*Ympäristökonfliktit ja tieteen
ja teknologian tutkimus*

Teksti on omaelämäkerrallinen katsaus antropologian väitöskirjan tehneen tutkijan kokemuksiin sosiologisesti suuntautuneen tieteen ja teknologian tutkimuksen myönteisistä vaikutuksista yhteiskunnalliselle yhteiskuntatutkimukselle. Kirjoittaja kertoo, miten 1990-luvun alun aktivismiin Saksassa pureutuva antropologian väitöskirjatyö haastoi tieteenteoreettisia perinteitä, joihin yhteiskuntatieteet ja kulttuurintutkimus silloin nojasivat. Antropologin oletettu kiinnostuksen kohde oli vain luonnon ja teknologian asiantuntijuutta "vääristävissä" tekijöissä; näin esittivät Mary Douglas ja Aaron Wildavsky teknologisia riskejä pohtivassa teoksessaan 1980-luvulla. Kenttätyön myötä tuntui kuitenkin väärältä, että fyysiseen ja koettuun ympäristöön ei voinut ottaa kantaa kuin korkeintaan kevyesti kuvaillen. Toki yhteiskuntatutkija ei voinut ratkoa, muttei myöskään sivuuttaa, tieteellisiä kiistoja, joita ympäristöpolitiikassa käsiteltiin. Työkalut tutkimuksen eteenpäin viemiseksi löytyivät Science and Technology Studies (STS) -nimikkeen alla tehdystä työstä, joka lähti osittain postkolonialistisesta tieteen ja teknologian historiasta ja osittain tieteellisen tiedon kulttuurisidonnaisuutta korostavasta tutkimuksesta. Erityisesti Bruno Latourin ja Donna Harawayn työ STS-sanaston kehittäjinä on tukenut yhteiskunnallista ympäristötutkimusta.

EEVA BERGLUND

Environmental conflict and Science and Technology Studies

COMPLICATING KNOWING FOR A BETTER POLITICS

INTRODUCTION: ENVIRONMENTAL POLITICS AND SCIENCE

Political life, like the social sciences, has entered a prolonged environmental moment where organising coexistence increasingly involves asking questions about earth systems and their viability. This has huge implications for knowledge or, in more academic terms, epistemology. Claims to 'know' and demands to 'act' can no longer appeal to scientific authority in a way that only a generation ago made environmental politics appear unpolitical. Or, as I argue, the concerns appeared at least partly free of politics, since environmental debate was thought to be about nature. So long as nature was the domain of science all this was seemingly free of politics. Now almost permanent crisis mode has made it clear that politics runs throughout debate about environmental matters. This autobiographical essay outlines some ways in which Science and Technology Studies (STS) helped me to explore as well as participate in this intellectual and political shift, one that has been of great importance to how social scientists approach environmental problems.

My story begins in the early 1990s when I embarked on a doctorate in social anthropology in the UK. My thesis dealt with the material infrastructures of modern, comfortable, lives: waste, transport, and energy. My research question seemed reasonable: how do German environmental activists deploy technical and scientific expertise as a campaign tool? However, it was not common at the time to treat science or the comfortable world of middle-class Europe as objects of anthropological research. Although the ethnographic study (Berglund 1998) turned out to be exciting, it was problematic that I was even questioning modern science and treating wealthy Europeans as anthropologically interesting. Neither

science nor Westerners were what anthropologists ordinarily studied. Dealing with both was helped immeasurably by the emerging field of Science and Technology Studies, new at the time. For a time STS was also understood as Science, Technology and Society studies, whilst exciting work was also being done under Social Studies of Science (SSS) and Social Studies of Knowledge (SSK).

The rise of STS coincided with a significant geopolitical and cultural moment, the end of the Cold War, the effects of which are still being worked out, politically, epistemologically, and materially. Here I concentrate on how STS guided my doctoral work. It enabled me to view science and technology as social and cultural. I was thus able to go against conventional understandings that considered science based on anything other than 'laws of nature' as either ignorant or flirting with relativism. I felt encouraged by STS to turn the question around: not 'Why are the activists crazy?' but 'Why do those in charge seem crazy?'. STS dealt with matter and ideas together, it did not insist on keeping potentially dangerous stuff and shared beliefs about them separate. Furthermore, it helped me make some sense of the complexities and complications that proliferated through my fieldwork and my reading. It began to feel possible that the human intellect could cope with these perplexing questions. Given the endless paradoxes, tensions, and contradictions that environmental politics was producing, that felt wonderful.

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We now have a language, with concepts like the Great Acceleration and the Anthropocene, that allow scholars of things environmental to generate valuable insight in new ways. This vocabulary is of great support to environmental social science. It helps to explore details and local forms of violence, for example, rather than basing understanding on banal averages, which is how industrial infrastructures and their unevenly experienced

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risks and benefits are generally known (Tsing et al. 2019). This vocabulary owes a considerable debt to research on science and scientists.

In the 1980s when I was making academic plans, social science interest in environmental matters tended to blur into reflections on and critiques of industrial society. My impulse to study environmental activism came from a personal frustration with the low priority given to environmental protection and from an intuition that anthropology, which I had studied as an undergraduate, could yield insights into questions that were considered technical at that time. To me, it felt obvious that they were also about ideology, values and interests. Like activists I knew, I was interested in pollution and in controversies around food production, such as genetically modified organisms or bovine spongiform encephalopathy (mad-cow disease) and I viewed these as damages brought about by industrial development. I also struggled to make material change, however imperceptible, matter to my professors and peers. They studied society and culture, not 'the environment', and though they were able to bracket out physical features of life in their research, I could not.

When 'environmental' problems emerged as public issues they were treated as the domain of technical experts. Social scientists and the broader public appeared, if they appeared at all, to express legitimate *local* concerns; but they were presumed to not understand the underlying science. It was "scientific enquiry conducted within an official framework, which [...] provided the true litmus test for whether or not issues are indeed issues" (Grove-White 1993, 21). The relevant expertise was among natural scientists and engineers, not social scientists, let alone scholars in the humanities.

This meant I lacked the tools to argue that culture also mattered in environmental politics,

but we doctoral students from many disciplines and countries started to change this. We engaged literature around the damages of technological culture, some of which went back to the early days of industrialisation. Some was just emerging, like Ulrich Beck's influential *Risk Society*, first published in German in 1986 as *Risikogesellschaft – Auf dem Weg in eine andere Moderne*. Scholarship from poorer countries gave a complementary view. There were already studies, often informed by Marxist critiques of political economy, of how Western development projects damaged poor places (Nandy 1988). Anthropological encounters with failures of development in the Global South (Escobar 1995) also taught us something about the wealthier people living unremarkable lives in the Global North – for instance, about how they saw science as both special and as common sense at the same time. If one looked hard enough, there was plenty of evidence of people, both South and North, fighting against the problems of business as usual also on scientific grounds (Jamison 2001). Drawing on the study of social movements, I could identify social and cultural forces that kept typically middle-class green campaigners in Europe focused on the unthankful task of opposing what others either ignored or deemed good.

Yet the question of the science remained. How could I (or we) talk about technical dangers and science-based projections of scary futures if we were not ourselves authorised to make scientific claims? Pursuing this issue is, I suggest, still one of the main tasks of environmental social science. For many of us, STS became an indispensable toolbox in this pursuit. Now its vocabulary and approaches are embedded in social science, in environmental social science in particular. As STS developed sociologically informed studies of science, this unfolded in conversation with exciting strands of feminism and philosophical contributions such as new materialism. These all straddled unhelpful institutional boundaries and the dualisms that underpinned them - such as nature vs. culture, public vs. private. For some, these endeavours had, and still have, something postmodern about them, arriving after or in reaction to the confidence and domination of modern understandings of knowledge. Within the so-called 'science wars' (Ross 1996) they provoked

sensible people to aggressive defensiveness, not least on North American campuses, where similar contestations are rife today, sometimes reified as 'culture wars'.

Significant changes in environmental politics have taken place since. In the 1980s and 1990s when environmental problems became legitimate research topics for the social and political sciences, sociologists, anthropologists, researchers in cultural studies and the other human sciences tended to bracket out questions of scientific and technical expertise. But no longer. Today these fields, on the whole, acknowledge that mess, paradoxes and incoherent epistemic claims abound. They argue confidently that concern for earth systems informs politics. They highlight that the everyday world is saturated with technological products and systems and open up questions about the values embedded in their very existence. It has become difficult to pretend that technoscience is separate from culture or society or that technological change is not a process involving endless moral choices.

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Because science and technology continue to have tremendous power, it is important that they can be discussed and assessed from multiple angles. My doctoral experience confronted me with the perplexing and contested political role of science and led me to the literature that later came to be identified as STS. Now, in the interdisciplinary space where I teach and do research, STS still offers a language for exploring the place-bound ways in which knowledge, matter and political rhetoric feature in what we still call environmental politics. But first, back to being a doctoral student at the University of Cambridge in the early 1990s.

WHEN PROBLEMS SPILL OVER BOUNDARIES

I did my ethnographic fieldwork in a town that I called Mittelstadt, anonymising the actors and places as was typical then. I studied numerous citizens' initiatives. One involved a toxic waste

deposit where knowledge was an acute political problem. The handling of this toxic waste deposit rested, I argued, on the proposition that only scientific accounts of reality could be objective whilst other discourses were necessarily biassed and thus politically questionable. Indeed, the core activists followed this logic themselves: environmental health was being endangered and democracy being undercut, they suspected, by the self-interest of the businesses and decision-makers involved in transporting and handling waste. Unlike activists, they seemed unconcerned about the probability that toxic material was escaping into the deposit's surroundings threatening human and environmental health. Knowledge about the actual situation was difficult if not impossible to come by: assessing the material harms involved required sophisticated instruments, and knowledge of and access to the site and historical records about it were not available to citizens. Those potentially affected, with environmental NGO support, did their own research and even commissioned an expert report that concluded that the dangers were considerable. This kind of counter-expertise was becoming a significant element of environmental campaigning at the time in many places, particularly as part of what has since come to be thought of as environmental justice (EJ) activism (Cohen & Ottinger 2011).

While working on my thesis, it was not easy to do justice to the people campaigning. Worryingly for me both as a doctoral candidate and a citizen, it seemed that social and cultural research was able to sidestep scientific knowledge and so disregard grave environmental risks. When anthropologists and sociologists encountered hotly contested knowledge, they searched for explanations in the social realm, in political power, uneven access to knowledge, institutions of expertise, and so on. Disagreement and even the fear of environmental damage were treated as reflections of underlying collective beliefs and their role in organising group dynamics.

An influential book here was Mary Douglas' and Aaron Wildavsky's *Risk and Culture: An Essay in the Selection of Technological and Environmental Dangers* (1982). Viewing knowledge as something exclusively social and psychological, its authors had developed a cultural theory of shared beliefs that saw knowledge

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as founded in cultural preferences. They noted that green activists were politically marginal and loosely organised. They contended that they were prone to apocalyptic thinking for all kinds of sociological reasons and they eventually viewed them as analogous to religious sects. Douglas and Wildavsky argued that to sustain internal order such groups identified the external world with disorder. Like marginal sects, marginal activists would be more interested in maintaining their own purity by viewing others as tainted than in seeking neutral knowledge about a common world shared by all. In this analysis, the material reality to which the science referred, the imported wastes with their actually and potentially toxic effects on the places where they ended up, was less important than group dynamics. The cultural explanation that *Risk and Culture* offered was either relativist and noncommittal about the reality of the problem, or it took sides with the *status quo*. Its authors aligned with the institutions of late industrial modernity with their faith in science and technology, their bureaucratic commitment to 'all other things being equal' and their lack of interest in material forces.

From my ethnographic perspective, to live in the neighbourhood of a potentially dangerous facility importing other people's waste did not bolster faith in scientific institutions. Nor did it feel democratic or just, since at issue was waste, physical matter with unwanted effects that those responsible could afford to send 'away'. All that is said with hindsight. At the time the deposit and its problems were understood by most people I met in a way that is recognizably modern: the main problem was secrecy maintained by interested parties in order to wield power over a weak public. Fact-based science was being distorted by politics. This was how the toxic waste facility was generally

understood locally, but there were other campaigns that took aim at issues that would not bend to this logic of science being either pure or tainted. Among other campaigners who were protesting road building and biodiversity loss, for example, science and technology at least offered a way to understand and even solve the problem. These other local campaigns were mostly about facilities yet to be built, and so debate revolved around what and how to prepare for the future.

My fieldwork was spent following highly contested arguments on many sides, many evenings a week, in events of different kinds where scientific expertise was never far away. It appeared in many forms and many idioms and, from my perspective, was rarely if ever caricatured in a way that stripped it of its historical and social baggage. There was occasional 'science-bashing', but for the activists, for me and among my academic peers, it was important to complicate matters in a constructive way. Because science appeared in this context as 'our' way of knowing, dealing with it was part of the identity I shared with activists, many of whom were themselves scientific experts.

Culture, aesthetics, interests, accidents, and all kinds of supposedly non-scientific things went into scientific knowledge.

Once fieldwork was over I had a jumble of data to make sense of. As I worked through it, scientific knowledge and its global reach, with its epistemological and practical powers, always threatened to creep into my judgments about people and groups. But so did the physical materiality of the issues that people were arguing over: biodiversity, pollution, invisible but measurable electromagnetic radiation, and a host of other 'green' issues that people discussed but were not the main focus of their local activism. All these debates sooner or later ran into contested knowledge claims and questioned the power of science to resolve the environmental argument. It was a revelation and a relief to realise that those claims would never be settled, not in my work and not anywhere. In Steve Woolgar's words,

"our knowledge of 'the way the world is' is shaped by the technologies of representation involved in our apparently neutral observation of the world" (1988, 103). Ethnographic research combined with political boldness had led sociologists like Woolgar to show how a cultural lens could yield important insight, not just about the critics but about the most hallowed of scientific institutions themselves. Culture, aesthetics, interests, accidents, and all kinds of supposedly non-scientific things went into scientific knowledge, not just in the context of popular or grassroots knowledge (those belittled by some researchers as akin to religious fanatics), but even in the labs of my natural science peers at university. In fact, historically and sociologically informed researchers were already applying a cultural lens to knowledge produced and authorised by scientific research, as, for instance, in the journal *Science as Culture* that had started in 1987.

SCIENCE, LIKE THE ENVIRONMENT, IS SOCIAL

Practically all decision-making today requires some understanding of science and technology. The need, in the current crisis-mode attaching to environmental change, is not for scientific experts so much as for appreciating their limitations. There is no expectation that technological and scientific consensus will deal with a worldwide series of environmental threats. Approaches to environmental problems range from confidence in future technologies, often called ecomodernist, to endless variations of hope and action towards social and cultural transformation or transition, with some people and institutions pursuing both. A social science interest in the issue leads to putting the social and political power of science into a historical context. And so, as a doctoral student, I devoured accounts and analyses of how science and technology had achieved their glory. The very effort took away some of that glory.

I was taken aback to learn how important to modern science were the early dabblings of wealthy gentlemen in Renaissance Europe, mostly keen to show how cultured and sophisticated they were. In the 1993 book *The Golem: What everyone should know about science,* two key figures of STS, Harry Collins and Trevor Pinch, wrote for a popular readership about the ways that science, contrary to its reputation, is messy and clumsy but also powerful, while being

unaware of its own dangerous power. In many ways its internal hierarchies, they argued, had always mirrored wider social patterns, with pure science more esteemed than applied science, technology (or engineering) seen as derivative, and the natural sciences generally more valued than the social and human sciences.

Approaches to environmental problems range from confidence in future technologies, often called ecomodernist, to endless variations of hope and action towards social and cultural transformation or transition, with some people and institutions pursuing both.

Gradually I learned that the literature complicating such notions was already massive. But it had not sprung out of nowhere, and it was interesting to learn that the concerns of scientifically oriented environmental activists of the 1960s and 1970s correlated with shifts in how science had developed (Jamison 2001). When 'radical' and even 'anti-science' critiques of industrial culture had gained popularity, they had benefitted from Thomas Kuhn's 1962 landmark book, *The Structure of Scientific Revolutions*, which argued that science does not simply mirror nature nor advance in a linear fashion, but rather through disruptions to convention. This had put social and cultural circumstances into the sciences in a new way.

The colonial experience of physical, economic and conceptual violence, was another resource for challenging conventional images of science and modern existence. Science was also about identity, it seemed. Europeans, the settler colonials and others, whose lives largely unfolded without acknowledging their dependency on nature, on carers, on luck, or much else, were the groups who most easily claimed the heroic image of modern science as their own. Studies of Indigenous knowledge, but also of the encounters between the colonisers and the colonised, were, however, full of

challenges to the presumed unity of science and its role in ideas about European superiority (Fairhead & Leach 1996). Despite my undergraduate studies in anthropology, ultimately the history of science had appeared to me as a universal history. I had almost accepted that European rationality, such as the 'scientific management of industry', say, was the pinnacle of human achievement. But when I delved into histories of the encounter between European explorers and the places they claimed to have discovered, the linear account of scientific progress provided by my standard education in the UK and Finland was replaced by a view where the role of colonialism in the very idea of modern science altered the picture in crucial ways (Nandy 1988; Haraway 1989; Grove 1995). Importantly, this literature did not caricature, let alone criticise science as such; much of it was nuanced analysis with few heroes or villains. It taught me of how settlers and Indigenous cultivators in the Americas exchanged knowledge as well as microbes (Cronon 1983) and of the way empire could engender both ignorance of devastating consequences and new knowledge of incredible power at the same time. This perspective on colonial history made clear the extent to which imperialism shaped European politics and identities and supported its political economy (Pratt 1992). But it left plenty of intellectual puzzles still to be worked out.

One issue was the entangled relationship between science and technology, which Bruno Latour (of whom more below) captured with a neologism, technoscience. Much environmental change and conflict was better conceptualised through the study of technology than science. From that position, the notion of the Social Construction of Technology (SCOT) was all but intuitive. Literature on the history and sociology of technology helped do away with the lingering technological determinism and optimism in scientific progress that had once dominated policy and education. If the construction of technology is also the construction of material impact, technological change is, and always has been, shot through with meaning, values and aesthetic preferences. These all help as well as hinder the uptake of innovations. Technologies also enforce certain practices and so uphold particular social order, a point well illustrated by feminist analyses of

industrialisation. The differences between men's and women's pursuits that capitalism normalised were as much about meaning and value as they were about practical or 'natural' differences between the sexes. The wider lesson is that when technological change compels people to behave in particular ways or be excluded from society (not having access to or a desire for novel gadgets, for instance), it is not just technology that has been constructed, but economic relations and human lives. The SCOT literature (Bijker et al. 1987) was a treasure trove of examples of how social and human are the environments we inhabit, and how gendered, racialised, and class-based are the activities we undertake as human beings.

In the early 1990s, studying these histories led to viewing modern knowledge and its institutions as always dynamic and changing, and always social. Learning about scientific or environmental controversies, some of which we lived through in 1980s and 1990s England – Chernobyl, mad-cow disease, controversy over genetic modification – showed how much labour and other resources, such as public relations exercises, went into constructing legitimate knowledge. Feminist and other subaltern research challenged claims that relied on the principle of 'other things being equal' when experience and impact were anything but equal. Thanks to them, it is now possible to note that "academic ways of knowing bracket, forget, and conceal much" (Law 2016, 19). If countless marginal figures had pioneered critiques of the presumed or imposed universality and equality of science, the often mischievous and sharp writings of Donna Haraway and Bruno Latour gradually made more room for exploring alternative ways of working on science-society entanglements within modern academia.

Bruno Latour's influence was huge. He argued, as in the title of his much-cited book, that *We Have Never Been Modern*. In the modern world, categories appear clear and distinct and agency easily attributable – as when an individual subject is treated as a responsible actor. Alas, significant things end up being ignored this 'modern' way simply because they are not noticed, recognised or named. Mistakes creep in, Latour noted, thanks to description and analysis keeping subjects and objects separate. Analysis was pursued on the basis

that objects were inert or subject to external control. Toxic material, however, could act in very harmful ways, either by design or by accident, a molecule combining forces with other molecules or entities, for instance, often to deadly effect. Latour laid out the paradoxes and self-delusions of the most powerful representatives of the modern world in a way that echoes, though rarely acknowledges, feminist scholarship.

On discovering the work of Latour and Haraway and particularly on getting the sense that I understood even just a bit of it, new well-being took over my body and mind.

Latour, Haraway and others highlighted the fundamental role of rhetoric in science, but also showed that words are not enough to construct facts. Other powers are always at play. Material processes were shown to participate in the form of petri dishes, computer simulations, journal citations, and so on. All knowledge, we learned, appears stable enough to appear fixed but is always likely to be unsettled, to become labile and precarious in experience and representation. As Haraway put it, "[a]ll knowledge is a condensed node in an agonistic power field" (1991, 185). If STS made room for politics in knowledge it also put technoscience into the environment, now more clearly seen as a hybrid or mixture of both natural and cultural entities. This facility of STS to specify the heterogeneity and contingent features of actors in networks at the same time as highlighting the real effects and capacities of those hybrids and networks, made it easier to incorporate materials, meanings and the dynamics of complex systems into our accounts of environmental disagreement. Whilst the 'modern' but problematic habit of behaving as if nature could be perfectly known and confidently harnessed, exciting alternatives were opened up through innovations associated with Latour, such as actor-network theory or ANT, and through Haraway's language of hybrids and monsters. On discovering the work of Latour and
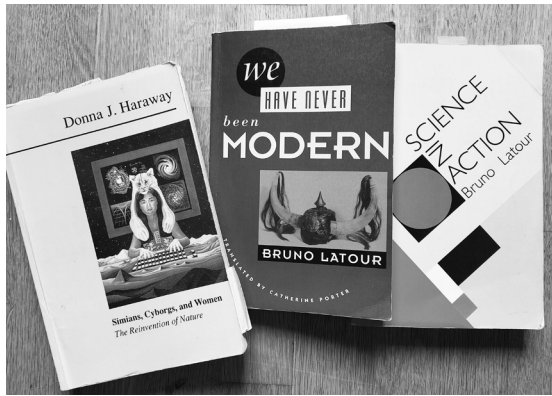
Haraway and particularly on getting the sense that I understood even just a bit of it, new well-being took over my body and mind. Text on the page felt more alive than I had ever realised was possible.

All this was relevant to politics. The question of whether those in charge were sufficiently capable of keeping the world safe had been posed in Ulrich Beck's pioneering work mentioned above. The arguments of the anti-toxic-waste activists whose work I followed aligned with Beck's proposition that, ideally, good governance would follow unbiased and objective science. But people and institutions have positions and construct knowledge from partial perspectives. Ultimately, the social system itself is so suffused with complex and potentially hazardous technical systems overlaid one atop of each other as to make it impossible to declare with confidence that everything is fine.

In 1992 while I was still 'in the field' the big annual anthropology conference in the UK, the ASA (the Association of Social Anthropologists of the UK and the Commonwealth), turned to the theme of environmentalism. Besides giving new confidence to my research interests, it introduced me to emerging scholarship in social studies of environmental politics. I was not the only one asking questions about green groups' distrust of scientific authority or about their reliance on that same authority. Many fine minds were producing situated and contextually rich analyses that could translate into critiques of environmental governance and environmentalism, particularly in Europe and other wealthy parts of the world. *Environmentalism, the View from Anthropology*, edited by Kay Milton from contributions to that conference, was one of the first works to offer me a sense of

an academic home. Not philosophy, history or political analysis, it marked a space for a new venture – environmental social science.

Thirty years later Greta Thunberg and others have called rather straightforwardly on society to 'listen to the science'. Perplexingly, perhaps, from an environmentalist point of view this both makes sense and doesn't make sense. The internal complexities, hesitations and contradictions of this thing called science are such that it is important to resist reifying it just as it remains important to resist essentialising society as a unified actor, both familiar principles of STS.

THE INFRASTRUCTURAL TURN OR LIVING WITH (OTHERS') SYSTEMS

Today publics around the world know that the confidence once associated with science was misplaced. But as Thunberg's plea makes clear, there is no option but to continue to rely on science. Hence the great importance of writings on science and technology that are accessible to non-specialists. I have come to agree with Isabelle Stengers, another giant in STS, that what "matters is [...] the possibility of creating relevant modes of togetherness between practices, both scientific and non-scientific; finding relevant ways of thinking together" (Stengers 2018, 145). But Stengers also encourages careful analysis rather than swift judgement. Thus, although Thunberg is no doubt right that 'the' science is not getting the attention it should, my STS-informed academic sensibilities lead me to trying to pay attention to and analyse how social and cultural dynamics are entangled in scientific discourses. Recognising its cultural dimensions does not make technoscience any less significant or powerful. In fact, the culture in technoscience is absolutely central to environmental politics, because it so shapes the structures that our lives now depend upon, our infrastructures.

Infrastructure is a key topic in STS and a persistent focus of social movements and research under the banner of environmental justice (EJ). This politically motivated activity above all has helped de-normalise industrial disasters and reflected critically on the impulse for growth and development. EJ highlights people and places, inequalities and differences, but environmental

justice campaigns typically do rely on science and technology (Cohen & Ottinger 2011).

Such considerations now feed into studies of the many damages brought about by the public and often global infrastructures on which our complicated modern lives depend (Tsing et al. 2020). In their influential book, *Sorting Things Out*, Geoffrey Bowker and Susan Leigh Star (1999) showed how standardised infrastructures – units of measurement, say, and the equipment for taking measurements – helped manage global processes involving heterogeneous actors. Resources could be extracted anywhere and put to work in standardised ways to operate as systems across different contexts. The engineering and economic expertise through which industrial infrastructures have historically been managed bracketed and concealed much, to use Law's words (quoted above). Gradually, however, efforts to keep human and natural processes separate have faltered, and alongside concerns about the viability of earth systems, a fascination with infrastructure, which is human and nonhuman at the same time, has blossomed. Across many fields, scholarship has built on STS vocabulary and produced an outpouring of studies where people, things, and meanings mingle in global assemblages (Ong & Collier 2005). The result is a further shift of perspective, which allows issues that were recently presented with confidence as environmental or to do with nonhuman nature to appear, instead, as multidimensional and political. So while trust in technology and ever more sophisticated infrastructures fuels business-as-usual in centres of power, critical analysis abounds.

Recent field encounters in rural Finland (Berglund 2024) have again highlighted the political salience of infrastructures and technoscientific expertise, leading me to argue, as before, that technoscience is multiple and messy but also, following another key STS principle, that knowledge is situated (Haraway 1991). For all claims to objectivity as neutrality or a 'view from nowhere' eventually turn out to be views from somewhere and therefore partial. In English the word partial points to two meanings: being a part of something bigger and enjoying or liking, 'being partial to', something. Even if the sources and even effects of its partiality are easily hidden, science too is partial. But Haraway argued that though a claim to globally

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objective neutrality can be undone by pointing to a subject or subjects of knowing somewhere, however hidden, the politics of knowledge could be understood quite differently. It might be less a question of opposing objectivity and subjectivity, and more a case of treating knowledge in a more playful and integrative way. To quote a much-cited text, "I think my problem and 'our' problem is how to have *simultaneously* an account of radical historical contingency for all knowledge claims and knowing subjects, a critical practice for recognizing our own 'semiotic technologies' for making meanings, *and* a no-nonsense commitment to faithful accounts of a 'real world', one that can be partially shared and friendly to earth-wide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness" (Haraway 1991, 187, italics in original).

Haraway's observations, rooted in extensive analysis of technoscience, remain remarkably relevant. More generally, the language of STS, now expanded to discussing the material effects of an industrialisation that was grounded in modern science and technology in all their heterogeneity and historical unevenness, is tremendously helpful to environmental social science. It is almost impossible to imagine a way of approaching the perplexing politics of how to keep living on planet Earth without something like STS. This is particularly so in the wealthy contexts within which I have always done research – where the shock of power inequalities or violence done to others in the name of progress is more muted. Today people and their things exist together in shared relationships of dependency, but not always in explicit ways that political action could deal with or even identify.

Certainly STS can make it more, not less, difficult to be precise and authoritative on matters that

animate politics. There is no stopping rule, it seems, for the entities that might be relevant. This makes 'paralysis by analysis', as one of my colleagues calls it, an ever-present danger. For all that, as someone whose inclinations led me to the social sciences, I am extraordinarily grateful that STS made it possible for me to pursue the irritations of my civic life into the academic world and beyond. As environmental social science continues to flourish, I know I have plenty of company in which to pose questions that might reap some very human rewards.

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