentally and socially sustainable.

Let's start by exploring social relationships. When it comes to the roles of publishing, there are two ends of the process one might begin with: the reader and the producer. They meet in the middle point of the publication itself. Readers, including editorial team members, journal advisory boards, and reviewers, are the central most important actors in sustainable publishing. We produce these works so that they might intervene in how people think and act. The reader ought to be able to find the work, to access it with ease, and to make sense of it. How could publishing be sustainable, if the work being produced is inaccessible due to language barriers, paywalls, or print disabilities (National Network for Equitable Library Service, n.d.)? While many pieces have readers in mind, often we can never know who will be best served by the work itself. Producers, themselves readers of others, often have strong reasons for doing the work they do: intellectual interests, passion, vocation, ethics, politics, and so on. They may have some professional knowledge of publishing, but in an ideal system this need not be the case. The experience for them should

be streamlined and transparent. For producers to make sure they have a sustainable role in publishing, they need to know how the publisher operates. Finally, publishers perform the key role in sustainable publishing; they know the field of scholarly publishing, manage production and distribution, and have the most power to make environmentally and socially sustainable choices.

Publishers, then, are where the process itself will bear meaningful consideration. They stand at the intersection of all actors and forces in the process of academic publishing, and this fact is why they may be best able to identify effective sustainable publishing practices for those working on the research and production side as well as those working on the distribution and funding side. Here are some questions that we hope will help illustrate choices and options in regard to the publishing process:

- **When it is time to produce an issue, who is called on to contribute and how are they invited?** The double-edged sword of representation strikes here, as well as with peer reviewers. Authors may be representative of the field, but are they doing too much work?
- **What timeline do they work with?** Is it viable for the researchers? Does someone need the piece to come out sooner or later?
- **How will their work be submitted?** Here, format matters for reasons of financial accessibility. Proprietary systems can mean servers around the world, but limited access and sustainable archiving for the future.
- **Will the publishing process and completed pieces be accessible to disabled authors and readers?** There are many factors to consider, including the use of dyslexic fonts, image descriptions and described video for multimedia pieces, and screen-reader friendly formatting.
- **What means of quality assurance are in place, and who is called on from outside the editorial team to take on such work?** The same issues raised when considering contributors can be raised here. Moreover, the career level of reviewers is crucial to note as well. We need to take care to determine who does the bulk of the work when it comes to quality assurance.
- **How and when are contributors notified?** Is this process conducted via email or some other platform? How might it be streamlined and made less labour intensive for publishers and contributors?

- **How will completed pieces be collected and distributed?** This question dovetails with the above questions about accessibility in both sense, paywalls and disability. It differs in that here the labour required to produce accessible works ought to be remunerated and clearly defined. Moreover, is Creative Commons licensing being used? Consider how much time and labour Creative Commons saves by offering a clear, legible model for licensing open-access work.
- **How will the work be promoted and publicised, and who is responsible for this?** Where will the published work be shared? If it is on social media, consider the ethics of content moderation, corporate ownership, and algorithms of these platforms.

There are multiple, intersecting forms of labour implied in this series of questions that need consideration for social sustainability. Much of it has to do with attending to communications and managing already busy people. So much of this takes place over email or through the proprietary systems of academic journal management. Best among these, in our estimation, is Open Journal Systems (OJS). OJS, developed by the Public Knowledge Project (PKP), is a widely used open-source software platform designed to facilitate the management of scholarly publishing and academic journals. It offers tools for online submission and peer review, editorial workflow management, and publishing, enabling editors to efficiently handle the entire publication process. But, academic publishing is a marketplace where each for-profit publisher also has software to track the publishing process. We think that a distributed network of open-access repositories built with PKP and OJS seems like the pinnacle of sustainable publishing. A comparable organisation, Open Library of the Humanities (OLH), is an open-access publishing platform that promotes scholarly communication in the humanities disciplines. It operates on a unique model where funding comes from a consortium of libraries, ensuring that authors do not have to pay publication fees. This approach allows the OLH to provide barrier-free access to high-quality humanities research while maintaining a sustainable and equitable publishing ecosystem. Open models do exist. After this brief overview of the *who* and *how* of scholarly publishing, we would suggest that the challenge to sustainable publishing is not so much in finding how to be practical and thoughtful in the publishing process, but rather how to

choose those publishers and support systems that are already doing the good work.

10.4 Moving From Sustainable Management Systems to Social Sustainability

After the analyses above, we reviewed elements of social sustainability for consideration in the move to sustainable academic publication. Three broad categories emerged: governance, logistics, and interpersonal well-being. Governance aspects included:

A   Hegemony: while the Big Five currently hold the ideational, financing, and sharing power, small publishers exist, have credibility, and can share their work more widely;

B   Governance: how processes, such as review processes, are governed and by whom. While the current state is top-down from editors pressured by financiers, when bottom-up governance by editors and readers result in enhanced quality of review and better transparency (Cardoni et al., 2020);

C   Equity sharing: the sharing of resources and profits through the publication process. The current systems compile profits in few hands, while many provide the labour. Other systems of publishing have demonstrated shared mechanisms that enhance equity, such as publishing peer-reviews alongside finished manuscripts so that reviewers are credited (Fleming et al., 2021);

D   Cultural inclusion: how the diversity within the journal's board, management, and workforce influence the quality, uptake, and impact of the knowledge produced (Mertkan et al., 2017).

Studies of the logistics of academic publication management also demonstrate ways of moving towards more social sustainability. The current state of human resources in publishing, for example, is that a small group of (sometimes) paid employees manage processes performed by a large number of academics and others providing free services (Tennant, 2020). Suggestions for improving social sustainability include funding journals as a public good, enhancing existing compensation to living wages, shifting workloads among more workers to

avoid exploitation, improving working conditions, and ensuring credit for editorial work at academic institutions (Lindebaum & Jordan, 2023). Another approach is to gather statistics on the actual demographics of a journal's readership, editorial base, and peer reviewers to track how racial, gender, and class equity might shape academics' workload, compensation, and career evolution (Fox et al., 2019). *Engaged Scholar Journal*, for instance, undertook an internal evaluation of researchers asked to serve as peer reviewers. This audit revealed that racialised scholars and women performed these tasks in greater numbers, raising questions about how the journal could better facilitate equity within its own practices. Similarly, sustainable supply-chain decision-making can be a useful tool for enhancing social sustainability by committing to the sustainable procurement of goods and transparency in reporting their sources (Khan et al., 2021). Within scholarly publishing, this may include reviewing manuscripts at a reasonable rate to encourage healthy work ethics, demonstrating that the publisher uses green energy for their servers, and advocating for journal funders and host universities to divest from fossil-fuel investments.

One final category of change for moving academic publishing towards social sustainability is the growth in interpersonal wellbeing. This can be achieved by encouraging funders, leaders, and workers in academic publishing to put more energy into health and wellbeing efforts—such as implementing a flexible or reduced work week structure, remote work, or allowing pets in the office—and to strengthen their political voice in their communications with funding agencies, professional associations, and government. Scholarly publishers can also enhance education and literacy in multiple languages, pursue publishing of knowledge that enhances social justice, and incorporate internal mechanisms for establishing, implementing, and reflecting on diverse sustainability goals. While these practices may not be applicable to every journal, they provide a useful place from which to start.

10.5 Calls to Action for Sustainable Publishing Futures

We wrote this chapter as a collaborative exercise in reimagining publishing for more sustainable futures from our vantage points as open-access

journal editors, writers, and, of course, readers. In mapping our critiques of contemporary academic publishing—its material inputs, neoliberal logics, and unsustainable labour practices—we hope to draw attention to the need for a cultural shift within academia, alongside an energy transition. By way of a conclusion, we leave you with these calls to action for creating more socially and ecologically sustainable publishing practices at all levels including, but not limited to, publishers' in-house practices.

10.5.1 To Authors

- Research the journals in your field to learn more about their labour and social sustainability practices. If possible, speak to colleagues, mentors, or mentees about their experiences publishing with a given scholarly journal. Does the journal you're interested in use volunteer or remunerated labour? Where are they indexed, if it all? Does the journal include accessibility features such as screen-reader-friendly formatting? Does the journal's editorial board include racial and gender diversity? Evaluate whether publishing with a journal will increase access to your research from an intersectional perspective.
- Only publish your work in open-access journals. When possible, select journals that offer the highest level of open access known as 'diamond' open access (free to submit and free to read). Pressure others to publish in those journals as well.
- Use what institutional power you have to boycott publishing in the 'Big Five' and to advocate for diamond open access. Tenured and full professors, in particular, can advocate for change and select open-access journals with more sustainable practices. To those of you serving on executive boards of professional associations, champion open-access publishing within your associations and pressure leading journals in your field to transition to open-access publishing.

10.5.2 To Editors

- Normalise longer timelines and clearly communicate these timelines to both authors and grant agencies. Publishing has always taken time, but it has certainly slowed even further since the COVID-19 pandemic lockdowns of early 2020.
- Peer review is the bedrock of most scholarly publishing, yet it rests on the unremunerated labour of increasingly over-burdened (and often,

precariously employed) academics. Redress some of the inequities in peer review's gift economy by implementing better policies to make legible peer reviewers' labour and expertise. Recognise reviewers by providing honoraria for their contributions, letters of support for promotion and tenure files, or other forms of public, citable acknowledgement. Reduce requests to precariously employed and pre-tenure researchers to serve as peer reviewers. If this makes it difficult to find qualified peer reviewers, consider alternative models of reviewing such as the published 'open' review used by *[in]Transition*, a peer-reviewed journal of videographic film and moving-image studies. This format provides reviewers an opportunity 'to revise these reviews for publication', visualising this work and validating reviewing as a form of scholarship ([in] Transition, 2023).

- While we focus primarily on social sustainability in this chapter, publishing's social impacts necessarily intersect with resource use and aesthetics. Use open-source hosting software for online journals, such as OJS, and help normalise the visual presentation of these platforms. The 'resource aesthetics' of OJS's utilitarian interface invoke Hito Steyerl's 'poor image': in contrast to the richness of the 'high-resolution image', lower quality or degraded images are widely accessible and easily shared (Bellamy et al., 2016; Steyerl, 2009). Like the less resource-intensive or bootleg image, the aesthetics of open-source hosting reflects the conditions of its existence, embodying 'sustainability' in visual form and structure.

10.5.3 To University Professors and Mentors

- When teaching and mentoring students, especially at the graduate level, provide more holistic training around academic publishing. Do not reduce student professionalisation to questions of 'how to get published quickly and painlessly in highly ranked venues'. Instead, make academic publishing an object of academic scrutiny and ethical engagement. If you are not familiar with the contemporary landscape or critiques of corporate publishing, educate yourself.
- Challenge the assumption that there is no alternative to commercial and market-driven publishers and advise students of the personal and structural dangers of buying into 'common-sense' assumptions about 'how to get a job' and the inescapability of productivity culture.

- Provide guidance to early-career scholars and pre-tenure colleagues about managing service work and how to communicate work as peer reviewers in job applications and promotion and tenure files.
- Assign open-access reading in your undergraduate and graduate classes. Help your students save time and money by using resources that are freely available and licensed for this kind of use.

10.5.4 To Students

- Publishing is not just content, it is a practice that needs to follow ethical principles in either reaching or limiting participation, knowledge sharing, and impact. Consider how you publish—and the social relationships it engenders—as much as where and what you publish.
- Adjudicators of academic quality do not all think alike. While normative practices in publishing such as rankings and metrics might be enforced by some, for others they might constitute red flags in the hiring and promotion process.
- When you are working on research for your courses or other writing, try to use open-access journals as much as possible. Even the slow, steady work of citing open-access research shifts the conversation in classrooms, cohorts, and departments.

10.5.5 To Aggregators

We're impressed if you read this piece and made it to this point! We acknowledge that not all aggregators operate in bad-faith profit mode. Here are some things you can start doing to support sustainable publishing:

- Eliminate all fees for open-access publishing.
- Remove all paywalls to material. If that is too much, try releasing material for open access after a one- to two-year period.
- Redistribute the fees charged to libraries and other institutions with journals and other publishers.

10.5.6 To Granting Agencies

- Lighten grant application requirements in order to make funding more accessible, especially operational funding. Financial sustainability is a crucial part of achieving social sustainability for journals.

- Revise the guidelines for publications to qualify for funding to more accurately represent the landscape of non-commercial and interdisciplinary scholarly publishing. In Canada, the Social Sciences and Humanities Research Council (SSHRC)'s Aid to Scholarly Journals fund, for instance, defines eligibility in part on 'a rigorous, independent peer review process' and the frequency of publication, 'a minimum of two issues per year' (SSHRC, 2023). This excludes academic journals using internal or more experimental forms of review—such as *The Goose*—or journals that publish fewer issues per year. In other words, such a definition of an 'eligible' journal limits a publication's social and financial sustainability, including attempts to make the workload for publishers, reviewers, and copy editors more manageable and sustainable.
- Move away from peer review as a requirement for scholarly publishing; it should not be the only or primary metric considered when qualifying a publication as suitably 'academic'. Insisting on peer review as the norm from a structural perspective has labour and epistemological implications, which may be at odds with a journal's EDI-AR (equity, diversity, inclusion, and anti-racism) initiatives (e.g. reducing peer review requests to precariously employed and racialised scholars, publishing forms of scholarship that do not conform to the conventional long-form article).
- Provide specific funding for journals to improve their accessibility, especially for linguistically diverse and disabled readerships.
- Provide specific funding for journals to improve their sustainability—social and ecological.

10.5.7 To Librarians

- Keep going! We see you. You are doing such great work when you support open-access, sustainable publishing.
- If you're not already, look into running OJS and recruit journals already published at your institution to open-access publishing.
- Start or join a server consortium to host materials across institutions so that you can say for certain how servers are cooled, maintained, powered, and secured.
- Run or facilitate workshops on academic publishing from a sustainable, equity-informed perspective.

10.5.8 To Academic Administrators and University Management

- Support union drives as part of a holistic approach to social sustainability. Historically, journal editors provide volunteer service to their intellectual communities from a place of secure employment. As universities increasingly replace tenure-track positions with precarious contract work, this model (as inequitable as it may have been) is broken. Until journal publishing is remunerated, university administrators should support unionised and secure employment for academic staff serving on editorial boards.
- Move away from problematic impact metrics (e.g. readership metrics, H-index, etc.) in assessing funding needs and priorities. They do not accurately reflect the long-term and complex ripples of knowledge dissemination within disciplines or society.
- Recognise the diversity of academic knowledge production and curation within institutional long-time planning (e.g. university strategic plans, mission statements, key performance indicators, etc.)
- Reclaim the academic publication space by supporting university presses and similar initiatives as part of the public mandate of a university. This support should include equity-informed approaches to labour and resources, including adequate staffing, student mentorship opportunities, teaching remissions for academic editors, and lower-carbon travel alternatives to conventions and conferences.
- Do not consider return on investment as a condition for funding and supporting academic publications. At the same time, increase funding earmarked for open-access publishing.

10.5.9 Finally, to Readers

You—we—are the most important group in publishing, even if this identity is often the most overlooked. You are the animators of a work's future: reading, discussing, and drawing connections to your own research, creating afterlives and ripple effects that authors and publishers cannot foresee.

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11

Landing Down the Carbon Clouds: Stories of Another Present

Clarissa Reche and Felipe Figueiredo

11.1 Warning

We tried.

We wanted to experiment with fictional, speculative writing that took into account our research and academic interests. In fact, that's the kind of writing you'll find below. But life threw us a curveball and forced us to write this preface. We tried, but the hot, unbearable, and unenergetic dimension of reality demanded that we open this chapter with a report. Like Ursula K. Le Guin, we believe that science fiction does not extrapolate reality but describes it. In fact, this could have come from dystopia, but unfortunately it is the current description of our reality.

Today is November 14, 2023, and what you are reading was written at that time. We are writing from the metropolitan area of São Paulo, the most populous city in South America. At the moment of writing, the only word to describe what is happening around us is chaos. The thermometer on the street reads 42 degrees Celsius, and the thermic sensation is certainly higher—on the radio meteorologists were talking about something around 60 degrees Celsius. They say we are experiencing an 'extreme heat wave' that has been going on for about a month and is now at its most severe—so far.

The high demand for refrigeration combined with recent storms and gales have caused the power-distribution system to collapse. Many parts of the city are without electricity, especially the outskirts (where we workers live) and the commercial centres (where we workers have our jobs). The trains, which carry workers from one point to another, are running without air conditioning due to the precarious energy situation. It's important

to note that the company responsible for energy distribution in São Paulo is privately owned, and the largest shareholder is the Italian government.

Water has also started to run out in some neighbourhoods. People get home and there's no water to shower or do the laundry. Those who can, go to relatives' or friends' houses. Those who can't … the government's responses are an eternal circus of 'push and shove' that they perform with such skill that they manage to continue without pointing out any responsibility.

We are not doing well. We are writing this chapter without the basic conditions to do so. It's impossible to work. A friend of ours pointed out something very accurate: no one is working properly, everywhere you go there's someone suffering from the heat, and those who are lucky enough to work under air conditioning are coming down with terrible flu. It's unbearable. We still have electricity, but some of our research colleagues haven't had the same luck.

Although we are indeed living in chaos, we can see a line of continuity in the things that are happening to us right now. In our largest commercial and financial centre, the mirrored buildings whose windows don't open, designed to run only on air conditioning, are currently without electricity. These buildings are reflections of a completely dysfunctional colonial architecture. Colonial because it's not just imported, it's shoved down our throats as the latest totem of what is 'modern' and 'developed'. It's no coincidence that these huge buildings were built where a snaking river used to run, which has had its course 'corrected' to a straight line. Beautiful examples of the latest technological development today. True miracles of science and technology.

Our tropical lands have always been too hot for science. That's why foreign researchers have always made long journeys, the result of their method of coming, getting what they need, and leaving as quickly as possible. Our first Brazilian scientists, on the other hand, like the architects of today's mirrored buildings, were busy bringing 'civilisation' and 'development' to Brazil. The first genuinely Brazilian sciences were eugenicist, concerned with the racial 'problem' and the cultural and material 'backwardness' of our people.

Poor scientists have never had anywhere to go. They have always been and remain in their homes. What we're trying to do now is shake off

our colonial shackles and actually produce something that serves us, not reflexive aberrations. That's what we're doing from here, in a fever, feeling sick. And you, what are you doing from where you are?

* * *

11.2 We Don't Want the Future to Repeat the Past

Compas,

We write letters because we still trust in the availability of low-tech and we don't trust the big data centres that eat our forests, drink our water, and suck our energy. When we need to, we use our local servers, which are intermittent but do their job and don't make us sick or cause illness.

After years of heavy rain, the climate has finally started to change. The Niñas who played among the oceans have calmed down and we can finally see the sun. The problem is that we are now experiencing a heatwave that seems to have no end. Putting down roots became very difficult, but we carried on. A place like this only came to fruition once we had distanced ourselves, with great difficulty, from our old modern legacy.

We recently received a call from the heirs of the People With Names, from Kapital, a neighbouring planet. They are scientists responsible for finding solutions to the climate crisis they are facing on their planet. This is a communiqué about their problems. Problems caused by them. And they ask: 'we are looking for reports that can help us postpone the end of our world'. Why us?

We believe this is because what we see today in Pindorama is a fertile ground for collective imagination, autonomous communities sharing their means of subsistence, knowledge, and technologies. Of course there are contradictions, but these are limited to the ways in which collective life is organised, discussed collectively and autonomously, and not to the means of production divided unequally and forcibly.

The rural landscape is combined with cosmic bio-interaction technologies, cultivated close to the mud, pointed towards the air and with roots that go to the centre of the earth. Through it, organisms flow and communicate, exchanging information and memories. The energy that drives this advanced technology comes from the sun, the winds, and the waters, but it is governed by the entity of Intermittence, because

everything that is abundant is dangerous. Everything that was excess, we put aside. Sufficiency has come to organise relationships, without surplus or accumulation.

How can we, who come from the bowels of the earth, help those who just want to go to heaven? On other planets, pre-disaster technoscience is still cultivated. In these places, there is still a veil of carbon, forged in boilers and spewed out of chimneys, which prevents people from seeing that disaster is inherent in the system. But for this science to continue, there must be believers and cults who believe in it, as well as their pastors. And as a way of overthrowing them, we Pindoramic peoples are betting on believing in the sciences of Intermittence.

That's their problem: the failures that affected millions of people in the so-called 'underdeveloped' world began to hit the elites. Lack of energy, water, and heating; food shortages; increased violence and militarisation; extreme climates and loss of biodiversity. Their renewable energies couldn't cope with the growing demand. They have failed to reduce deforestation. Rivers have continued to dry up. More intense tsunamis.

Even with the latest technology and the number of articles being published on these issues, our neighbours' pre-disaster technoscience seems unable to solve their problems. We call it pre-disaster technoscience because they consider the Catastrophic Times to be a thing of the future, not of their present.

They want to produce technoscience that has a low carbon impact, but it is still very much tied to the mercantile way of producing knowledge. It's tied to competition, hierarchies, productivity, and paper markets.

First of all, we would like to start a dialogue with you, our relatives. 'We need to come to a collective decision on what to do', said one of the older residents of our community. That's why we're writing this letter and reaching out to you.

Let's start with an account of a recent past:

There was a time when we still co-inhabited the same planet as Kapital, when some well-intentioned scientists began to think about reducing their carbon footprint. In other words, they began to question how the research methods employed by the technosciences consumed fossil fuels and began to think about alternatives to them. One of the results of these reflections was the creation of an international scientific network whose

aim was to share scientific data openly between different countries, without the need, for example, for a researcher located on a rich continent to get on a plane and go and do fieldwork in the Amazon (those from the White-North always came here, the opposite was more unusual).

By sharing data from researchers living in the Amazon, be they biologists, climatologists, or even ethnologists, it was possible for scientists on the other geographies to obtain their data, make their inferences, and propose their theories. It seemed that the problems caused by flying scientists back and forth had finally come to an end.

But before I go any further, we need to comment on the working conditions of these Amazonian scientists, hard-working fellows who inhabit the forests. The prospect of doing citizen science filled their eyes. Seduced by the promises of local development, they entered university and started producing data. They produced data madly. Then a master's degree and a PhD. More data, graphs, inferences, observations. Terabytes and terabytes of information shared on solar-powered servers. They almost went mad from working so hard. They worked on a project for the sustainable development and monitoring of Amazonian water resources. They generated data that contributed to major articles authored by big names in the environmental sciences of the old White-North. The international division of scientific labour was in place. Some produced data, others theory. As they advanced in their careers, they had more and more work to do, and the time they once had for writing articles was taken up by producing data to feed the international databases on the Amazon.

Never before in human history has there been so much data on the biophysical, chemical, and social conditions of the Amazon. At the same time, unprecedented environmental devastation. Were they not producing enough data to stop the devastation and curb climate change? Why were scientists' efforts to reduce emissions still insufficient? When all pre-crisis technoscience stopped burning fossil fuels, we realised that it represented only a tiny part of the population and of life as a whole.

Friends, we believe that one of the reasons—within the capitalist logic—for the intensification of the Catastrophic Times is what we call Continuity, combined with excess and development. We would like to reformulate our neighbours' request through dialogue. By naming those responsible for their misfortune.

How can we get the inhabitants of Kapital to break with the vision of a pre-disaster technoscience? How can we transform Continuity into Intermittency? How can we turn Intermittency into something beneficial and not just a 'glitch'?

GLASS SHARDS REVOLUTIONARY COMMITTEE

Right bank of the River Tietê. Spring of the third cycle. Pindorama Planet

* * *

11.3 Counter-Witchcraft in the Cellars of the End of the World

Amigas, companheiras,

We received the letter you sent, shared it with each other, discussed it for long nights and wrote this reply, which doesn't answer anything. We thought it might be interesting for us to answer the call from the North-White. As we're learning, these diplomatic missions, as they once called them, could be a security strategy for us. In any case, it's important to be strategic. You know that. Our people don't want to postpone the end of the world. The end of that world interests us.

We've decided to revive some stories that might help us think better. As you know, the effort of telling stories is what keeps us going. That's why we thank you for letting us record the demands that come to you, your thoughts and actions. We are allies in the struggle, and as the allies we are, we will also make this effort to create memory.

* * *

There was a time when Intermittence was suffocated. It was with the emergence of the internet and the worsening of the eugenic wars that followed. There were several attempts at genocidal extermination. Anyone different from them was hated and persecuted. These wars also tried to exterminate the Intermittence. Anti-aircraft batteries and suicide drones were also filled with the desire to exterminate silence. At that time, the People With Names and Surnames were terrified of silence, of absence, of interruptions, of gaps, of spaces filled with nothing. It is said that the descendants of these people are still trying to deal with this heritage with various therapies. They still have difficulty realising that Intermittence also involves exchange and communication.

At that time, the Intermittence was suppressed in various ways, but all of them were sensual. Biochemical interventions were intensified with the aim of attacking pleasure. Little by little, people became addicted to instant availability. Thinking about a reality where you couldn't access everything from anywhere was physically painful for some people.

Many people lost their way, stopped being who they were, went mad, or died of sadness. It was no different among those who practised technoscience. Thought, so important to the handicraft of technoscience, was swallowed up by Continuity. In the belly of this monster, the desire for instant availability met with the desire for total explanation. The result was the Time of Catastrophes, and with it the unpleasant New Climate Regime.

* * *

Our elders say that there was a day when people believed that things worked properly and that structures were solid. In fact, it seems that people in the era just before the New Climate Regime didn't even think about structures and infrastructures. They lived as if they were sitting on solid ground. But they were just bewitched, and so couldn't see that they had built their castles on quicksand. It was around the time of the rise of so-called 'data science'. The world, which had already been a machine and an organism, was now made up of data. People became a collection of data, and lethal quantities of water, sun, coal, and wind were transformed into digital storage. The promise was that those who could manipulate the data would be able to see into the future. When the ability to predict began to show signs of weakness, we, the people at the bottom, saw it as our chance to bring down this people-grinding machine.

Some of our people turned from workers into undercover spies and began to describe in detail the operations of the big business families of the time, the so-called 'big techs' and the 'financial market'. We have kept some of these accounts here in our revolutionary cell. They are shocking. In one of them, a fellow 'data scientist' who worked in the 'risk' department of a large bank (in those days, this was the way the people of the White-North tamed and enslaved the poor) describes how this data was managed. What she tells us sends shivers down the spine, and we even find it difficult to explain such absurdity to our children, who are used to our beautifully simple community digital infrastructures.

At that time, these great institutions, capable of bearing fruit or destroying lives, were based on monstrous spreadsheets with hundreds, sometimes thousands, of tabs. The number of rows and columns these spreadsheets had was something that, in life, a human being couldn't handle. The cells in the spreadsheets referenced each other in a daunting tangle. To us, the description of the companion of this spreadsheet system sounds like a living being, a golem, a virus. No one could deal with it properly, no one could understand it, no one could reform it, everything was based on it: who could and couldn't get credit, profit forecasts, and a whole bunch of other variables that made the institution reliable or not. Obviously, this was a form of management designed by and for fraud, rich became risky.

When we got to know the guts of the monster, we, the people at the bottom, agreed that sabotage was ethical and fair.

* * *

The story goes that our Rebel Memory Communication and Maintenance Infrastructure, which we look after with great care and love as we learned from our elders, was inspired by a moment known as the 'beginning of the internet'. This moment was a short period of time when hardware and software were not dominated by the big corporate families, there was not yet a hatred of Intermittency and digital technologies were not at the service of the biochemical control of desire and the destruction of the idea of community. Waiting and exchange were the prevailing ethics because the infrastructures were basically infrastructures made by and for the action of pirates. This group of people, in a way our ancestral relatives, did not accept the appropriation of knowledge by a few people, nor did they follow the laws of other peoples who instituted the idea of intellectual property.

At that time, content-suggestion algorithms had not yet been invented. Today we know that they are demons in the service of Continuity that limit Thought, but when they began to take the place of real virtual communities, many people were seduced by the supposed ease they represented. At the 'beginning of the internet', people had to establish direct, unmediated communication to get the information they needed. At that time there were databases, but they weren't managed by companies and their algorithms, but were fed, cared for, and curated by communities, just like ours are.

Our elders tell us that the biggest mistake we made in the recent past was giving up our ability to create, store, and manage our digital data, ceding our capacity for Thought to the false and seductive promise of Continuity and its Kapital operators. That was almost our end. We must never forget that.

* * *

Many moons ago, a witch from where the sun rises, a devotee of Hermes Trismegistus, structured a system of piracy of scientific articles that allowed us to be here today. At that time, the centenary colonial families of the White-North, devotees of capitalism, controlled the publication and circulation of scientific knowledge worldwide with golden fists. It was expensive to publish and expensive to access the knowledge produced by technoscience workers. But thanks to the witch and her cyber-crypto skills, this has changed. Around the world piracy became more and more present, and many workers began to thank the witch in their theses and dissertations, because without her the work presented there would not have been possible. There was no moral resistance to the penetration of the spell cast by the witch, and suddenly many who paid tribute to the capitalism entity became servants of Hermes Trismegistus, who, as the entity he is, revived and grew. And the entity of fertility, magic, divination, patron of thieves and diplomats, who invented fire and words, guardian of the gifts of lies and seduction, was back on his feet. That was just the beginning. It is in the basements of the world that this new technoscience continues to be gestated. We too are feeding our own entities. It's only a matter of time.

* * *

These are the stories we wanted to tell you.

They were told to us by our elders. That's what they say happened.

Shall we have a party to discuss these issues more objectively and in depth? With food, drink, tobacco, hashish, and music. And let it all be produced by our own efforts. That way, we might be able to make a communication to our northern allies that is real.

Seguimos!

Oh, one last thing: in our laboratory we have developed a species of juazeiro that grows faster! As you may know, Juá bark is perfect for

deep-cleaning hair, teeth, and even clothes. A wonderful soap. Mixed with Jaborandi, Rosemary and Hibiscus, it's the best shampoo there is. Much better than any of the chemical crap that the old industry still insists on making. We haven't had the energy to deal with it for a while. If you want, you can get seedlings from our bench here.

Warm hugs

COMANDANTA RAMONA REVOLUTIONARY CLANDESTINE COMMITTEE

Left bank of the River Tietê, opposite the sacred Jaraguá hill, Guaraní-Mbya land. Pindorama Planet

* * *

11.4 Imagining Other Infrastructures, Other Sciences

Compas,

Thank you very much for your response and generosity in sharing the bark of this ancient tree. We know that we can always count on you, our companions, to share ancient knowledge and techniques, just like in the story of the witch from the land closest to where the sun rises and her cyber-crypto witchcraft.

Her words remind us of those of an ancient sage who prophesied that science and universities produce synthetic knowledge (thought in one place to be developed in another), which is the nourishment of Continuity. What we have made proliferate, based on stories like these that you have brought, are the sciences of organic knowledge (thinking together, organically, locally, in order to engage with the environment and beings), making Intermittence flourish as well.

As you remember, years ago our planets entered another phase of existence. It's the New Climate Regime. It's not just a crisis. No. We repudiate that idea. Change isn't appropriate either, because we didn't choose it, we were forced into it. But they still insist on talking about pre-disaster technoscience. The problem with believing in this science is that it reiterates extractivist values and, furthermore, the imaginary that the worst is yet to come, based on projection models made for carbon-market consumers, with the idea that we can 'develop' a little more, that we can 'burn' a little more in the name of the Continuity of Capitalism.

Continuity of deforestation, of pollution, of burning fossil fuels, of increasing GDP, of development, of agribusiness, of capitalism. Continuity is a multi-headed monster. You cut one off and two grow up in its place. They thought, for example, that they would be solving the problem of burning fossil fuels by promoting renewable sources, but they only increased the demand for energy, and the big renewable developments generated other forms of exploitation and inequality. They thought they would solve the problem of carbon consumption in science by ending air travel, but all they did was increase new forms of digital colonialism within universities.

The problem with Continuity is that it has a very dangerous seductive power. Having all the goods we want, when we want them, is very attractive, as it satisfies our libido at any time. That's why the monster of Continuity is always allied to excess, productivity, and abundance. But this seduction is a danger, because we are talking here about the Continuity of everything that brought about the Time of Catastrophe. Continuity deceives even science into believing that its world will last and that disasters are a thing of the future. To tackle the problem, we have to go to the root and demolish the chimneys.

How can we tell new stories to this world?

Like you, my friends, we also believe in the power of Intermittence. Not as a lack, not as a failure, but as a condition of life, of cycles, and of sharing. By closing down the industry of unnecessary items, by increasing the reuse of technologies, by manufacturing for the duration, we have managed to drastically reduce energy consumption.

Our energy sources are intermittent. But that's not a problem. We stop working at night, we rest. We play the guitar and the flute by the fire.

We believe in working with the land. What they call science for us is work, it is production, it is being in connection with the land. We are producing implicit, pragmatic knowledge, dealing with the fact that our world began to end at least as far back as the 14th century of the Christian era. Our disaster already was and continued to be until we broke away and gained our autonomy. We were capable of imaging the end of capitalism without the end of our world.

To those with a First and Last Name (who madly write scientific articles and put their names on it) we say: we need to imagine other sciences, connected to life and, above all, break with technocratic salvationism! We need to reactivate the ability to compose, to get involved.

The ability to see what is important!

Only in this way will low-carbon sciences be possible, based on the transformation of the planet in which they are involved. For the end of the Continuity of Capitalism by casting the powerful spell of Intermittency. Pre-disaster technoscience has been one of Kapital's main accomplices. The digital transformation carried out by big tech is extremely dangerous, as it is combined with perverse energy consumption. We don't trust big tech companies and capitalist technoscience. The fundamental scientific question for any kind of alternative methodology should be: What infrastructures are we using? Who does this knowledge serve?

We create our own servers, our own infrastructures, as intermittently as our lives.

We are very grateful to our companions for creating our Rebel Communication Infrastructures!

May other people on other planets be inspired by this exchange of messages to imagine possible futures, where low-tech and anti-capitalist alternatives are considered.

* * *

We also thank you for inviting us to party with you. The party is the most valuable and powerful intermittent technology we have to unite us!

We would like to hear more from you about the technoscientific transformations that are on the horizon.

GLASS SHARDS CLANDESTINE REVOLUTIONARY COMMITTEE
Right bank of the River Tietê. Spring of the third cycle. Pindorama Planet

* * *

11.5 Salve Geral

El problema con la realidad, es que no sabe nada de teoría.

Don Durito de La Lacandona

Camaradas,

Technoscience is not an entity. Capitalism is. Technoscience is a tool by which the capitalist entity conquers physical, psychic, and emotional territories in order to expand its frontiers. A wise old woman from another

land once told us that we are facing a sorcerous system, only without sorcerers to operate it. We agree about sorcery—and we know its power. But capitalism is not a system. Capitalism is an entity—the offspring of colonialism and slavery. You don't annihilate entities, they will exist for eternity, jumping through time and space, fighting for their very existence. We agree with witchcraft, but we, from here, can see who is devoted to capitalism, who sacrifices in its name and who the sacrificed are. Who discovers, designs, and manufactures the bomb, and where it falls.

Certainly, capitalist sorcery clouds minds and entices hearts. Many of us, simple people and not Money Priests, live our lives entangled in delicious capitalist networks, alienated from our own work, unable to materially and physically enjoy what we imagine and produce.

It's no different for technoscience workers.

Low carbon impact? To us, that sounds like just another stunt for the people of Kapital to clap their hands about. Another alienating distraction. Another invisible layer between work and enjoyment.

Low carbon impact means absolutely nothing around here. 'Low carbon impact' is neither a word nor an action for the future, much less a present concern for our people. Here, we mean the following chains of words-actions: 'end the deaths of young black men in wars promoted by the state'; 'end the war against native peoples and guarantee their ways of life on the lands that are part of who they are'; 'end the accumulation of wealth and the exploitation of labour'; 'end the murder of rivers, mountains, biomes'; 'for life, a world where many worlds fit'.

By blowing away the low carbon impacts, we can see what matters to us. In this way, we can minimally organise our thinking and share it with the people on the North-White axis. We hope that this will help them to blow away the carbon cloud that affects them too:

- The problem with methodology begins precisely with the choice of research problem. If we think that 'low carbon impact' makes sense, perhaps it would be more effective to shift the question from how to research to what to research. Technoscience that produces life is not alienated. What we mean by this is simple: our research must be traversed by our own bodies. One question must be asked before any other: how does what I am researching relate to me, my history and the place where I live? This is a dangerous move, because it can be

extremely painful. In the case of those who inhabit areas—physical and spiritual—that receive the bomb, it means dealing with centuries of trauma, violence, and interdicted lives. In the case of those who inhabit areas where the bomb is projected, it means dealing with the horror of looking in the mirror and discovering that they are heirs to projects of dehumanisation. In both cases there is a lot of work to be done.

- We know that such an idea is a radical change in the technoscientific paradigms that are practised around the world. This is because the absolute majority of the technoscience workers who inhabit the White-North, or the zones where the bombs are designed, have no autonomy whatsoever in choosing their research agendas. It's those who fund it who decide what might or might not be a good question. A science for life financed by the Priests of Money is not possible. To dispel the carbon cloud, technoscience workers must be aware of who pays them, and why. From constant and suspicious awareness, we believe that alternatives to this abyssal problem can emerge that have not yet been posed (… there's a great research question!).

- In this effort towards horizontalisation, we also believe it is extremely important that our work can circulate on the basis of an ethical practice of justice. Starting with languages. It's unfair that we, the inhabitants of the bombed zones, have to be at least trilingual in order to perhaps access the carbon-fogged area and try to get our ideas circulating. We know how many doors to the world are opened by speaking other languages. In fairness, all technoscience workers should also speak other languages, especially if, by chance, their research problem (which passes through their body) also passes through the bodies of people who speak other languages. It is immoral to access other worlds with the tools of technoscientific scrutiny without at least accessing the way in which the people who inhabit that world think and express themselves.

Our science has always been done in our backyard, and it is from our backyard that our elders have always written their theses. From our backyard, we tell you what we've heard and thought. From our backyard we return our gaze to you. And from the question that came to us, we answer it, but we also leave you with another question: what are you doing?

* * *

Author Bios

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