ABSTRACT

Just as what is regarded as labor, land, health and mobility have changed under neoliberalism, so too has what is regarded as climate. Under previous phases in capitalism, climate was construed as part of a nature external to, yet interfacing with, society – as a condition for accumulation; as a resource; as an object of conservation; as a computer-modellable system. The neoliberal state builds on these conceptions in reconstructing climate also as rentable and marketable units. A thorough grasp of the exploitative and neocolonialist politics that this innovation perpetuates and deepens requires dialogue with indigenous peoples, peasants, workers and their collective history.

Neoliberalism's Climate

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> **"The climate system is natural capital … capital created by nature, not us … an asset that is … valuable because it generates a flow of services over time."**
>
> Geoffrey Heal (2015)

Is it useful to label the current political era "neoliberal"? Those of us who think that it is are in roughly the same predicament as periodizing historians of music. We have to explain not only what is importantly new about the period we single out as significant, but also how it grew out of what went before. What did Mozart, Haydn and Beethoven do so differently that would justify reserving a special name – "classical" – for their style? Yet in what ways was the very distinctiveness of their innovations dependent on earlier developments associated with, say, Vivaldi, Handel and Bach – or for that matter 12th-century polyphony (Rosen, 1975, 1988)?

This chapter defends the term "neoliberal" as a significant category of historical analysis by arguing that what has been made of climate through a range of practices to which the label is attached is deeply novel, yet also multiply dependent on the ways in which climate has been co-constructed during preceding eras of imperialism and regulated industrial capitalism. Just as important musical eras reconstruct what music is in terms of, for example, its tonal organization or social embeddedness, so neoliberalism creatively reworks the capitalistic organizations of climate that it has inherited. Conversely, the construction of a planetary ecosystem service economy that includes climate plays a part in constituting and developing neoliberalism.

In investigating what count as climate and climate change for neoliberalism, then, a first step is to consider what they mean for capital. A crude, oversimplified analogy may help pave the way for a more extended analysis: capital tends to experience deleterious climate change in somewhat the same way that it experiences the degraded well-being of workers. At first, worker well-being tends to be invisible to capital. Laborers are worked to death in efforts to extract more and more surplus. When blowback appears in the form of resistance, refusal and industrial breakdown, worker survival intermittently becomes visible as one "condition" for accumulation that must be conserved in a modified shape against capital's tendency to threaten it. The state learns to interest itself in the particular kind of well-being that has to be protected in order for accumulation to continue: in 1847, Britain passes the Ten Hours Act; in 2007, China enacts a new Labor Contract Law. What is this well-being, how much is really needed and by whom, and how might it be secured? That is, when, where, how, and to what degree must capital be restrained from "externalizing" costs onto the

bodies and subsistence activities of workers? As negotiations unfold amid conflicting traditions of well-being and diverse medical transformations, new varieties of health become defined and entrenched in countless bureaucratic and regulatory actions and reactions. “Labor rights” and “health services” emerge. It is objects such as these that are subsequently privatized and converted into standardized, appropriable, deliverable 'units' under neoliberalism. What has evolved partly as conditions for or “services” to capital accumulation themselves become objects to which second-order “services” and units of “benefit” can be provided.

This chapter will begin its own particular tale of continuity in change by touching on various inherited aspects of neoliberalism's climate. In particular, it will review some of the circumstances in which, since colonial times, climate and society have been made to seem external to each other as part of larger movements toward organizing nature/human binaries and a “global environment” – movements that have accompanied increases in labor productivity, possibilities for efficiency, scarcity and economies of scale and velocity, mechanization, and the centralization of expertise, as well as the development of the conception according to which, instead of humans belonging to the world, humanity is seen to “consist, in essence, in the transcendence of physical nature” and the world to belong to it (Ingold 2000). Concrete ways of externalizing climate, it will suggest, have provided materials for the neoliberal innovations of climate rent and climate commodities in much the same way that concrete ways of externalizing land from human activities have played a part in widening land and labor markets. Climate as object of colonial management; as external determinant of or limit to human activities and biotic systems; as average weather which is nevertheless subject to change; as molecules and radiation; as chaotic but modellable global circulation system capable of independent agency – all have all been enlisted as material for characteristic neoliberal operations. Among the end results have been the following:

- Regulatory “boundaries” limiting the excesses of the accumulation process have been globalized, pollution made more abstract, and an expanded palette of compensations and equivalences pressed into service to help override local barriers to extraction, production and circulation.
- Climate change action has been transformed, largely through the agency of the state, into the generation of tradable, priced and ownable units of molecular “mitigation”.
- New forms of territory and rent have been created by the state and distributed to assorted elites.
- Industrial and financial powers have been both deresponsibilized and handed extended powers to define social choices.
- Meteorological forces have been enlisted in exploitation, oppression and capital accumulation in fresh ways.

Persisting Histories of Conflict

It has only been through discontinuous, varied, contested and fairly recent historical processes that some intellectual classes have come to be able to conceive of and propose climate as an internally-coherent worldwide physical system impinging on separately-constituted societies, economies and ecosystems and susceptible to being changed globally through external “forcings” or external technocratic management. The climate that many elites talk about today has been, in the words of geographer and climatologist Mike Hulme (2011: 247), first “extracted from the matrix of interdependencies that shape human life within the physical world, then, once isolated, elevated to the role of dominant predictor variable.” Every day, newspapers and television consolidate this new common sense with a flood of predictions about the “impacts” or “costs” of climate change on something “outside” climate (“a one degree rise in temperature means a fall in per capita income of eight per cent”) as well as items about, for example, “climate refugees” and “climate wars”.

At most times in the past – as in most places today – what is currently referred to as "the climate" by environmentalists, national states, the United Nations and the climatology profession as a whole would likely have been – or actually is – regarded as an aspect of an exotic, newly exploitative kind of politics. From this point of view, climate is neither natural nor social nor a hybrid of the two, but bound up into "substantial, living forms" and part of the "active formation of the lived environment" (Taylor 2015: 39). When, in Tibet, weather regarded as part of a complex of specific qualitative relations among humans and nonhumans encountered postwar Euro-American climatology (Huber and Pedersen 1997), what resulted was not an adversarial "politics of knowledge" or disagreement about how to interpret an external world, but rather a "staggered transformation of the socio-ecology of the Tibetan plateau in which lives and livelihoods were slowly drawn into a new field of relations with different forms of political authority, organizations of labor, changing social hierarchies and new means of ordering the landscape" (Taylor 2015: 39). Among these new relations were, among other things, direct or indirect interactions of Tibetans with maps, clocks, timetables, archives, travelling scientists, thermometers, barometers, chemical laboratories, telecommunication, satellites and supercomputers, as well as encounters and intermixing – as widespread in industrialized societies as elsewhere – between practices enforcing Newtonian space and time and practices of orientation and coordination associated with commoning and what anthropologist Tim Ingold calls "wayfinding" (Ingold 2000). By the same token, ordinary people in rural Pakistan today have no trouble in understanding that their government's contention that "climate change adaptation" is a matter of protecting a functioning "social system" against disruptive physical change coming from outside it is hostile to their efforts to survive under conditions of global warming (Taylor 2015: 137-8). It would be difficult for them to think otherwise, given their experience of the way that the pushing of smallholders onto marginal land through the workings of debt and dispossession since the 19th century has "constructed an uneven human topography of vulnerability to flooding"; the way that the pushing of other smallholders further and further up new irrigation canals has made them more vulnerable to drought; or the way that "productivity" in their country has become associated with proletarianizing economies of scale rather than labor-intensive small-plot agriculture – an association that has gone hand in hand with the sharpening of precisely that divide between nature and society that is instantiated in the United Nations conception of climate (Taylor 2015: 129-137).

Such encounters are emblems of a persisting history of friction over the complex nets of relationships that influence what weather or climate are supposed to be. This history is extremely heterogeneous and contingent. Even within the relatively small world of climate science, for example, huge shifts have taken place over the past 150 years. At first, climate science was a geographically-oriented study "describing the collective effect of local atmospheric phenomena on human senses" (Fleming and Jankovic 2011). To describe "climate" *was* to describe differences among different locations; "global climate" would have been close to a contradiction in terms (Heymann 2011). Later on, in part through the varied and idiosyncratic agencies of globally-linked measurement bureaucracies, flight and space technologies, and computers, climatology became almost exclusively a physically-oriented study treating not only large-scale weather systems, but also oceans, mountain uplift, photosynthesis and the rest of a unified "earth system" considered as an isolatable mechanism. Focusing less on variations across space, it concentrated increasingly on variations over time.

Such changes – and there are many more in the history of climate – are resistant to having any simple pattern imposed on them. Yet, over the long term, numerous processes of externalization and abstraction of climate and society from each other are discernible. In various ways, these processes have both reflected and helped to constitute capitalist and colonialist interests. They have also

played a deep role in political conflict. For example, the earlier view that climates and latitude zones were interchangeable – ultimately traceable at least as far back as Hippocrates – became by the 18th century a tool that, from a distance, "enabled an entrepreneur to wield expertise in the geography of colonial investment" (Jankovic 2010: 204) and comparative advantage by explaining the different kinds of "productiveness" or profitability of different regions – in addition to justifying the dominance of imperialist societies through an association of climate with social attributes ("heat encourages laziness and backwardness") that has survived down to the present even among liberal thinkers (e.g.., Galbraith 1979). By the 16th century, pioneering intellectuals in Iberian colonies were trying to work up a coherent picture of a divinely-directed global nature that could explain anomalies such as the way tides and winds moved in the "wrong" directions at the "wrong" times in the southern hemisphere (Canizares Esguerra 2006). In the 17th century, Edmund Halley identified a mechanism of worldwide trade wind circulation in the rising of hot air in the tropics (Edwards 2013: 29-30), and by the 19th, global climate maps featured isotherms and isobars drawn across huge regions increasingly linked by world commerce. Further "abstraction of meteorological knowledge from the people and places that produced it" into a "physical-dynamical model of the global climate" took place as a part of the pre-World War I imperial science associated with the Habsburgs and Romanovs (Coen 2011: 62, 45). Through fitful processes involving globalization and "real subsumption" of space and time, climate was gradually becoming one of the so-called "abstract" natures characteristic of societies dominated by the imperatives of capital accumulation (Moore 2015).

Early colonial discussions and actions on observed *changes* in climate can also be seen as important steps in the abstraction of climate from culture, that has provided a foundation for neoliberalism's innovations, whether climatic shifts were seen as potentially manageable threats to colonial production (as on various island colonies and in India) (Grove 1997); the benign result of civilizing European influence and the displacement of indigenous peoples (as in North America) (Vogel 2011); or the dire outcome of a Spanish imperialism insensitive to the balance of nature (as in the discourse of Alexander von Humboldt about the drying up of regions of Venezuela and Peru) (Cushman 2011). The climate that was seen as changing in all of these instances had not yet been separated out into the pure, integrated, three-dimensional worldwide physical agent or force that intellectuals and politicians talk about today. Yet these earlier efforts to isolate or manage it frequently involved a kind of oppression that continues in the neoliberal age in parallel forms.

For example, many of the European colonialists who populate Richard Grove's environmental histories attributed the anthropogenic climate changes that they perceived to deforestation. Beginning in the 16th century, a whole discourse arose in colonial societies on islands such as the Canaries and Madeira, as well as in Central America, about "desiccation" caused by capitalist plantation agriculture. By the 18th century, official forest protection programs were in full swing on islands from Tobago to Mauritius, and, in the 19th century, became a central preoccupation of colonial authorities and a new category of "state scientists" on the Indian subcontinent and in Africa. Such programs' purposes included sustaining a climate suitable for colonial plantation and timber production based on the takeover of commons, but also securing colonial governments against threats posed by social unrest spurred by climate change, preserving exotic or huntable nonhuman species in an Orientalized "Edenic" environment, and even, to some extent, protecting a nature conceived as global (Grove 1997). Climate became climate *for* a colonialist society – for rulers (to secure plantation productivity or nature conservation) but also for workers (partly to keep them from rebelling). Because colonial forest managers tended to bracket capitalist practices as unquestionable and were not in the business of extending the myriad noncapitalist relations constantly re-emerging in commons interactions among humans and various non-humans in specific locales, they inevitably found themselves helping to construe a monolithic climate connected to a

monolithic society only through an interface of scientific management. Following assumptions still widely held today, this climate came to be seen as corrigible, stabilizable and to some extent predictable. Not itself a resource or commodity, it was treated as one of their "constitutive outsides" and its management externalized to a sphere of state conservation. The effects, as Grove observes, "were frequently just as destructive or oppressive in their effects on indigenous societies as direct ecological destruction and appropriation of environments and common rights by private capital" (Grove 1997: 183) – an observation that is in no way contradicted by the inevitably numerous practical, sympathetic colonial and indeed postcolonial efforts to enlist or hybridize "native" subsistence or commercial practices on the land in the cause of forest preservation. In newly-evolved forms, this colonial-style oppression continues today in ex-colonized nations where forests are being re-managed to produce tradable tokens of climate betterment for a world carbon market – even if the "climate" and "forests" being protected are now defined differently, and many of the managers are different and, as described below, doing different, distinctively neoliberal things.

Although many ways of externalizing and investing in climate tended to be pioneered in the colonies, a discrete "air" requiring management was also emerging in Europe. Even prior to colonial times, smoke from coal fires was regulated in cities like London as a nuisance and health hazard, although it was not until the 20th century that research on the effects of air pollution on worker and urban populations became widespread. With the rise of fossil-fuelled industrialism, smoke took on a more sweeping significance. Steam engines, batteries, dynamos and motors manifested the fusion of a number of hitherto separate natural phenomena into a seemingly limitless, mobile thermodynamic energy sourced from eons of prehistoric plant growth, an unparalleled resource for disciplining, concentrating, and raising the productivity of labor, as well as for reducing turnover time (Corner House 2014). Steam and smoke came to be as crucial to industry and transportation as reliable rainfall was to colonial plantations, part of the "irreparable rift in the interdependent process of social metabolism" that Karl Marx identified as being part and parcel of proletarianization and new forms of accumulation and class struggle (Marx 1981: 949; Foster 2000; Malm 2014). Just as, in the colonies, the climatic impacts of plantation agriculture had to be reconciled with capital accumulation, so too in Europe, the climatic impacts of fossil-fuelled industrialism had to be squared with the developing thermodynamic construal of energy as monolithic and eternally scarce (Corner House 2014; Illich 2010) – a construal that today is so thoroughly "naturalized" among educated elites worldwide that it is projected into a billion-year future (e.g., Brown 2015). Although apocalyptic warnings about global warming's possible threat to civilization had been issued long before Svante Arrhenius's first calculations of the possible future extent of the greenhouse effect in 1896, at no time was there any question of governing elites drawing lessons for the developing structures of relations among dispossessed commoners, owners of capital, and current or prehistoric nonhuman life.

Systems and Contexts

The 18th and 19th centuries saw the development of many technologies of industrial control that ultimately also proved crucial to neoliberal construals of climate. Automatic feedback control devices ranging from steam engine governors to thermostats and gyroscopes had to be applied to industrial machinery, while the Jacquard loom used in textile manufacture was an early development in punch-card computer control. T. R. Malthus (1798) described a population servomechanism that would keep returning human societies to a condition resembling the brutal transitional capitalism of his day. Fossil-fuelled steam and electrical power, in addition to opening a new era in labor discipline and productivity, facilitating rapid circulation of goods and introducing industrial pollution on a new scale, further encouraged conceptions of communication as a dynamic, complex form of dominion, in which responses to management could be reduced to feedback for

eliciting control adjustments (Beniger 1986).

Early in the 20th century, European colonies nourished the developing science of ecology and ecosystems, as they had nourished forestry before it, resulting in investigations into energy flows in various habitats and connections between climate fluctuations and, say, the evolution of San people in Southern Africa (Anker 2001). Later on, the Second World War became a crucible of forced interdisciplinarity that gave rise to intricately interlinked innovations including systems analysis, cybernetics, game theory, nuclear weapons, modern computers and artificial intelligence, all of which greatly elaborated the control systems that had accompanied the increased material and energy flows of the industrial revolution. As continued military funding encouraged the development of new kinds of human-machine couplings ranging from computerized flight simulators to interactive computing, the bloodline of postwar cybernetics crossed with that of earlier, imperialism-infused ecosystem thinking. Organisms, animal societies and ecosystems alike were theorized by eminent ecologists such as E. P. and H. T. Odum and E. O. Wilson as command-control-communication systems involving multiple feedback loops (Elichirigoity 1999: 33-36; Haraway 1991: 62-68). Meanwhile, Second World War artillery-targeting analogue servomechanisms morphed not only into giant digital nuclear weapons command-and-control systems encompassing the North American continent but also into James Lovelock's NASA-backed models of Gaia, the "living planet". By the early 1970s, Jay Forrester – who had developed fire control servomechanisms on battleships during the Second World War, invented computer RAM (random access memory) in the 1950s, and later on pioneered systems analysis for corporations and cities at MIT's Sloan School of Management – popped up as the presiding spirit of the Club of Rome's computer models of world ecological crisis, which served as a rallying call for new types of integrated global governance of resources, population size and the "international economic situation". The sensitivity of the prominent midcentury US game theorist, computer developer and polymath John von Neumann to the parallels between the modelling of nuclear explosions and the modelling of weather – both problems of nonlinear fluid dynamics not susceptible to normal experimental procedures (Edwards 2013: 115) – meanwhile helped pave the way for computer models of earth's climate capable of tracing multiple and almost unimaginably complex feedback loops on a global scale. With the support of the US Air Force and the Atomic Energy Commission and with some collaboration from the insurance industry, MIT's General Circulation Project got under way in 1948. The first computerized General Circulation Model (GCM) of climate was developed in 1955 by ex-Air Force officer Norman Phillips, a member of von Neumann's computer team.

Economics and management sciences, always susceptible to the charm of machine metaphors, were meanwhile undergoing their own cyborg makeovers, challenged by the postwar expansion of industrial society and influenced by some of the same Cold War figures, including von Neumann and Forrester (Mirowski 2002). Neoclassical economist Irving Fisher had already developed a hydraulic apparatus for calculating equilibrium prices in the 1890s, and the purportedly self-contained structure of relations known as the "the economy" had begun to emerge worldwide as early as the 1930s (later to be given more texture through the work of new bureaucracies creating mobile, exchangeable, comparable national and global statistics enabling the commensuration of commoning and capital and the calculation and definition of national wealth as Gross National Product) (Mitchell 2002; Speich 2011). But it was around the time of the Second World War that quasi-cybernetic concepts like "economic model", "simulation" and "price signal" really began to take hold, and that Friedrich von Hayek began to try to configure economic relations across society as an information-processing device superior to conventional statistics-based attempts to predict and control (Cooper 2011). It was not entirely a coincidence, in short, that some of the innovations

foundational to neoliberalism and to climate modelling emerged roughly in parallel.

The channelling of expertise into the modelling of systems helped update older nature/society, fact/value and science/policy dichotomies into a "systems/context" dualism – linked, like its ancestors, to capitalist production, management and, to a certain extent, property creation. If conventional scientists continued to work hard to give the "untidy world of the laboratory the appearance of perfectly regulated order" (Collins and Kusch 1999: 141), systems experts began to arrange computer-housed multiple feedback simulations in ways that also allowed tendencies toward "balance" or "resilience" to be attributed to external natures – even if the relevant mechanisms usually worked, in Jay Forrester's terminology, in "counterintuitive" ways. Shaped partly by computer evolution and other institutional developments, climatology underwent an accelerated hypertrophy of physical data collection, simulation and theorization accompanied by a continuing atrophy of political, historical and geographical analysis. Just as what mainstream economics labored to isolate – aided by an institutional hypertrophy of statistics-creating techniques and sophisticated mathematical modelling procedures that tended to pass over labor exploitation, say, or the political ecology of fossil fuels – was a discrete "economic system" that an external "state" interfered with at its peril, so too GCMs and Integrated Assessment Models helped limn a binary comprising, on the one hand, a coherent global "climate system" and, on the other, an external, residual "context" or "social system" category into which everything else was implicitly unloaded, including political decisions, individual preferences, class struggle, oil company strategy, an "expanding range of ideologies" (Hulme 2008: 9), and other matters seemingly less modellable, predictable or controllable. "The global knowledge that the Intergovernmental Panel on Climate Change produces,", as Kathleen Fogel puts it, "helps governments erect and then justify their simplified constructions of people and nature, and the institutions based on them" **(**Fogel 2004: 109). The hegemonic problematic became how unspecified, idealized or imaginary climate or economic managers might, with the advice of experts, bring about contexts that would allow the semi-detached systems over which they were assumed to have dominion to work as they were supposed or destined to (whether "working" meant "tending toward stasis or stability", "yielding optimal results", or, as happened later, "being resilient" in the face of catastrophe). While this system/context divide, like earlier nature/society divides, was plagued with multiple and irresolvable contradictions, it was not an academic "mistake" about how the world was that had somehow escaped intellectual refutation. Rather, it *changed* the way the world was, in part because it was an effective mode of assembling capital-friendly responses to political crisis out of a variety of logics, with many of its academic exponents, especially economists, becoming hands-on political organizers of an imagined interface between system and enabling context who attained enormously influential positions in society. Failures to address crisis became problems more of context than of system. Not only did the World Bank perpetually blame the development disasters it presided over on accidents of implementation and inadequately-managed context. In parallel fashion, the United Nations climate apparatus required climatologists first to testify about the workings of the "climate system" – from which any trace of coal companies or agrobusiness had been removed, and in which various uncertainties and indeterminacies tended to be reduced to probabilities – and then to walk out, implicitly shunting all blame for inaction on global warming toward the supposedly separate "political" world of diplomats and states and their lamentable lack of leverage at the interface between enabling context and system.

Cyborg ecosystems and cyborg economies had already long been linked in a way that produced quite general strategies for evading confrontation with the processes of capitalist degradation of both human and nonhuman nature that had been outlined by Marx. "Externalities" treated as incidental nuisances by earlier economists like Marshall or Pigou had been retooled as systems-management challenges in a proposed cybernetic "spaceman economy" (Boulding 1970), in which

everybody becomes aware that the planet is bounded and that what goes around comes around (Lane 2015b). Even before the onset of the neoliberal era, cost-benefit analysis had been expanded to include in its "cost" column a huge range of damage to the environment or to the intangible "services" of social-ecological reproduction. It was only a matter of time before various waste dumps and pollution-absorption capacities were upgraded to the status of objects for industrial management almost on a par with resources and conventional "fictitious commodities" (Polanyi 2001) like land and labor. What historian Paul Edwards (1997) describes as the "closed world" of Cold War cybernetic imagination came to encompass not only the closed world of the ecosystem but also the closed world now described by the Trilateral Commission as the "meshing of the world's economy and the earth's ecology" (Elichirigoity 1999: 15). In place of the physiological or moral "checks" on an inveterately land-encroaching humanity advocated by Malthus, or the world business management hinted at by the Club of Rome, economists learned, between the 1950s and the 1990s, to propound the sweeping "internalization" or pricing of any and all externalities through new markets, taxes and property rights regimes. What might otherwise have been seen as an inherent dynamic of capitalist markets was converted into incidental "market failures" curable by more and better markets and more advanced financial engineering. "Completing" incomplete markets, or making the environment cybernetically "visible" to – or processable in new ways by – the bounded object called "the economy" became approved post-Malthusian methods for depoliticizing struggles over enclosure and degradation. Environmental problems were reconstructed as inadequately-internalized externalities, and (rehabilitated) nature as a mass of properly-internalized externalities. Following 20th-century developments in engineering, planning and insurance, even "natural catastrophes" began to be modeled as probabilistic (Kob 2015).

In one sense, this way of treating the whole planet – whether seen as stocks of resources, flows of ecosystem services, or low-cost natural infrastructure – as a "system amenable to management" (Elichigoity 1999: 37) merely carried forward older appropriationist traditions. Nature was still an ahistorical something-or-other that was subject to prediction and control and that offered specifiable external limits to economic managers bent on profit. It remained relatively constant and self-repairing, given proper oversight (O'Neill 2001: 3275-76). As such, its supposed existence continued to serve as a rationale for the enclosure of commons and a riposte to commoners' claim of the right of all to survival in environments that were typically assumed to require a safety-first approach. While anthropologists trying to "restore" various human groups to some past, supposedly static condition, or to maintain them in their current status, were increasingly forced to confront charges of racism, restoration ecologists and ecosystem stabilizers faced parallel accusations generally only from indigenous peoples (Cruikshank 2005). Yet the systems approach did represent something new at least in that it helped neoliberals develop their trademark claim of being able to tackle all social issues largely through price discovery. What ecological Marxism saw as fundamental crisis tendencies were translated into waste outputs awaiting economic optimization via servomechanisms. In this vision, capital's unstoppable creation of new externalities, as well as increasingly unequal thermodynamic exchange (Hornborg 2012), disappeared in a shimmering spectacle of a late 20th-century perpetual motion machine regulated by green economic feedback mechanisms, or a Maxwell's demon that somehow does work with nothing more than a magically-disembodied form of "information".

Like all purported perpetual motion machines, the proposed new form of environmental governance was troubled by a continual return of the repressed. Servomechanism metaphors were no more, if no less, successful at hiding capital accumulation's more or less one-way degradation of both human and nonhuman nature than earlier economistic mythologies of "equal exchange" had been able to conceal what Marx (1990: 279) called the "hidden abode" of the exploitation of labor involved in production. On the one hand, the imperative of accumulation was crucial to incorporate in machine

construals of "the economy" following the devastation of global war. If, as Marx had urged, capital is nothing if it does not accumulate, so the new "economy" was nothing if it did not "grow". The first big takeoff in the use of the phrase "economic growth" – now so central to international discourse – occurred between 1948 and 1966 (Google 2015). How to square this reality with the new "closed system" norms? The Club of Rome channelled Malthus in insisting that there were "limits to growth". As environmental economics and ecological modernization policies proliferated, other specialists envisaged an ecosystem-like, stable version of capital accumulation in which, in the words of proponent Herman Daly, "value could conceivably grow forever, but the physical mass in which value inheres must conform to a steady state" (Daly 1980: 6). Many economists and scientists posited entities called "renewable resources", which were supposed to be indefinitely exploitable as long as a calculable, more or less linear schedule for their replenishment was respected: "maximum sustainable yield" rapidly became a watchword in the decade up to 1975, as did "reduced throughput" and "sustainable development" thereafter (Google 2015).

Predictably, each such conception ran up against its own stubborn contradictions and resistances. Yet rather than simply eroding the systems/context binary in a linear fashion, some of these forced it to develop in ways that helped sustain it for decades. The US environmental movements of the 1960s and 1970s, for example, pressured the country's federal government to enact environmental legislation with some decidedly non-cybernetic aspects. US pollution-control legislation of the early 1970s was not set out in cost-benefit terms, but required "attainment of national standards" at individual points of emission using particular technologies. Under a 1973 federal law, endangered species were supposed to be defended "whatever the cost" (U. S. Supreme Court 1978), and under other legislation certain kinds of wetlands development were baldly prohibited in certain places. By now, however, economic and policy thinkers had many of the materials needed to rework such atavisms into a more flexible systems form. By 1975, it was possible to say that the Clean Air Act was threatening the expansion of polluting energy and manufacturing industries in many states (Lane 2015a: 28), and thus impeded "economic growth". The US Environmental Protection Agency duly redefined pollution as something to be aggregated, regulated and traded within larger and larger "bubbles" using any means available, not something that occurred at particular sites and had to be fought using specified technologies (Lohmann 2006). By changing what pollution was – and indeed what territory and jurisdiction were (Rice 2010) – it made it cheaper for private firms to maintain compliance with laws regulating it. In the Midwestern US, meanwhile, construction firms, regulators, bankers and conservationists worked together to find ways to make wetlands legislation more "flexible", so that building could go forward on banned sites, compensated for by wetlands "offset credits" generated through improvement, creation or preservation of wetlands elsewhere. Before long, the Reagan regime was requiring federal environmental legislation to pass cost-benefit tests – a commensuration technique that had already been altering the nature of "nature" for half a century. By the early 1990s, a nationwide sulfur dioxide trading program was in operation, relieving pressures for innovation in pollution-control technology.

Climate Trading as System

Climate change too soon had to be integrated with "the economy" and commensurated with other features of the obligatory two-dimensional systems diagrams so that it could be governed "efficiently" according to investment standards. A new climate had to be discovered to sit alongside other emergent natures of the neoliberal era. From early on in the neoliberal era, some intellectuals were asserting the existence of scarce "atmospheric resources" whose value could be determined in order to "decide whether they are worth controlling, and in what way they should be controlled" (Maunder 1970). Others posited the existence of a type of climate that could be "stabilized" at either high cost or low cost (e.g., Lovins and Lovins 1991). Eventually, many experts converged on

the view that states might someday not only be able to suggest optimal global temperature increases, but also to estimate roughly how far greenhouse gas pollution needed be capped to keep temperatures below that level and to limit emissions accordingly. Danish ex-Prime Minister Anders Fogh Rasmussen was explicit about the climate required by his own school of neoliberal policymakers when he advised climate scientists in 2009 that "I need fixed targets and certain figures, and not too many considerations on uncertainty and risk and things like that" (Hulme 2009; see also Miller 2004, Randalls 2011).

In the 1990s, climate-as-molecules and prices-as-natural-signals fused in the hybrid system of carbon trading, which proved to be one of neoliberalism's landmark innovations. Under US pressure in Kyoto in 1997, the parties to the United Nations Framework Convention on Climate Change adopted greenhouse gas markets as an "economically rational" management response to global warming. In the 2000s, Europe moved into the lead in transforming potentially investment-threatening public concerns about climate into a supposedly "depoliticized" market for ecosystem services through the European Union Emissions Trading Scheme (EU ETS). Both the Kyoto Protocol's carbon market and the EU ETS combined "bubble" and "offset" systems, allowing for the circulation of a huge variety of interchangeable tokens or units of pollution compensation. In Polanyian terms, an attempt by society to protect itself from the market through the regulatory state was itself marketized. To quote the words one climate market proponent, Pedro Moura Costa of Brazil's Bolsa Verde, the idea was to "transform environmental legislation into tradable instruments" (Nicholls 2011). After having helped to construct a regulatable, nonhuman climate, in other words, national states and the United Nations then unitized it and made it circulatable.

The units in question facilitated the creation of a "climate rent" (Felli 2014) that could be charged by polluting industries to the rest of society – a welcome innovation at a time when a decline in profits was challenging capital to find new opportunities for accumulation by dispossession. European states were now able to appropriate quantifiable, tradable slices of the earth's carbon-cycling capacity and deliver them to their largest corporate emitters in proportion to their prior use of it. Both inside and outside the Kyoto and EU ETS markets, polluters were also provided with mechanisms to supplement these holdings by cheaply annexing various climate change-mitigating capacities outside the "bubble" in the form of "offsets", further reducing their costs. For example, a project which reduced HFC-23 emissions from an industrial plant in Korea beyond the level that consultants specified "would have been the case without the project" could produce cheap credits for sale to European industries which legally empowered them to use or sell on equivalent entitlements to the earth's carbon-cycling capacity. Similarly, the molecule-based systems fiction that fossil fuel combustion could be "neutralized" by adapting land, trees and crops for maximum carbon absorption helped perpetuate the technopolitical structures facilitating the disastrous flow of prehistoric carbon out of the ground into the earth's oceans, atmosphere and land surface, where it continued to accumulate. Investor freedom – already long protected by a society/nature divide whose "nature" component was claimed to be defensible through "limits" – was further extended by the unitization of the limited territory and a trade in climate services.

True to form, the systems/context dualism inherent in the new markets helped them not only to survive over a two-decade stretch of proliferating failures, but even to spread to new jurisdictions. The collapse of successive attempts to make carbon markets "work" as advertised – for example, delaying auctions to relieve pollution rights oversupply, abolishing certain kinds of offsets, taking action against corruption, promising to auction a greater proportion of permits in the future rather than giving so many away for free – could always be attributed to political context, leaving the postulated "system" free of blame (e.g., Hahn and Stavins 1995: 203; Hahnel 2012a, 2012b) while facilitating further delays and dispossession. Carbon markets and the regulatory nature on which

they were based were also justified, at least provisionally, on grounds of heuristics. It was not that anyone "really" believed that given the right carbon emissions budget or limits on temperature rise (2 degrees Celsius, say, or maybe 1.5 degrees, or maybe 4 degrees), the earth's climate would maintain equilibrium with a quantifiable degree of certainty (Boykoff, Frame et al. 2010), or could be relied upon to continue to provide a manageable environment for a certain level of global GDP. Nor did anybody think that the scarcity provided by the weak caps legislated under the Kyoto Protocol or the EU ETS was enough for the economic "system" to function in a way that could seriously address global warming. But experts did continue to propound the claim – which the nature they had co-created in a sense "believed *for* them" even if they themselves did not believe (cf. Zizek 1989: 31) – that trading in scarce pollution permits fashioned out of state-regulated caps, limits and "planetary boundaries" (and out of the financial mechanisms required for their circulation) must somehow be a "step in the right direction". The existing inadequate caps were, it was implied, merely dummy variables to get the economic-ecological machine up and running until such time as better numbers from scientist/economist/policymaker collaborations became politically possible.

The detailed political mechanics of commensuration, however, could not but spell eventual trouble for the new climate. As many observers pointed out, in the science/policy process, models for optimizing climate change had a way of becoming "truth machines" rather than just heuristics or tools for policymakers to think with, bringing economists' climate into increasing conflict with that of climatologists (Wynne and Shackley 1994; Randalls 2011). For carbon markets to be seen as environmentally relevant, moreover, some correlation had to be posited between the number of carbon permits in circulation and increments of climate stability, no matter how lax the caps were out of which the permits were made; yet it was obvious to serious analysts that carbon trading was actually worsening the climate crisis by, among other things, licensing increased exploitation of fossil fuels. To make matters worse, a second cybernetic wave was eating away at the picture of sustainable appropriation associated with the new market-friendly natures. This wave came partly from the increased mathematical power of computer weather modelling itself, which over time had revealed climate's unpredictability. Especially in the last two or three decades of the 20th century, homeostasis-oriented game theory, general equilibrium models, conventional approaches to the regulation of finance and old ideas about "climax" or equilibrium-prone ecosystems were more and more forced to give way to theories of chaos and turbulence in non-linear complex systems that emphasized discontinuities, path dependence, nonequilibrium ecologies, unpredictable tipping points, unknowable uncertainties, the extreme sensitivity of outcomes to initial conditions, and so forth, giving new substance to Hayekian suspicions about Walrasian equilibrium and managerialism in the mode of a Keynes or even a Milton Friedman (Cooper 2010, 2011). It was perhaps not coincidental that this second-order complex systems and nonequilibrium ecology theory came to prominence in an era in which profit crisis, the demise of Bretton Woods exchange-rate governance, and the decline of Fordism was encouraging new waves of disaster capitalism, accumulation by dispossession, financial thievery from an uncertain future, investment strategies involving derivatives premised on volatility, and all sorts of speculation, gambling and "creative destruction". Instead of attempting to minimize the role of the unexpected as an "outlier", many theorists embraced it as an investment strategy; even the debt associated with traditional investments in sites with cheap labor was increasingly linked to esoteric financial products, which, despite having been labeled as "derivatives", began to dominate economic interactions. Ominously, labor productivity began to look as if it were constituted as much by a nonautonomous, nonequilibrium, resistant set of human-nonhuman relations as by a collection of discrete, nonlabor "boxes of 'resources' the yields from which could be individually maximized" (Berkes and Folke 1998: 1) or optimized. Worse, human-nonhuman relations aimed at eliciting sustainable yields from an external nature from which

human activity had been erased began to seem actively at odds with relations that encouraged what ecologist C. S. Holling – who became the director of the International Institute of Applied Systems Analysis – had dubbed the "resilience" that was needed to "absorb and accommodate future events in whatever unexpected form they may take" (Holling 1973: 21; Boykoff, Frame et al. 2010) – including climate events. Growth itself began to be seen less as steady and predictable than as non-linear, discontinuous and dependent on periodic disturbance, disorder and collapse – together with the adaptibility and flexibility that could take advantage of them (Nelson 2015: 472). The right of all to survival in a commons became counterposed less to the vision of a passive and stable nature than to a valorization of *sauve qui peut* in a capricious world.

As mathematical probabilities and linear extrapolations were partly replaced by multiple images of starkly different possible futures, "scenario planning" came into its own at institutions ranging from the World Economic Forum and the IPCC to the World Bank, the International Monetary Fund, the US's National Intelligence Council, the UK's National Ecosystem Assessment and various oil companies and reinsurers, as well as in much scientific practice. Today, Pentagon strategists consult Hollywood screenwriters alongside old-timey systems analysts or compilers of actuarial tables. Bureaucrats trying to calculate how much carbon is "saved" or "stored" by offsets ask "to be held accountable not to predictability but to plausibility and to the quality of [their] practices of convening the imaginations of experts into scenario-building" (Mathews 2015). Quant inventions like the Black-Scholes-Merton option pricing formula are no longer imagined as unproblematic machines for the mass production of financial instruments, but are known to invite catastrophes (albeit potentially lucrative ones for those correctly positioned) unless they are constantly "repaired" *ad hoc* by human traders with instincts for the incalculable (Haug and Taleb 2010). Companies like Royal Dutch Shell toy with the predictability-dependent aspects of carbon trading not in opposition to, but in combination with, the search for innovative profit opportunities in unpredictable climate disasters (Funk 2015).

Three Aspects of Neoliberalism's Climate

At least three aspects of neoliberalism's reorganization of climate merit brief emphasis. First, the standardized units required for the operation of a cybernetic economic-ecological system tend to be different from the units associated with a either a resource or conventional biological system or the elements identified in commons regimes. The contributions of capitalist non-resource nature to capital accumulation, as well as many of the ill effects of resource exploitation on communities, had not usually been a matter for precise quantification. They were not broken down into marginal increments nor their management economically rationalized. The units into which nature was divided (for example, species or molecules) tended to serve other purposes. Conservation efforts tended to have multiple and heterogeneous justifications, including that of maintaining political stability or of preserving some aspect of nature "for itself". Pollution and pollution control mechanisms tended to be associated with particular conventionally-defined sites, regions, substances and agents. Neoliberal natures, on the other hand, tend – albeit with the help of some of the same scientists accustomed to working with the older units (Wynne-Jones 2012) – to be divided into interchangeable "ecosystem service" units allowing aggregation, exchange and economic circulation. Just as the biological nature of ecosystem services is made up not only, for example, of species, but also of exchangeable "species equivalents", so too atmospheric circulation defined as an ecosystem service winds up being made up not only, for example, of molecules, but also of "molecule-equivalents" (for example, 333 CO_2/8.8 CH_4/1 NO_2/0.06 CFC-11) that are collectively certified to be equally destabilizing to the climate and that can all be traded one for another to provide the "same" services to an "economy" (MacKenzie 2009; Forster, Ramaswamy, Artaxo et al. 2007; cf. the "virtual chemical compounds" of an early computer climate model [Heymann 2010]).

Hence a power plant emitting one million tonnes of carbon dioxide per year need not be a source of pollution in the neoliberal sense of the term provided that it has contracted for one million tonnes of "offsets" per year from "carbon-absorbing" plantations in Indonesia or from "foregone" emissions attributed to refrigerant plant improvements in China; rather, it is said to be "carbon-neutral". As the location of pollution expands to a "bubble" where it can be diluted, or to the radius of a "bubble"-plus-"offsets" arrangement, so does the location of pollution control, abstracting nature's space yet further away from the daily work of communities or even national states while dis-locating environmental responsibility, usually in the direction of the disadvantaged. An "aggregate natural capital" (Helm 2014) forms a different kind of "limit" to industrial expansion than did the old disaggregated nature. The new interchangeable parts, of course, can also be used outside formal ecosystems markets. EU targets for climate-friendly "renewable" energy, for example, are being met partly by importing wood pellets harvested from US land and shipped across the Atlantic for firing in conventional thermal plants. Overall, a huge range of "performative equations" (Lohmann 2014) defining a standardized "climate benefit" unit (tCO_2e, or "tons of carbon dioxide equivalent") are stretching the spatial, temporal and logical ways of conceptualizing both pollution and climate itself.

Thus in the colonial era, a 10,000-hectare forest management area could never have been seen as a producer of, say, 500 tonnes of carbon sequestration services per year. This is not to say that many of the same human-nonhuman relationships and mechanisms of land control required for timber extraction or conventional colonialist conservation in such an area were not later pressed into service for extraction of climate services. Many foresters belonging to the tradition descending from 19th-century experts such as Dietrich Brandis have found employment in the new carbon service industry, measuring tree diameters and using satellite imagery to estimate sequestration rates. But at the same time, the new ecosystem services technocracy is to some degree split by low-intensity internal strife among "capitalists, scientists and regulators concerning value", the "functional interdependence of ecosystems", and so forth, as the imperatives of cyborg economics rub up against those of traditional conservation biology (Robertson 2012). These tensions are exacerbated by the fact that, as Antonio Tricarico (2014) points out, the new ecosystem commodities, unlike more traditional commodities such as wheat or oil, have been highly financialized from the outset, involving the development of complex procedures transforming the activities of nonhumans into financializable asset streams. For example, over 95 per cent of EU ETS transactions are speculative futures trades – not surprisingly, since each installation receives its state grant of pollution rights one year before it has to cover its emissions and must hedge against price uncertainties. The unavoidable conflict between the compliance and financial functions of the market that results renders ludicrous the already insupportable claim that it might someday have a positive effect on weather and climate.

Second, the new nature is no less a nature defined by capitalist appropriation of commons and commons relationships than the older "resource" and "conservation" natures – even as it features a number of new twists. In the past, water sources might have been mined, without recompensing either indigenous peoples or the earth, in order to supply industrial plants or maintain industrial wheatfields supplying cheap food to urban workers. Today they can also be appropriated for ecosystem services aimed at reducing or obviating costs of reproduction as they are defined by environmental regulation. If classical industrial capitalism saw value as created mainly through the initiative, sacrifice or organizing ability of owners and managers rather than through the activities of workers, environmental policy in a neoliberal age sees the value of nature as dependent on applications of economic/ecological expertise to an external, nonhuman entity rather than the historical interactions of commoners and commons. Thus, for example, specialist-controlled seed

banks or biosphere reserves occupy a position of honor as repositories of genetic information needed for biotic reboots of agriculture, while the role of "unbankings" or outgrowings of seeds to expose them to socionatural change is obscured. Tellingly, the role of indigenous peoples in the new green economy is mainly to work for wages as caretakers of a newly-constituted climate, or a newly-constituted "biodiversity", whose salient features have been defined by others who tend to work with an alien conception of nature (Ingold 2000; Bowker 2005). Offset calculations based on a new generation of storytelling practices meanwhile carry forward colonialist traditions of representing non-European societies and polities as a static, passive and predictable background to the creative actions of experts and the property-creating "improvements" of Europeans: in order to create quantified units of climate benefit for exchange, indigenous or "backward" polities necessarily have to be reduced to a single "emissions baseline" against which a variety of "pollution-saving" alternatives identified by specialists can be calculated, insured and financialized. As Andrew S. Matthews (2015) vividly puts it, "a nightmare of indigenous people destroying the forest becomes more valuable as it becomes more nightmarish, with an added caveat: the international money will not arrive unless you act to make the nightmare go away" by changing what indigenous peoples do.

Indeed, when viewed from an indigenous, peasant, feminist or ecological Marxist perspective, neoliberal natures look more like an elaboration of their pre-neoliberal industrial forebears than a radical alternative to them. Even the most advanced computer climate models succeed in adding credibility to the threat of catastrophic global warming only in the course of sharpening and enforcing a neo-Malthusian, depoliticizing opposition between a purified, monolithic "nature" and a purified, monolithic "society" – a homogeneously-defined *anthropos* packaged as an object subject to macroeconomic prediction and state governance. Over the decades, Global Circulation Models have selected and incorporated more and more nonhuman processes ranging from CO_2 and chloroflourocarbon molecule circulation to feedback cycles involving vegetation and cloud formation, adding a great deal of fine grain and density to the sense of an exclusively nonhuman "nature" while simultaneously obscuring the myriad connections linking such processes with, for example, the use of fossil fuels to discipline and increase the productivity of industrial labor (Malm 2014), international transport's need for refrigeration, and diverse indigenous and industrial land use practices. This movement of sorting and solidifying an "external" nature has been one with expanding a distinct "nonpolitical" class of bureaucratic scientists and economists equally "external" to peasants, workers, factory owners, administrators and indigenous societies; the more scientists have gone to work hunting, classifying, isolating and explicating physical processes in the contexts of laboratories, computer programs or wildernesses that have had human communities edited out of them, the more "external" that nature has become, and in turn the more crucial it has become to recruit specialists to understand it. Practices of treating climate not so much as a neutral backdrop to human activities as an integral part of innumerable vernacular moral or political orders – whether followed by peasants, indigenous peoples, religious elites or iconoclastic Marxists – tend to be ignored, discredited, or treated as heretical. Elided are the ways that commons regimes – among peasants, laborers, childminders and everybody else – in fact incessantly undermine the picture of burgeoning foreground human activities encroaching on a background "nature". Political action is then forced to restrict itself to a rudimentary interface between the two structures, which consists of "anthropogenic emissions", "policy", "carbon prices" and the like. Mainstream climate politics becomes a matter of border controls between society and nature, not about questioning either the two entities themselves or the interface that has been constructed between them (Asdal 2003, Rouse 2002). As in the colonial era, the destructive effects of industrial capital are only allowed to be addressed or contained from "outside" the black-boxed dynamics of capital itself. This is part of the reason why terms like "coal companies", "labor" and "capital accumulation" (which would complicate the program of establishing simple, straightforward relationships between

molecules and their would-be human managers) never appear in the documentation of the UN climate negotiations, why the international community remains unable to get to grips with the global warming challenge, and why it is so difficult to achieve recognition for climate as a labor, energy or civilizational issue. While oil or auto companies' financing of climate change denialist propaganda has been the more favored target of middle-class climate activists, dominant intellectual elites' modelling of climate as a "nature" disaggregated from political relationships has been incomparably more powerful in stymieing effective climate action. It is only when they are forced to acknowledge that there exists no uncontested baseline "external" to human societies to restore ecosystems to that environmentalists are compelled to concede that their desired states of affairs have to be negotiated among different groups of humans and nonhumans. It is only when they (for example) distinguish "survival emissions" from "luxury emissions" (Agarwal and Narain 1991) – two entities that refuse to stay on either side of the nature/society divide – that they recognize that climate cannot be defined by climatologists and policymakers alone.

Third, the new rents, commodities and markets that help define neoliberalism's climate are constructed and maintained overwhelmingly through the expanded activities of the state and international agencies. Carbon trading law stipulates that the climate system is the state's to manage and intervene in from "outside" as long as it does not venture too far into determining who produces what in which quantities, for whom, and at what price. State-regulated "caps", "limits" and "carbon budgets" define the scarce material out of which tradable units are constructed. State-driven and state-sanctioned quantification, monitoring, reporting, verifying and insuring techniques make offsetting possible. State police and military units take responsibility for the repression and policing of communities whose presence interferes with the efficient production of ecosystem service tokens (see Kill 2015, Lang 2015 and Gilbertson and Cabello 2015 for some representative archives). Indeed, state agendas lie behind the very concept of ecosystems, from its earlier colonial incarnations to the military-financed development of the technologies underpinning General Circulation Models. In keeping with neoliberal tenets, moreover, the new climate is built in ways that help state as well as corporate actors evade much of the burden of addressing the social problems that markets are now advertised as cheaply solving. With the state underwriting the profits of a galaxy of private-sector partners, contractors, consultants and technocrats who carry out most of the work of producing, circulating, standardizing and regulating the new climate benefit units, conventional dualisms opposing "state" and "market" are of as little use in analyzing official climate policy as they are in understanding other areas of neoliberal politics. As elsewhere in neoliberalism, the flip side of this expansion in the scope of state agency is a ritualistic or histrionic denial of its existence. The copious interventions of the neoliberal state to protect investor freedom are reinterpreted as, at most, mere caretaker moves safeguarding the integrity of a non-state "system", and are vigorously contrasted with the alleged blunt-force meddling of "command and control". Ecosystem services themselves are treated as if they had always been there, state or no state, awaiting merely the figurative flipping of the switch that would allow the profit motive to be enlisted in their behalf (e.g., Heal 2015).

Achieving a well-rounded understanding of the distinctiveness of neoliberalism's climate – and of its continuity with previous capitalist climates – requires a standpoint of resistance. Putting in perspective neoliberalism's claim that it can provide an alternative, cheaper way of preserving and stabilizing a singular, timeless, nonhuman climate needed by all humanity entails listening to the indigenous, peasant, labor, feminist and commons movements with the experience to perceive the classism, racism and neocolonialism inherent in such construals of nature. At the same time, resistance can benefit from an extended historical understanding that can help pre-empt attempts to identify the development of nonextraction rents or commodities with the defence of commons: attempts to establish, for instance, that movements to keep oil in the soil in the Ecuadorian Amazon

are really all about "caps" and "biospheric limits"; that Latin American indigenous practices of *sumak kawsay* or *buen vivir* amount to green developmentalism, natural resource management or "resilience"; that indigenous territories are instances of the abstract spaces co-devised by 16th-century European mapmakers or 21st century prophets of "natural capital"; or that Andean visions of *pachamama* is one of the externalized "natures" of capitalism, whose rights, it is implied, can only be defended by humans considered to be outside of it. The most penetrating inquiries into neoliberalism's climate, in short, are likely to be connected not just with efforts to "reculture" climate (Endfield 2011), but also with the formation and defense of radical political alliances and dialogues.

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