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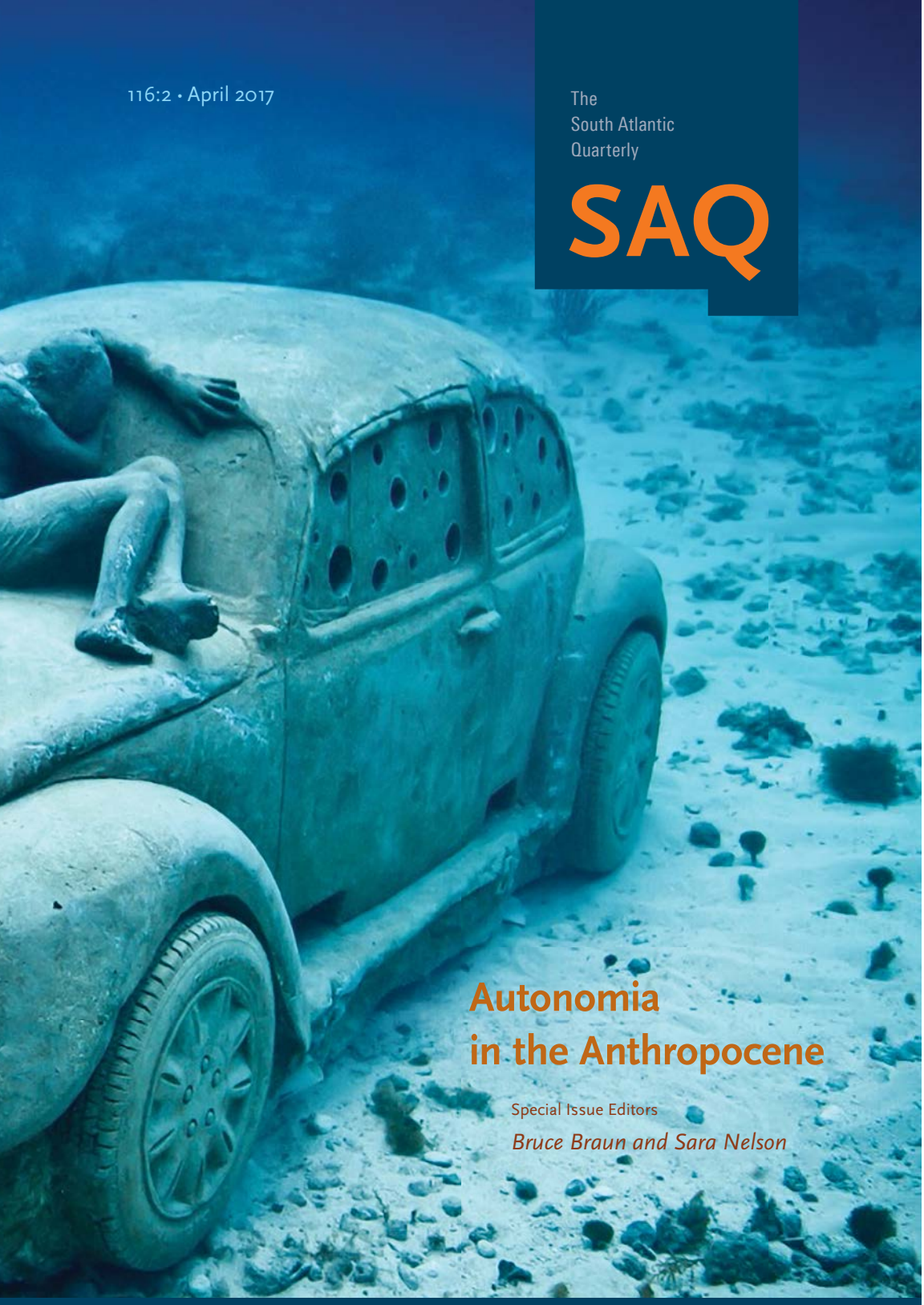

Autonomia in the Anthropocene

Special Issue Editors

Bruce Braun and Sara Nelson

AGAINST the DAY • Pipeline Politics

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Autonomia in the Anthropocene: New Challenges to Radical Politics

The theoretical innovations that emerged out of the Italian Autonomia movement of the 1970s have enjoyed a striking revival in Anglophone critical scholarship in the past two decades, informing a generation of political activism that erupted in force with the alter-globalization movements of the late 1990s. In the midst of the "Italian miracle" of industrial growth following the country's postwar devastation, a broad-based movement of workers, students, and intellectuals refused capital's "gift" of work (Tronti 2007) and advanced a politics of self-determination and self-valorization outside of state and party politics. *Autonomia,* Italian for autonomy, referred both to the ontological priority of labor power vis-à-vis capital and to a rejection of the bureaucratic politics of compromise characteristic of the establishment Left.[1] Among the movement's ongoing legacies is a vibrant intellectual tradition that has transformed established categories of Marxist analysis to contend with the changing political terrain that accompanied the rise of what is now referred to as a post-Fordist mode of production. Along with Latin American and indigenous anticolonial movements, Autonomia forms one of several intellectual undercurrents nourishing the

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turn toward direct, horizontal democratic organization outside of the representative structures of electoral politics and oriented toward a horizon of liberation.

Despite Autonomia's widespread influence on political action and post-Marxist scholarship, it has been surprisingly slow to address planetary change and environmental politics. With a focus on cognitive capitalism, many autonomist scholars have downplayed or fully ignored the ecological dimensions of post-Fordism—its foundations in extractive energy economies, its links to the accelerating financialization of nature under the banner of so-called green capitalism, its harnessing of nonhuman capacities, and its wildly uneven toxic geographies. This lack of engagement is regrettable given that, we propose, autonomist insights hold great promise for understanding both the transformed relation between capital and nonhuman natures in post-Fordism and the many political movements that have emerged in response.

More significantly, the era of anthropogenic global change named by the Anthropocene poses profound challenges to a politics of autonomy in the present. The nomination of the Anthropocene as a new geologic epoch shines a spotlight on the immense scale and consequence of human transformations of earth systems. These changes cannot be undone; we have produced a new nature and a new humanity, the contours of which we are still discerning. That responsibility for these transformations is uneven has been widely noted, and other names—Capitalocene, Plantationocene—have been proposed to identify specific social actors and forces that have brought us to the present juncture. These names matter, but none of them alter a key point: we may now be geological actors, but that has only further revealed our entanglement with the nonhuman world, the impossibility of separating the anthropos from geology, ecology, and climate. In the context of these entanglements it is not clear what autonomy means, politically or ontologically. Indeed, even as the figure of the human is inflated in some Anthropocene narratives, it has been radically decentered in others, as *inhuman* materialities, temporalities, and genealogies come to the fore that precede, exceed, and subtend human life. "Considering the human within geologic time," Kathryn Yusoff (2015: 388) writes, "poses the problem of thinking an *inhuman milieu*, both before, after and internal to 'us'" (italics added). Placed alongside recognition of the consequences of anthropogenic change, this displacement of the human demands that "life" be understood not in terms of humanity as a unified category but in terms of what Elizabeth A. Povinelli (this issue) describes as "more or less densely compacted forms and modes of existence" that nei-

ther begin nor end with "us," with consequences not just for the most hubristic fantasies of geoengineering but also for what constitutes the common, where and in what potentiality is located, how autonomy should be understood, and who and what is named by the anthropos.

It is no longer evident that key terms found in the autonomist lexicon—*species being*, *the common*, *multitude*, *potentia*—survive the challenge of the Anthropocene unchanged or that the production of subjectivity (a cornerstone of autonomist thought) can be understood solely in terms of language, habit, or gesture. It may therefore be necessary to think beyond the struggles of the factory floor, or those of the cognitariat today, to imagine and think from other sites of struggle, other forms of solidarity, and other experiments in "commoning." These bring into play unfamiliar actors and unacknowledged geographies: sites of extraction and circuits of waste, indigenous communities and territories, rising seas and toxic landscapes that are materially present within the informationalized economies of global capitalism, but often invisible to those working within them. We might say, then, that the Anthropocene names autonomist Marxism's unthought, an unthought that intrudes on its political imaginaries. What happens to autonomism if it begins to question the autonomy of the human? Or if it leaves its privileged sites in the global North? And what does it mean, in the context of cognitive capitalism's toxic ecologies, to advance a politics based on the progressive expansion of human productive capacities? Might we be compelled to recognize, as Isabelle Stengers (this issue) forcefully asserts, that capitalism may lead only to catastrophe and barbarism? In sum, the conjuncture named by the Anthropocene would seem to push Autonomia to its conceptual and political limits.

Yet if the Anthropocene describes a blindness in autonomist thought and politics, it is a blindness rooted in the historical tensions that gave rise to the Autonomia movement, in a manner that is constitutive but contingent. Focusing for the moment on the movement's epicenter in Italy, we can see that the politics of Autonomia were rooted in the geographical specificity of workers' experience in postwar Italian industry. As the country's productive capacity and share of world trade ballooned throughout the 1950s and early 1960s, commentators hailed the "economic miracle" that transformed Italy from a largely rural economy into an industrial powerhouse centered on the automotive industry (De Rosa 2008c; Wright 2002: 6). This "miracle" was predicated on an intensification of exploitation: Italy's comparative advantage lay in its low labor costs, enabled by a large industrial reserve army of migrant workers from the impoverished South (Berardi 2007: 150; De Rosa 2008c: 102). The workerist movements gathered under the banner of Potere Operaio

(Workers' Power) diagnosed the crisis at the heart of the economic miracle, revealing its roots in the hyperexploitation of labor and the uneven geographies of Italian development. In the "hot autumn" of 1969, widespread strikes, factory occupations, and sabotage rocked the manufacturing sector, resulting in the loss of 40 million worker hours that autumn alone (Berardi 2007: 149; De Rosa 2008c: 108). Capital flight intensified as the contracts won by labor kicked in the following year, and a shortage of money capital prompted rising inflation and a contraction of credit (De Rosa 2008c: 108). The notion of labor power's autonomy that would inflect autonomist thought was therefore rooted in the concrete experience of workers' power as it was exercised on the shop floor and reverberated throughout the banking and financial sectors.

Borrowing from Antonio Negri's (1991) reading of Spinoza, we might rename the so-called Italian miracle "the Italian anomaly." Negri finds in Spinoza's metaphysics a radical expression of "the Dutch anomaly," describing the seventeenth-century Dutch Republic's exceptional rate of economic growth, precipitated by an emerging industrial capitalism and an expanding colonial regime; the coinciding golden age of Dutch humanism, in stark contrast to the baroque reaction in France and elsewhere; and its constitutional structure, which stood apart from European monarchies. In this context, Negri (1991: 8) argues, Spinoza recognized the multitude as an emerging political and economic force underpinning both the republican constitution and Dutch industry: "It is on the basis of this material force that Spinoza's philosophy is comprehensible, as power and as an anomaly with respect to all modern rationalism, which is irremediably conditioned and restricted by the limitations of mercantilist development." By formulating a philosophy of democracy grounded in the collective forces of social production, Spinoza's thought "becomes a 'savage' anomaly," amplifying the revolutionary power of a multitude oriented toward liberation (xix). It is in this sense that, Negri argues, Spinoza produces a "philosophy of the future" adequate to the struggles of the 1970s (8).

Paraphrasing Negri, it is on the basis of the material forces manifest in the "Italian anomaly" that the philosophy of workers' autonomy is comprehensible. That Italian comparative advantage hinged on a docile and inexpensive labor force placed workers in a position of immediate economic power, which was exercised through wildcat strikes and factory takeovers without the mediation of union bureaucracy. It was on the basis of the demonstrated ability of the working class to destabilize the politics of economic growth that the demands for autonomy and the rejection of the Left estab-

lishment's collusion with the interests of capital were solidified, giving rise, in 1973, to the dispersal of Potere Operaio into a loose network of social movements under the heading of Autonomia Operaio (Workers' Autonomy). To borrow Ian Baucom's (2005: 24) phrase from a different context, we can see why, for Negri, Spinoza's milieu constituted a kind of "non-synchronous contemporaneity" with the struggles of 1970s Italy, when the multitude emerged again as a decisive force that both exceeded the representational structures of capital and the state and had underpinned them all along.

The Movement of '77, out of which many of the leading figures in Autonomia's intellectual legacy would emerge, expanded the politics of refusal inaugurated with workerist struggles into a general refusal of capitalist social relations. In an economy in which technological innovations in production were stifled in favor of intensified exploitation, Autonomia envisioned an application of the general intellect toward the overall reduction of work and a politics of cultural transformation (Berardi 2007: 156). Not merely advancing a set of political demands, "the movement of '77 was itself a rich, independent, and conflictual productive force," deriving its power from the new forms of social cooperation and technical capacities that would become the foundation of the post-Fordist economy (Castellano et al. 1996: 234). In that regard, it prefigured the counterrevolutionary response that followed. As Paolo Virno (1996: 246) put it, the movement "addressed the same problems that neoliberalism would later address, but sought different solutions. . . . [It] represented the only vindication of an alternative path for the management of the phase of the end of 'full employment.'"

And yet if we expand our perspective on the Autonomia movement beyond the Italian autoworkers, other forces at work in its constitution may come into focus that disturb this narrative. For example, in Italy, the postwar boom and the maintenance of low wages via migrant factory labor depended on an unprecedented transformation of agriculture and energy production accomplished between the 1950s and 1970s. The national plan for economic development in the 1950s, which drove the industrialization process, centered on the expansion of the country's energy base, chiefly through a shift from hydropower to fossil fuels. During that decade Italy experienced its own oil and gas boom, which dramatically changed the country's prospects in the context of an international energy transition from coal to oil: "Italy's greater proximity to the major oil fields and refining centers meant lower transport costs than those borne by the others [other industrial countries in Europe], and Italy's discoveries of oil and gas at home gave it a further edge" (De Rosa 2008b: 135). By 1975 74.5 percent of the nation's energy came from

oil, with natural gas in second place (137). This new dependence on oil drew Italy more fully into the global economy, making it particularly vulnerable to the oil crises of 1973 and 1979 that coincided with labor unrest to undercut the politics of growth (De Rosa 2008b: 137; 2008c).

Simultaneous with the energy boom was an agricultural revolution that one commentator called "the most sweeping renewal ever in Italian agriculture" (Mario Bandini, quoted in De Rosa 2008a: 71). The highly-contested push to mechanize farming in the 1950s, enabled in large part by a landmark agreement between Fiat and farming industry groups, helped to increase productivity and reorient production toward market imperatives while dramatically reducing farm employment. The resulting outflow of labor from the south to northern factories became the motor of industrial production. This migrant labor force was also the lever used by management to keep wages low and later, beginning in 1968 and 1969, would become "the mass-base at the forefront of the union struggle (and the base, too, for organized political revolution)" (Berardi 2007: 150). In other words, the Italian anomaly sprang not solely from labor power employed in the factories but from its convergence with the "dead ecologies" (Huber 2013) concentrated in fossil fuels and the unparalleled transformation of Italian landscapes through agricultural modernization and deruralization.

Understanding the new forces of production at work in the Italian anomaly requires attending to the concomitant intensification of *nonhuman* productivity that accompanied the mass mobilization of labor power in the factories. These transformations were not concentrated only in Italy, but rather unfolded in a new era of globalization that transformed geographies of production and dramatically intensified resource extraction and emissions on a global scale. That the workerist and autonomist struggles erupted around the industrial production of automobiles, the quintessential technology of the Anthropocene and its constitutive form of capitalist subjectivity, is not inconsequential. Automobile production in the 1960s was at the center of Italian industrialization due to the privileged position of the auto sector globally. That gave the Autonomia movement an international character from its beginnings, developed through exchanges among autoworkers, activists, and intellectuals in the United States, Italy, Europe, and Latin America. These movements exalted factory labor and implicitly accorded autoworkers a privileged status with regard to the revolutionary project, in a moment when autoworkers' power was indexed to a new era of globalizing capital that was premised on (and promised) a worldwide expansion of consumer culture and an intensification of energy infrastructures.

In other words, the forces at work in the Italian anomaly were also those forces registered in the so-called Great Acceleration, the unprecedented increase in global population, emissions, energy use, automobiles, and numerous other indicators of global change generally represented in the procession of "hockey stick" graphs that now accompany most depictions of the Anthropocene. Even if we may not follow some geologists in identifying this Great Acceleration as marking the definitive onset of the Anthropocene (Steffen et al. 2015), it undeniably constitutes a critical moment in its advance, both in terms of its drivers and the knowledge infrastructures by which we have come to know it (Pasquinelli, this issue). In this sense workers' power manifests the powers of the Earth, whose accelerating exploitation has brought us to our present crisis. Thus if the vantage point of advanced capitalism enables us to read in Spinoza's thought the historical emergence of the multitude as a political subject, it is from the vantage point of the Anthropocene that we can read in autonomism both the need for and the possibility of a more expansive posthumanist politics.

In this light, the Italian anomaly constitutes both the potential and the limitations of autonomist thought for the Anthropocene. The novelty of Autonomia with regard to the Left establishment inhered in its refusal of the very form of late capitalist life and subjectivity promised by mass automobility, a form of life that also bolstered workers' power. With the diffusion of the struggle from the shop floor throughout the fabric of society, Autonomia revealed that the crisis of the "Italian miracle" was unfolding not only within the production process but also in the bourgeois utopia that the miracle promised. But the insistence on labor power's autonomy reinforced the anthropocentrism underpinning capitalist ideology: instead of a consumerist utopia, autonomism envisioned a society in which the general intellect would be employed toward liberation from work. As evinced in the notion of "immaterial" production and an emphasis on the revolutionary possibilities offered by cognitive and communicative capitalism, the material conditions of this new economy in extractivism and the globalization of manufacturing remained unacknowledged, as did the incorporation of nonhuman life within its communicative and informational orders (see Johnson, this issue). The understanding of human potentiality that inflects Italian autonomism depends on a sharp distinction between life and nonlife, human and nonhuman, and the movement's historical analysis and political imagination rely on a knowable, reliable, "always there" nature that is neither used up nor filled with surprises. That is the same understanding of nature that underpinned the Fordist-Keynesian regime of industrialization against which Autonomia rebelled

and which has been thrown into dramatic crisis with the onset of the Anthropocene. In other words, the liberation envisioned in the autonomist movement was the liberation of a *particular* anthropos situated in a *particular* locus within global production networks, whose freedom from work depended on an intensified appropriation of nonhuman "work/energy."[2]

Autonomia's disengagement from environmental politics was undeniably conditioned by the political context of the 1970s: as Virno (1996: 253) recalls, in contrast to environmental movements elsewhere in Europe, for the Italian Greens "ecologism was born *against* the class struggles of the 1970s." Virno and other leading theorists of autonomism therefore dismissed environmental anxieties as an ideological displacement of class struggle.[3] And yet it was only on the basis of the ecological and geological forces unleashed in the Great Acceleration that workers' autonomy became thinkable, that the "reduction of work, [through] the intelligent application of technical and scientific knowledge" (Berardi 2007: 158) could become a concrete political possibility. If, as autonomist-feminist theorists argued, the ability for wage labor to appear as the substance of value is predicated on the invisibility of reproductive labor, then the autonomy of the working class was similarly predicated on the occlusion of the nonhuman productivity that gave labor its growing power. In sum, revisiting the Italian anomaly from the vantage point of the Anthropocene indicates that we have never been autonomous.

Instead of reading autonomism's disengagement from ecology as a theoretical gap to be mended, thinking autonomism in the context of the Italian anomaly can help us to discern the material forces animating this thought and to engage them more fully from the perspective of the present. In his reading of Negri's *Savage Anomaly*, Joost de Bloois brings forth the colonial encounter as a subterranean current that animates Spinoza's conception of the multitude and Negri's reincarnation of it. He writes: "Rather than implying that Spinozism simply bears the hallmark of the advent of modern capitalism . . . Negri conceives of Spinozism as an alternative imagining of the encounter with the New World: not as capitalist savage accumulation . . . but as the endorsement of multiplicity—a different kind of savagery" (de Bloois 2015: 33). To paraphrase de Bloois: How might autonomism stage a different encounter between anthropos and the planetary forces that Stengers (this issue) names Gaia, in the guise of the "one who intrudes"?

Staging such an encounter may mean locating and amplifying tendencies already present in the autonomist tradition that point beyond its tenacious humanism. It most certainly means pushing autonomist thought beyond the limits imposed on it by its historical vantage point and drawing

out those implications of its analysis that become visible only in hindsight. One of the enduring strengths of Autonomia has been its insistence on building theory from struggle. Many of its key concepts—the common, potentiality, autonomy, commoning—emerged from the experience of struggles on the factory floor, as workers began to realize and assert their autonomous power and build alternative, noncapitalist spaces and relations. Today the same principle may lead us to invent new concepts or revise old ones that emerge from, and are adequate to, contemporary struggles. In this light the present from which we can reflect on the Italian anomaly is not an abstract Anthropocene but a field of struggle in which new forces, not all of which are human, assert themselves and demand thought.

This methodological commitment may enable us to find within the autonomist tradition some of the theoretical tools essential to both diagnosing and treating its own blindnesses. For instance, when autonomist-feminists such as Silvia Federici, Mariarosa Dalla Costa, and Leopoldina Fortunati demonstrated that wage labor was predicated on a constitutive (and unacknowledged) disproportion between reproduction and production, they indicated a continuity among struggles against capital's dominion over life-activity beyond the purview of the wage. Building on the work of these thinkers, Jason W. Moore (2015) considers colonial expropriation, social reproduction, and the transformation of the nonhuman world to be different manifestations of capital's *appropriation* of unpaid work/energy, which for him underpins every increase in labor's productivity. Moore thereby places the "resistance" of nonhuman nature (in the form of superweeds, megaviruses, and, above all, climate change) alongside labor's resistance on a single terrain of class struggle (see also Read, this issue). As Federici and other autonomists demonstrated, it was precisely the boundary between reproductive and productive labor—between the interior of capitalist production and its constitutive outside—that was the object of struggle in post-Fordist transition. If Moore encourages us to imagine all forms of anticapitalist resistance (whether human or nonhuman) in terms of class struggle, might we not also interpret all contestations over the relation between life and work, or production and reproduction, as instances of "environmental" politics?

How, then, might the new terrain of struggle named by the Anthropocene prompt us to overhaul our conceptual inheritance from autonomism? We might start, for instance, with the concept of the common and the practice of commoning. For Virno and Cesare Casarino, the common (as distinct from the commons) describes those generic capacities common to humanity as a whole, such as language, thought, and affect. Casarino (2008: 13) thus

associates the common with communication as opposed to "community (understood as *Gemeinschaft*)." This understanding of the common is reflected in Marx's (1964: 44) early descriptions of communism: humans do not live in common "only in the form of some directly communal activity and directly communal enjoyment"; rather, "the individual *is the social being*. His manifestations of life—even if they may not appear in the direct form of *communal* life carried out with others—are therefore an expression and confirmation of *social life*" (45). For Marx, the particular life activity of the individual acts on social products as its material ("as is even the language in which the thinker is active") and is the mechanism for the development of the human species as a whole (44). The common names the repertoire of human capacities that capital seeks to capture and put to work as wage labor, but which can just as readily be turned to other noncapitalist ends. It is thus both immanent to capital and continually exceeds its attempted enclosure as surplus value.

Defined as "thought, language, and affect, in both their potential and actual aspects," Casarino (2008: 13) writes, "for better or worse, the common from its very inception is defined as a universalist concept." This notion of the common thus reinscribes a universal humanity, albeit one that, rather than unifying particularities into an abstract People (or *anthropos*), describes the opposite motion—"the individualization of the universal, of the generic, of the shared experience" (Virno 2004: 24–25). For Virno, Casarino, and Marx, however, this preindividual common—like potentiality more generally—is decidedly species-specific, a specificity that is located in the association of the common with linguistic capacities. For instance, the multitude, Virno (2004: 25) writes, finds its unity in the "language, intellect, and communal faculties of the human race." And while Michael Hardt and Negri (2009: 171) call for a general "ecology of the common," they also define the social common (comprising "knowledges, information, images, affects, and social relationships") in contrast to the ecological, on the basis that the former "does not lend itself to a logic of scarcity" (139) that apparently characterizes the latter.

At the same time, however, the common names a potentiality that is historical in character, taking on different powers and characteristics over time, as language, gesture, and habit develop and change. This is most forcefully articulated in Virno's writings, which follow philosophical anthropology to develop an account of the human as that animal that lacks a determinate milieu and is defined by an open and creative process of anthropogenesis (Read, this issue). For Virno, "human nature" and the "common" coincide, the historical development of the former defining the potentiality of the latter. Today, in an age in which the human is so clearly entangled with a

wider nonhuman milieu, and where political struggles center on these entanglements and the possibilities they hold, this historical sensibility would seem to demand an expanded notion of the common (see Tola, this issue).[4] Rather than contrasting a (limitless, immaterial) human common to a (finite, earthly) ecological one, we are prompted to reimagine the common as always more than human and simultaneously capacitated and constrained by the concrete formations in which it is manifest.

In other words, it is not enough to extend the "common" to include nonhuman capacities; it is equally as important that the common be understood as immanent to concrete arrangements of existence/existents. Potentiality is never exhausted, but neither is it everywhere the same. Histories of colonialism, racism, and patriarchy have produced widely diverging transindividual collectivities—some far more toxic than others—which cannot simply be conflated into a universal ontology of potentiality. Similarly, we cannot simply assume that capitalism *increases* the potentiality of the common: these capacities may be irredeemably diminished in a world of social and ecological devastation. The "cramped space" of potentiality outlined by Povinelli (2011) is in this conjuncture also a cramped time, insofar as the horizon of the future has been radically foreshortened by global climate change. In this context, new temporalities of politics may be necessary, requiring in particular that we overcome Autonomia's congenital allergy to the "backward" glance of ecology, a retrospection that is often discredited as nostalgia for a better world in the past. We may instead need to "reclaim" old knowledges and practices as part of a pragmatic and experimental politics of commoning (Stengers, this issue), just as we must also take seriously the limits of solidarity in any commoning project. For if the Anthropocene represents the farcical realization of human autonomy in the form of planetary devastation—in which the "production of man by man" appears to lead to his extinction—then we are forced to recognize that while the multitude may be undeniably more-than-human, not all forms of existence will find common ground within it.

As one of the challenges of the Anthropocene, we are thus faced with the uncomfortable prospect of deciding which forms of existence may need to be extinguished in order to realize our capacities to be in common, including, perhaps, a *particular* anthropos that drowns out other possible arrangements of being (Kanngieser and Beuret, this issue). This is a problem for which autonomist thought may be well suited, less as a set of theoretical propositions than as a methodology of developing theory from struggle. We close by reiterating this final point, because autonomism's roots in struggle

are part of what has endowed it with its remarkable dynamism and ongoing relevance. The nomination of the Anthropocene as a new geologic epoch is not merely a statement about humanity's immense but differentiated impact on earth systems; it also recognizes new sites and subjects of struggle, located no longer only on the factory floor or in the growing cognitariat laboring in the informationalized economies of the present but also in the tangled socioecological webs that make up any mode of production. The strength of autonomism has always been that it has thought *from* these sites and struggles and has continuously reinvented and revised its theoretical concepts accordingly. Autonomism opens us to the sights and sounds of struggles that we might otherwise overlook, that may not even appear to us as struggles, that confound our vision of revolution—it offers us a new set of "revolutionary glasses" with which to discern a political terrain that remains imperceptible through the lens of conventional politics (Guattari 2007: 237). In a sense this special issue of *South Atlantic Quarterly* brings this process into the present, a present in which the *inhuman* and *nonhuman* basis of worker power and worker struggles can no longer be ignored, in which the struggle for autonomy from capital can no longer assume the autonomy of the human, and in which colonial and capitalist appropriation and exploitation have left a differentiated world unevenly threatened by rising seas, climate volatility, and toxic natures. What this means for autonomism today, for its concepts and its politics, is the challenge that the Anthropocene urgently poses.

Notes

1 We use the categories "autonomist thought" and "autonomist Marxism" as shorthand for this broad-based movement and its key conceptual and political elements. The category is an Anglophone invention and not widely used or recognized in Italy.

2 On the notion of "work/energy," see Caffentzis (1980) 1992 and Moore 2015.

3 The situation in American autonomism was somewhat different. See, e.g., Caffentzis (1980) 1992, which links human and nonhuman resistance through the work/energy crisis of the 1970s.

4 In *Commonwealth*, Hardt and Negri (2009) occasionally gesture to such an expanded notion of the common (see, for instance, page 171).

References

Baucom, Ian. 2005. *Specters of the Atlantic: Finance Capital, Slavery, and the Philosophy of History*. Durham, NC: Duke University Press.

Berardi, Franco. 2007. "Anatomy of Autonomy." In *Autonomia: Post-Political Politics*, edited by Sylvère Lotringer and Christian Marazzi, 148–71. Los Angeles: Semiotext(e).

Caffentzis, George. (1980) 1992. "The Work/Energy Crisis and the Apocalypse." In *Midnight Oil: Work, Energy, War, 1973–1992*, edited by Midnight Notes Collective, 215–72. New York: Autonomedia.

Casarino, Cesare. 2008. "Surplus Common." In *In Praise of the Common: A Conversation on Philosophy and Politics*, by Cesare Casarino and Antonio Negri, 1–39. Minneapolis: University of Minnesota Press.

Castellano, Lucio, et al. 1996. "Do You Remember Revolution?" In *Radical Thought in Italy: A Potential Politics*, edited by Paolo Virno and Michael Hardt, 225–40. Minneapolis: University of Minnesota Press.

de Bloois, Joost. 2015. "The Death of Vitruvian Man: Anomaly, Anomie, Autonomy." In *The Anomie of the Earth: Philosophy, Politics, and Autonomy in Europe and the Americas*, edited by Federico Luisetti, John Pickles, and Wilson Kaiser, 25–43. Durham, NC: Duke University Press.

De Rosa, Luigi. 2008a. "The Agricultural Revolution (1943–79)." *Journal of European Economic History* 37, no. 1: 65–83.

De Rosa, Luigi. 2008b. "The Energy Revolution." *Journal of European Economic History* 37, no. 1: 127–38.

De Rosa, Luigi. 2008c. "Sunset of the 'Economic Miracle.'" *Journal of European Economic History* 37, no. 1: 102–17.

Guattari, Félix. 2007. "Why Italy?" In Lotringer and Marazzi, *Autonomia*, 234–37.

Hardt, Michael, and Antonio Negri. 2009. *Commonwealth*. Cambridge, MA: Belknap Press of Harvard University Press.

Huber, Matthew T. 2013. *Lifeblood: Oil, Freedom, and the Forces of Capital*. Minneapolis: University of Minnesota Press.

Marx, Karl. 1964. *The Economic and Philosophic Manuscripts of 1844*. Edited by Dirk J. Struik. Translated by Martin Milligan. New York: International Publishers.

Moore, Jason W. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso.

Negri, Antonio. 1991. *The Savage Anomaly: The Power of Spinoza's Metaphysics and Politics*. Translated by Michael Hardt. Minneapolis: University of Minnesota Press.

Povinelli, Elizabeth A. 2011. *Economies of Abandonment: Social Belonging and Endurance in Late Liberalism*. Durham, NC: Duke University Press.

Steffen, Will, et al. 2015. "The Trajectory of the Anthropocene: The Great Acceleration." *Anthropocene Review* 2, no. 1: 81–98.

Tronti, Mario. 2007. "The Strategy of Refusal." In Lotringer and Marazzi, *Autonomia*, 28–35.

Virno, Paolo. 1996. "Do You Remember Counterrevolution?" In Virno and Hardt, *Radical Thought in Italy*, 241–60.

Virno, Paolo. 2004. *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Wright, Steve. 2002. *Storming Heaven: Class Composition and Struggle in Italian Autonomist Marxism*. London: Pluto.

Yusoff, Kathryn. 2015. "Geologic Subjects: Nonhuman Origins, Geomorphic Aesthetics and the Art of Becoming Inhuman." *Cultural Geographies* 22, no. 3: 383–407.

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Species, Nature, and the Politics of the Common: From Virno to Simondon

Two stratigraphers writing in the magazine of the Geological Society of America recently asked, "Is the Anthropocene an issue of stratigraphy or pop culture?" Puzzled by the popularity of the term, they argued that currently the Anthropocene allows conceptual mapping rather than conceptualization based on empirical evidence (Autin and Holbrook 2012). To be sure, the Anthropocene has become a matter that exceeds the geoscience community. It is an issue of popular culture and politics as much as stratigraphy. Within feminist studies and allied fields, a central problem is that the generic *anthropos* of the Anthropocene closely resembles the hegemonic model of the human, the white Man of European modernity entitled to appropriate a feminized and racialized material world in the quest for capitalist progress. But this does not entail a wholesale dismissal of the Anthropocene concept. Rather, the question becomes what politics might be pursued within and against prevalent narratives of the Anthropocene that foreground an undifferentiated human species capable of simultaneously causing and remediating the ecological crisis.

With these concerns in mind, I turn to the work of Paolo Virno, a radical political thinker

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who stands out for his persistent investment in human nature—a notion somehow out of sync with feminist and antiracist contestations of who and what counts as human. Although Virno has not directly engaged the Anthropocene, the anthropos is at the core of his analysis of post-Fordism, a flexible form of accumulation that connects disparate modes and places of production. The current economic regime, he argues, mobilizes the biolinguistic faculties that set *Homo sapiens* apart from the rest of the living. These faculties, understood as inexhaustible potentiality rather than as timeless given, constitute the common of humanity, what might be actualized in the form of "engaged withdrawal" from capitalism and the state (Hardt and Virno 1996: 196).

In works such as *A Grammar of the Multitude*, *When the Word Becomes Flesh*, and *E così via, all'infinito*, Virno (2004, 2015, 2010) attempts to reconnect the history of labor with natural history, the transformation of social relations with the powers of the human as natural being.[1] At the intersection between the human form of life and the post-Fordist transformation, he contends, new modes of being together may emerge. As the key thinker of the "naturalist" tendency within Italian autonomism, Virno offers a compelling point of entry for exploring limits and possibilities of autonomist Marxism for thinking politics in the Anthropocene.

The first part of this article charts Virno's investment in "human nature." What is the anthropos for Virno? How does it intersect the hegemonic model of Man? These questions are useful not only for engaging Virno's work but also for examining the tendency within autonomist Marxism to privilege man-the-producer as primary agent transforming himself and the world. It is certainly puzzling that Virno participates in the species discourse without sufficiently addressing its ties to global circuits of exploitation that, throughout Western modernity, have shaped the categories of human and nonhuman in exclusionary ways. In what follows, I explore some of the implications of this elision at a time when much of the Anthropocene discourse describes the human species as the key geomorphic force behind the "sixth extinction" (Kolbert 2014) while also placing confidence in managerial planning and technological fixes (Hamilton 2013).

The second part of the essay tackles the centrality of the anthropos in Virno's work from a different angle. In order to complicate Virno's anchoring of the common in properly human capacities, it discusses his use of Gilbert Simondon's philosophy of individuation and provides an alternative reading of Simondon's concept of preindividual nature. Through the discussion of a particular instance of commoning occurring in Italy, I build on

Simondon to rework the common as a form of collective individuation capable of cultivating attachments to the prevital and living elements that constitute its condition of possibility. At stake is not just the introduction of difference within human nature but a reflection on the common as a project that requires the interplay of disparate beings, not all of which are human.

Post-Fordist Anthropogenesis

Virno was a member of the workerist group Potere Operaio (Workers' Power) until 1973, when the organization dissolved into the broader movement of Autonomia. He was active in the cycle of struggles that began in 1967 and culminated in 1977 with the irruption of new subjectivities in the Italian political scene that expressed simultaneously the refusal of work and the invention of new modes of living. As one of the defendants in the "April 7th trial," Virno spent three years in prison before finally being acquitted of charges of subversive association and armed insurrection. Throughout the 1980s and until the present, he has been a crucial voice in autonomist debates on the shifting nature of labor and political organization in the age of post-Fordism.[2]

Trajectories of exile and activist exchanges led autonomist thinkers such as Antonio Negri and Franco "Bifo" Berardi to encounter the French philosophies of Gilles Deleuze and Félix Guattari, Michel Foucault, and Jean Baudrillard. Virno has taken a different path, one defined by the interest in philosophy of language and the German philosophical anthropology of the early twentieth century. Combining Marx's concepts of "general intellect" and "species being" with philosophical anthropology's reflection on human nature and Simondon's theory of individuation, Virno has developed a distinctive account of how the potentialities of *Homo sapiens* have become the "raw material" of post-Fordist production.

In the "ten theses" that conclude *A Grammar of the Multitude*, Virno (2004: 106) observes that "in Post-Fordism, the *general intellect* does not coincide with fixed capital, but manifests itself principally as a linguistic reiteration of living labor." This statement encapsulates a central motif of the autonomist interpretation of Marx's "Fragment on Machines." Part of the *Grundrisse*, the "Fragment" is the key text autonomist Marxists draw on to make sense of the shifting relationship between labor and capitalism. Here Marx reflects on the relationship between *dead labor*—that is, labor objectified in machinery and technology—and *living labor*, creative human activity identified with the collective potentiality of working bodies. He suggests that

the *general intellect*, the collective knowledge of living labor, has become a direct force of production objectified by capital in technical machines (Marx 1973: 706).

Autonomist Marxists propose an alternative reading of the general intellect, one that privileges living labor as that which is only ever partially captured by capitalism. This analysis is largely rooted in the post-1977 Italian landscape of repressed insurrection and capitalist restructuring. Capitalism has converted the refusal of factory discipline expressed by new antagonistic subjects into productive activities that blur the boundaries between labor and life. Post-Fordist workers are no longer required to perform repetitive tasks. What is now put to work is the capacity of acting in concert. If Marx identified the general intellect with the abstract knowledge subsumed by the machines, autonomist Marxists argue that "general social knowledge" cannot ever be fully integrated within fixed capital because it is "actually inseparable from the interaction of a plurality of living subjects" (Hardt and Virno 1996: 194). This new *mass intellectuality* drives the development of post-Fordist capitalism.

This is precisely where the nature of the *anthropos* comes into play. Virno's wager is that contemporary capitalism produces value by harnessing the "biological invariant" common to human individuals: the potentiality of speech and relationality. While other animals dwell in a fixed environment that triggers specialized behaviors, *Homo sapiens* is characterized by innate disorientation (*disambientamento*). The lack of specialization, "the habit of not having solid habits" (Virno 2005: 29), translates into a fundamental oscillation between blockage and innovation, negation and affirmation.

Here Virno draws on philosophical anthropology's attempt to compare man and animal as a way to grasp the distinctive traits of man. Influential in Germany between the 1920s and 1950s, the philosophical anthropology of Helmut Plessner and Arnold Gehlen was indebted to Jakob von Uexküll's (2010) ethological study of the relations between organisms and their *Umwelten*, lifeworlds defined by correspondences between sensory capacities and environmental forces. Uexküll, however, seemed inclined to think that humans, too, act within a particular milieu, one more complex than that of many other living beings and yet functioning on the basis of the same operating principles.[3] In contrast, philosophical anthropologists argued that the human species is fundamentally deprived of *Umwelt* and therefore compensates this deficiency through the creation of cultural environments and the capacity for self-reflexivity.

Virno and philosophical anthropologists agree that all organisms are enmeshed in lifeworlds. But humans, they contend, are eccentric beings,

deprived of a milieu and therefore at a distance from themselves. This "openness to the world" sets *Homo sapiens* apart from other organisms. As beings that do not fully coincide with their milieu, humans have the capacity to transform their form of life. Insofar as post-Fordism relies on human nonspecialization, it engenders, according to Virno (2009), a historical and social repetition of anthropogenesis. In other words, the post-Fordist organization of labor corresponds to an ontological condition that oscillates between repetition and the capacity to invent the new.

It is important to note that when Virno draws attention to the "since always" of human nature he is evoking not a transhistorical essence but a potentiality that is immanent in human beings. He is interested in how the "right now" of post-Fordism, with its insistence on flexibility and precarity, forces a reconsideration of the human as species. In this respect, his intervention partially overlaps with Dipesh Chakrabarty's (2009: 212) point that the Anthropocene "requires us to put global histories of capital in conversation with the species history of humans." For both thinkers, it is not that the human has a species destiny to fulfill but that the current global situation imposes a return to species thinking. What is perplexing, however, is the conflation between human generality and global dynamics. Chakrabarty links the global fact of anthropogenic climate change to the return to the generality of the species. In Virno's analysis of the transformation of global capitalism, natural history is conflated with the history of *Homo sapiens*. In both cases what remain unexplored are the other-than-human forces that enable, and disable, human existence and that capitalism variously enrolls in productive processes (see Johnson, this issue).

The Political Economy of Species, Race, and Sex

According to Virno, in the context of post-Fordist transformations, Marx's category of *Gattungwesen* (species being), the generic existence of humanity, acquires new relevance. He writes, "Roles and tasks, in the post-Ford era, correspond by and large to the *Gattungswesen* or 'generic existence,' which Marx discussed in *The Economic and Philosophic Manuscripts of 1844*" (Virno 2008: 78). We have come full circle: human nature is the point of integration between historical materialism, the critical trajectory that began with Marx and connects productive forces and social relations, and "naturalistic materialism," by which Virno means the investigation of the distinctive capacities of the human species. A closer look at Marx's species being, however, reveals an ambiguous relationship between humans and their lifeworlds, one that intersects philosophical anthropology.

In a famous passage, the young Marx describes man as a natural, conscious living being who manifests a peculiar mode of existence through sensuous activity. He writes: "The productive life is the life of the species. It is life-engendering life. The whole character of a species, its species-character, is contained in the character of its life activity; and free, conscious activity is man's species-character" (Marx 1988: 76). Species being returns in *Capital*, volume 1, where Marx (1976: 283) offers a famous definition of *labor* as the process by which man "regulates and controls the metabolism between himself and nature." He goes on to say that through this relation man "develops the potentialities slumbering within nature, and subjects the play of its forces to his own sovereign power" (283). Clearly, Marx was inspired by scientific ideas of life as the constant transformation of matter. Metabolism, a concept that he borrowed from agricultural chemistry, refers to the material exchanges activated by labor for the production and reproduction of human life.

Now, it seems to me that the formulation of species being reflects a process in which human beings act upon lifeworlds rather than in conjunction with them. Through labor, a form of energy capable of adding energy, man activates potentialities that would have otherwise remained latent. Human relation to nature, therefore, can hardly be explained in terms of coevolution, as some theorists of metabolism suggest (Foster 2000). Rather, it describes the emergence of the human out of nature, as a living being capable of tirelessly mobilizing natural forces, animate and inanimate, for its own transformation. Ultimately, what underpins species being is the narrative of the self-reflexive *anthropos* capable of transforming himself and the world. As Donna Haraway (2008: 47) puts it: "Of all philosophers, Marx understood relational sensuousness, and he thought deeply about the metabolism between human beings and the rest of the world enacted in living labor. As I read him, however, he was finally unable to escape from the humanist teleology of labor—the making of man himself." For Marx, as for Virno's philosophical anthropology, the human species has a relation to nature by virtue of its detachment from it.

Jason Read (2003: 180) suggests that the English translation of the German term *Gattungswesen* as "species being" might be misleading in that it underscores biological meanings. He argues that the French translation of *Gattungswesen* as *la vie générique* (generic life) might more accurately convey Marx's use of the term. This attempt to detach species being from biology, however, overlooks how in Marx "generic life" indexes man's universality as *opposed* to animal particularity. Marx contrasts human species being to the "species life" of animals. Animal activity is identical to itself: it is purely

instinctual and subordinated to physical needs. Humans, in contrast, can act and, simultaneously, confront the objects that they have created (Marx 1988). Labor, or *praxis*, is the primary way through which human beings collectively transform nature and, by doing so, transform themselves. In the attempt to define what is proper to man as laboring living being, Marx's species being creates a distinction between the human and the nonhuman by which only the former acts upon the world, while the latter just exists.

Still more, in this concept we find echoes of the eighteenth and nineteenth centuries' species discourse, one not only bound up with racialized and sexualized formations but also paradoxically connected to classic political economy's effort to naturalize capitalist relations of production. The idea of the human as species emerged in eighteenth-century Europe, where it was often conflated with race and used to naturalize the hierarchical ordering of biological differences. The development of species taxonomies was steeped in the colonial obsession for classification, connected to racial subjectification and infused with sexual difference. Carl Linnaeus's taxonomy is paradigmatic in this sense. The Swedish naturalist introduced the term *Mammalia* in the mid-eighteenth century to indicate the class of animals, including humans, characterized by the presence of mammary glands. Then he used the term *Homo sapiens* to distinguish between humans and other primates and defined four racialized subspecies ranging from the white, blond, and inventive *Homo sapiens europaeus* to the *Homo sapiens afer*, described as black, lazy, and ruled by caprice. As feminist historian Londa Schiebinger (1993: 53–55) has shown, the genealogy of *Homo sapiens* is not only highly racialized but also profoundly gendered. While Linnaeus used a female characteristic (the lactating breast) to emphasize the ties between humans and animals, he employed a traditionally male feature (reason) to indicate human uniqueness, or, more precisely, the uniqueness of the European white man.

Marx was not immune from the racialized legacy of species thinking. In the *Grundrisse* he uses the distinction between species life and species being to contrast the Asiatic Mode of Production to the Germanic mode of production. Gayatri Chakravarty Spivak avers that Marx conflates the Asian individual with species life, natural life without human specificity. It is only with European feudalism and the movement toward urbanization in the Germanic mode of production that the self-reflexive relationship with nature typical of species being emerges. Spivak notes (1999: 80) that in Marx's description of the Asiatic individual "it is almost as if Species-Life has not yet differentiated itself into Species-Being." The species distinction is now recast in historical as well as geographical terms.

In *The Order of Things*, Foucault (1970) argues that modern Man emerged at the intersection of three discursive domains—life, labor, and language—articulated by biology, political economy, and linguistics, respectively. These are interdependent domains, characterized by an intense flow of ideas. Political economy, for example, borrowed heavily from the species taxonomy developed by natural history. Adam Smith, who was familiar with the work of Linnaeus, proposed the market as a natural, self-regulating force independent from individual agency and able to guarantee the perpetuation of the species against extinction (Schabas 2003; Cohen 2013). Political economy had an anthropological foundation insofar as it constitutes itself in relation to "the biological properties of the human species" (Foucault 1970: 257). Marx's project countered classic political economy's attempts to naturalize an economic order grounded on private property and the slavery of wage labor. Yet by thinking labor as species capacity, he imported from classic political economy the idea that labor is what makes us human.

I argue that Virno, with his insistence on the coincidence between human language and labor, runs into a similar problem. Moreover, the account of post-Fordism as historical reiteration of anthropogenesis risks producing an insidious foreclosure: it elides the effects of racialization and feminization that the species discourse has historically both enabled and entailed. The foregrounding of labor as potentiality immanent in the whole of humanity obliterates the potentialities of the ecological and geological milieu that provides the conditions for what "we" have come to understand as human. Because he operates within a framework that conceives the constitution of the world in terms of production, Virno falls short of providing a counterpoint to the narratives of the Anthropocene that posits "generic" man as primary locus of geopolitical agency. However, in Virno's work we find an expansive, and nuanced, notion of the collective that displaces the political ontology of modernity, particularly the idea that the political community is made up of individuals who have left behind the state of nature. His work invites the question of how to inherit autonomist Marxism's rich account of the collective without embracing the human as central agent of world making.

States of Nature

Virno's insistence on the political valence of human nature in the present context of capitalist accumulation poses an important challenge to Western modern political thought. The liberal tradition envisions isolated individuals lacking communal relation. Each individual owns something but shares

nothing with others except a set of recurring elements. For example, in the work of Thomas Hobbes, one of Virno's favorite targets, the relationship between the many and the sovereign is unidirectional. It begins with a multitude of hostile individuals scattered in the state of nature and culminates with their submission to the law in exchange for protection from violence and death. Through the transition from the prepolitical state of nature to the civil state, the multitude becomes the people, an aggregate of individuals whose interests are mediated by the universal figure of the state.

To the Universal of modern thought Virno (2010: 204–7) opposes the Common. While the former results from the abstraction of recurrent elements that return in a number of already individuated entities, the latter provides the conditions for the emergence of singularities. The common, the shared linguistic faculty of the human species, expresses a multitude of singularities that persist as such. There is no dividing line between the common and the multitude, only trajectories of dislocation. This means that there is no overcoming of the state of nature, only countless realizations of its potentiality.

Simondon's theory of individuation is key in Virno's articulation of the common as shared biolinguistic faculties that are performed differently by a multitude of singularities. Virno's interest in the process of individuation dates back to the 1980s. Already in *Convenzione e materialismo*, a book first published in 1986, he draws a connection between Marx's notion of general intellect and the philosophical concept of *principium individuationis*, which he traces back to medieval philosopher Duns Scotus. Instead of taking the individual as the given unity from which everything else can be derived, Virno (2011: 56) speaks of individuation as a process "whose rhythm is not in tune with the cogito or with consciousness (not even class consciousness) but unfolds through exterior intersections and dislocations of productive forces" (my translation) In other words, individuals are modulations of the "collective intelligence" of living labor. The reflection on the expansive dislocation of the general intellect remains a fundamental theme in Virno's thought. The encounter with Simondon has allowed him to fully explore this intuition and formulate the notion of the common as *preindividual reality*.

A rare case of a thinker working at the intersection of physics, biology, and philosophy, Simondon has been largely interpreted as a philosopher of technics and technogenesis (Mackenzie 2002; Stiegler 1998). Explicit references to politics in his work are sparse.[4] Yet the relevance of the model of ontogenesis for elaborating alternatives to the modern fixation with individuals as the basic unity of social and political life has become the subject of an

increasingly lively debate. Etienne Balibar (1997) sees a convergence between Spinoza and Simondon as political thinkers. Muriel Combes (2013) argues that Simondon breaks away from the division between nature and politics that has been crucial in the juridical tradition of the social contract. Virno, who has translated Simondon into Italian and introduced his writings to autonomist circles, employs Simondon to advance a politics of collective subtraction from capitalism. More recently, feminist theorists such as Hasana Sharp (2011) and Elizabeth Grosz (2012) have turned to Simondon in the effort to elaborate a feminist politics that moves beyond the image of Man as the sovereign subject of history.

Instead of focusing on elementary units or essences, Simondon shifts attention to *ontogenesis*, that is, the process through which specific forms of life come into being and change over time. Ontogenesis originates in a metastable "preindividual reality," which Simondon, inspired by pre-Socratic philosophers, also calls *nature*. In physics and chemistry, metastability indicates a system in a state of tension that even the smallest disturbance can alter. The preindividual is characterized by a level of potential energy, internal "disparations" that trigger a change in the system, leading to the emergence of more or less completed individuals.[5] Simondon (2009: 5) writes: "In order to think individuation, being must be considered neither as a substance, nor matter, nor form, but as a system that is charged and supersaturated, above the level of unity, not consisting only of itself." Individuation takes place when a communication is established between different orders of magnitude that coexist within the metastable system. This produces a new phase of being, a medium order that provisionally resolves an internal problematic. The growth of a plant is an example of ontogenesis: "A vegetable institutes a mediation between a cosmic order and an infra-molecular order, sorting and distributing the chemical species contained in the ground and in the atmosphere by means of the luminous energy received from the photosynthesis" (Simondon 2009: 16).

Simondon (2009) describes the dynamic of differentiation within the preindividual as transduction, an operation—physical, biological, psychic, or social—through which an activity propagates and structures heterogeneous domains that remain in relation. Transduction designates the modulation of a field, its coagulation into specific points that, in turn, trigger new rounds of structuring activity. Importantly, by describing transduction as an operation that cuts across the physical, the social, and the technological, Simondon shifts emphasis from the divisions between these realms to the nonlinear movements and thresholds that link them together. The same operation

of transduction produces living and nonliving individuals, thus destabilizing the hierarchy between life and nonlife, organic and inorganic.

Simondon distinguishes between "physical individuation" that produces inanimate individuals and "vital individuation" that produces living beings. There exists a difference of complexity and degree of metastability between the two. The emergence of physical individuals occurs in a definitive manner, marked by a stabilization of energy that indicates a completed individuation. In contrast, living individuals always carry within themselves a dimension of preindividual potentiality that makes further individuation possible. Although this argument seems to privilege life over nonlife, it carries an important corollary: "There is no real division between the physical and the vital, as if they were separated by an equally real boundary; the physical and the vital are distinguished by functions and structure, not on the basis of their substantial reality" (Simondon 2005: 323; my translation). Transductive operations affect both individuals and milieus. The preindividual milieu is never equal to itself; it is transformed by individuation in a way that does not impoverish its potential to engender endless variation. Form, matter, and energy coexist in it; none of them appears as an external element that superimposes on the others from the outside.

Virno glosses over Simondon's insistence on the preindividual as a prevital field of disparation that propels innumerable modes of becoming. Instead, he uses the preindividual to describe the common potentialities of the human that are put to work in the circuits of post-Fordist accumulation. From this perspective, the common refers simultaneously to the linguistic capacities of the species being and the "transindividual" public sphere that might be produced by the multitude. He offers three definitions of the preindividual common, and all of them are species-specific. First, "the pre-individual is the biological basis of the species, that is, the sensory organs, motor skills apparatus, perception abilities" (Virno 2004: 76). Sensory perceptions constitute the generic capacity of the human rather than of any particular individual. For example, when I touch something, it is not just I who touch but the generic "one" of the species. Sensory perceptions exceed the sphere of the subjective to open up to the larger domain of the impersonal and the common. According to Virno, this is also true of language. A historical-natural language is shared by the speakers of a certain community; it belongs to everybody and to nobody. Thus the linguistic faculty encapsulates the second definition of the preindividual common. Finally, his third definition argues that in the regime of advanced capitalism the realm of productive forces is preindividual because "the labor process mobilizes the most universal

requisites of the species: perception, language memory and feelings" (Virno 2004: 77). How does Virno resolve the question of the relationship between the preindividual common and the realizations of its potential? Once again, he turns to Simondon and specifically to the notion of collective individuation, which he sees as a prerogative of the human associated with political life.

In contrast to the conventional image of the collective as a sort of synthetizing machine that diminishes difference, Simondon claims that the collective furthers individuation. Virno (2004: 78–79) remarks: "According to Simondon, within the collective we endeavor to refine our singularity, to bring it to its climax. Only within the collective, certainly not within the isolated subject, can perception, language, and productive forces take on the shape of an individuated experience." The multitude, an unstable network of cognitive workers, is a form of collective individuation in which the many persevere as many and always carry within themselves shares of preindividuality. It is in the network of the multitude that the second face of the common may emerge: "Besides being preindividual, it is *transindividual*; it is not only the undifferentiated backdrop, but also the public sphere of the multitude" (Virno 2009: 64).

Virno is careful to not characterize the multitude simply as a network of rebellious singularities capable of creating alternative modes of living. It is a much more ambiguous formation, one that reflects the ambivalence of *Homo sapiens*. Such nuanced assessment of the multitude underscores the indeterminacy of any radical political project. But in Virno's peculiar political reading of Simondon, it is as if the process of individuation that might actualize the common would begin and end with the anthropos.

Other readings of the preindividual, however, radically dislocate the centrality of the human. Deleuze (2001: 49), for example, suggests that the ontology elaborated by Simondon is "one in which Being is never One." Combes (2013: 3) defines the preindividual as a "power of mutation," always in excess over itself. Unlike much of modern Western thought that understands the social as processual and dynamic, capable of mobilizing a malleable nature, the ontogenetic approach frames preindividual nature as what creates the conditions for the production of variations that reverberate through the social. For Grosz (2012: 45), the preindividual "is the real, the world, the universe in its unordered givenness. What is given are singularities, specificities, tendencies, forces but not yet modes of ordering and organizing them into systems, levels, dimensions, or orders. Chaos." Simondon's preindividual does not coincide with human nature but is closer to what pre-Socratic philosophers called *physis*. The philosophy of ontogenesis revitalizes

physis. Even more, it rejects the division between *physis* and *techne*, what emerges out of nature and what is produced by human activity.

Ontogenesis does not accord particular privileges to any species of individuals, including humans. The preindividual, a field of prevital incompatibilities, provides the conditions for the emergence of living and nonliving beings. In other words, it makes individuation possible, but it is not reducible to any particular trajectory of becoming. By foregrounding this aspect of the differential, chaotic nature of the preindividual, I want to complicate Virno's notion of the common as reservoir of human potentialities and public sphere of the multitude.

A profound skepticism, if not an outright rejection, of "anthropological" problems appears everywhere in Simondon's writings on individuation. "The notion of anthropology itself," he contends, "implies the implicit affirmation of the specificity of Man, separated from the vital" (Simondon 2005: 297; my translation). The reference to anthropology can be taken as a critical reference to the dominant humanist orientation of Western philosophy from which Simondon seeks a way out. In the French context of the 1950s, the tendency was to look at the human through either the Freudian lenses of the psychic or the Marxist lenses of social relations of production. The model of ontogenesis breaks with both traditions in that it places emphasis on what enables individuation, on transductive transformations across physical, psychic, social, and technical domains. For Simondon, there is no human nature, only thresholds and transitions that define the human as a particularly unstable field of individuation. But rather than explaining instability through the abstract model of the species (Simondon 2011), he focuses on degrees of individuation. This is not to deny human singularity but to refuse bounded notions of the human as a form of becoming autonomous from animal and mineral existence. Individuation is not human to begin with; it emerges out of an inhuman milieu and unfolds in innumerable directions.

Virno does away with the notion of politics as an overcoming of the state of nature deeply ingrained in the liberal tradition. In thinking the common, he connects natural potentialities with a politics that is also entangled with the development of the forces of production. This is a powerful move, but one that presents the limit of analyzing the human species as a rather undifferentiated aggregate of living beings and in utter isolation from ecological and geological formations. Simondon, on his part, does not provide an analysis of power, an understanding of how particular individuations of preindividual tensions come to acquire quasi stability as abstract models with violent effects on particular categories of bodies. For example, how did

gender, race, and species become hierarchical categories producing distinctions within the human and between human and nonhuman beings? What Simondon offers, however, is the forsaking of anthropology as the ground of politics. This, I contend, does not mean to do away with politics altogether. On the contrary, it poses the challenge of cultivating different forms of politics.

This is the direction toward which Simondon (2005: 314) points us with the striking assertion that the collective "exists physikos and not logikos." The Greek adverbs φυσικῶς (physikos) and λογικῶς (logikos), which appear in the French text, can be roughly translated as "pertaining to nature" and "pertaining to reason," respectively. I take this as an indication that, in thinking the formation of the collective, Simondon prioritizes "physical" nature, that is, the relation to preindividual reality rather than cognitive capacities. Instead of thinking preindividual nature as the mute substratum that is left behind in the human process of collective becoming, Simondon calls attention to the indeterminacy of *physis* that makes politics possible. What is at stake here is the opening up of an approach to politics that does not lose sight of the prevital and living elements that are elaborated by psychic and collective individuation. Collective individuation is realized via transductive movements that actualize a field of potentialities. As that which creates the conditions for trajectories of becoming, preindividual nature "renders social transformation thinkable" (Combes 2013: 54).

Making the Common in the Ruins of the Anthropocene

Combes (2013: 50) writes that Simondon replaces the Kantian query "What is man?" with the question "What can a human do insofar as she is not alone?" Simondon, she argues, proposes "a humanism without the human to be built on the ruins of anthropology" (50). This assertion resonates with the trope of "living in ruins" that Anna Lowenhaupt Tsing (2015), Haraway (2016), and Isabelle Stengers (this issue) have been deploying in recent writings. These feminist thinkers direct attention to collectives that strive to persist in the devastated landscapes of the capitalist Anthropocene. Not unlike Simondon, they contend that the invention of the new requires the dislodging of Man as prime mover of history. Joining these efforts to dethrone the anthropos from its commanding positions, I want to rethink the common through the Simondonian question of what humans can do insofar as they are not alone. Let me turn to a particular instance of the common to clarify what I mean.

In the early 1990s, builders working at the foundations of a shopping center in a densely populated area in Rome, Italy, struck a source of Rome's famous *acqua bullicante*, mineral water that flows through a geological layer

storing the ruins of the Roman Empire and now mixed with plastic debris, a marker of the Anthropocene. After a few months, the water submerged the construction site and formed an urban lake. The watery formation bordered the Ex SNIA Viscosa, a former textile factory turned into a self-managed social center and laboratory for activists. Quietly, the lake began to exert its force of attraction on those who learned to care for its existence.

When new development plans for the area were announced, an alliance of local residents and activists from the Ex SNIA Viscosa, including hip-hop artists and rebel scientists, organized a protest. They studied the geology of the area, tested the water for assessing toxicity levels, learned about the birds and plants populating the lake, and negotiated with the local administration.[6] They referred to the "lake that resists" as a common. But, I suggest, this is a common where it is hard to tell when nature ends and the social begins.

That is how the hip-hop song "The Lake That Struggles," composed as part of the mobilization, describes what happened: "The lake invaded the reinforced concrete and asked for help, / we learned to imagine, love, and experience it."[7] For some this may conjure up the romantic image of an innocent nature that turns against plunderers to form a common that activists are called to defend. I do not wish to subscribe to this narrative of holistic nature. More than pristine wilderness that needs to be protected, the lake resembles what some would define as "second nature" produced by human action (Smith 1984). But this second nature does something: it is capable of altering the beings that press upon it. Through the reference to a "nature that resists," the lyric makes present an attachment that forced political thought. Stengers (2005: 191) suggests that "attachments are what cause people . . . to feel and think, to be able or become able." Attachments generate problems and pose questions that may be resolved through new trajectories of collective form taking. They propel collective transformation that could not be enacted by humans alone. Attachments, however, are not a matter of partnership or even alliance. They involve asymmetry, the possibility of relation without reciprocity.

The episode of the lake is seemingly insignificant when placed next to big-pictures stories of antagonism, riots, and uprisings that characterize the uneven geographies of the Anthropocene. Yet this struggle, one among many specific instances of commoning, constitutes fertile ground for experimenting with alternative textures of politics in the ruins of the Anthropocene. To me its significance is this: the watery formation slowed down urban development and enabled the making of the common. What might be flourishing around the urban lake is an instance of collective individuation that

foregrounds attachments to its ecological and geological conditions of possibility. This is a mode of commoning without the anthropos as its center.

As Alberto Toscano aptly notes, Virno's thinking of the preindividual common as human nature implies that a new social configuration lies in a state of latency, as if waiting for the propitious convergence of anthropogenesis and capitalist development to emerge. From this perspective, politics would consist in the insurrection of human biolinguistic capacities against capitalist control (Toscano 2007: 2). Simondon instead gestures toward a politics that begins with "the invention of a communication between initially incompossible series; as invention of a common that is not given in advance" (3). Moving along these lines, this essay argues for a reconsideration of the preindividual as a more-than-human field of potentiality, the ground for the difficult task of making the common. Neither the reservoir of human linguistic faculties nor its actualization beyond capitalism, the common could be thought of as a project enacted by humans as beings "with and of the earth" (Haraway 2016: 60).

Virno offers a profound rethinking of the relationship between natural human potentials, their historical realizations and political relevance for the present time. By doing so, he unsettles one of the key tenets of Western political thought, namely, the idea that politics begins where the realm of nature ends. Yet as this essay demonstrates, he also conflates natural history with the history of the laboring human. For Virno, as for Marx and much of autonomist thought, man produces man, a figure whose only attachment is to himself. This essay focuses on different genealogies of the human. It attends to the racialized and gendered logic that has historically informed the dominant model of man that acts upon and transforms the world. At the same time, building on Simondon, it explores instances of the common capable of making present the other-than-human forces operating "within everything we think is ours, or our own doing" (Sharp 2011: 9). The capitalist Anthropocene is replete with assumptions about *Homo sapiens* as agent of catastrophe and source of salvation. Radical thought ought to operate within and against them, for it is not a reinvigorated humanism that can create modes of living otherwise but rather situated collectives that politicize the attachments to that which makes them possible.

Notes

1 *A Grammar of the Multitude* and *When the Word Becomes Flesh* were published in Italian in 2001 and 2003, respectively. Portions of *E così via all'infinito*, published in 2010, have appeared in the journal *Parrhesia*. See Virno 2004, 2015, 2010.

2 Virno offers rich accounts of his political and intellectual trajectory in an interview with Branden W. Joseph (see Virno 2005) and in *Gli operaisti*, a book collecting biographical statements and interviews with many workerist thinkers (see Borio, Pozzi, and Roggero 2005).

3 Of course, the problem with Uexküll is the tendency to think in terms of enclosed sensory bubbles, vital spaces at times conflated with the nation-state. Roberto Esposito (2008: 17–19) has drawn attention to this aspect of Uexküll's ethology.

4 Simondon's first publication, *Du mode d'existance des objects techniques* appeared in France in 1958. It is only in 1989, with the posthumous release of *L'individuation psychique and collective*, that his work began to be widely read. His writings on individuation have been published as a whole in *L'individuation* à *la lumière des notions de forme et d'information* (Simondon 2005).

5 Simondon uses *disparation* (*disparition*) to name an incompatibility, a difference, that arises within a metastable system. Disparation is therefore a condition of individuation.

6 In 2014 the city's administration expropriated a large part of the land and pledged to work with the activists to keep the area accessible to all. The funds promised for this project, however, have been diverted elsewhere. The struggle continues.

7 "The Lake That Struggles" is a song by Assalti Frontali and Il Muro del Canto. My translation.

References

Autin, Whitney, and John Holbrook. 2012. "Is the Anthropocene an Issue of Stratigraphy or Pop Culture?" *GSA Today* 22, no. 7: 60–61.

Balibar, Etienne. 1997. *Spinoza: From Individuality to Transindividuality*. Delft: Eburon.

Borio, Guido, Francesca Pozzi, and Gigi Roggero, eds. 2005. *Gli operaisti: Autobiografie dei cattivi maestri* (*The Workerists: Autobiographies of Wicked Teachers*). Rome: DeriveApprodi.

Chakrabarty, Dipesh. 2009. "The Climate of History: Four Theses." *Critical Inquiry* 35, no. 2: 197–222.

Cohen, Ed. 2013. "Human Tendencies." *e-misférica* 10, no. 1. http://hemisphericinstitute.org/hemi/en/e-misferica-101/cohen.

Combes, Muriel. 2013. *Gilbert Simondon and the Philosophy of the Transindividual*. Translated by Thomas LaMarre. Cambridge, MA: MIT Press.

Deleuze, Gilles. 2001. "Review of Gilbert Simondon's *L'individu et sa genèse physico-biologique* (1966)." Translated by Alberto Toscano. *Pli: The Warwick Journal of Philosophy* 12: 43–49.

Esposito, Roberto. 2008. *Bíos: Biopolitics and Philosophy*. Translated by Timothy Campbell. Minneapolis: University of Minnesota Press.

Foster, John Bellamy. 2000. *Marx's Ecology: Materialism and Nature*. New York: Monthly Review.

Foucault, Michel. 1970. *The Order of Things: An Archeology of the Human Sciences*. Translated by Alan Sheridan. New York: Vintage.

Grosz, Elizabeth. 2012. "Identity and Individuation: Some Feminist Reflections." In *Gilbert Simondon: Being and Technology*, edited by Arne De Boever et al., 37–56. Edinburgh: Edinburgh University Press.

Hamilton, Clive. 2013. *Earthmasters: The Dawn of the Age of Climate Engineering*. New Haven, CT: Yale University Press.

Haraway, Donna. 2008. *When Species Meet*. Minneapolis: University of Minnesota Press.

Haraway, Donna. 2016. "Staying with the Trouble: Anthropocene, Capitalocene, Chthulucene." In *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, edited by Jason W. Moore, 34–76. Oakland, CA: PM Press.

Hardt, Michael, and Paolo Virno. 1996. *Radical Thought in Italy: A Potential Politics*. Minneapolis: University of Minnesota Press.

Kolbert, Elizabeth. 2014. *The Sixth Extinction: An Unnatural History*. New York: Holt.

Mackenzie, Adrian. 2002. *Transductions: Bodies and Machines at Speed*. London: Continuum.

Marx, Karl. 1973. *Grundrisse: Foundations of the Critique of Political Economy*. Translated by Martin Nicolaus. Harmondsworth, UK: Penguin.

Marx, Karl. 1976. *Capital: A Critique of Political Economy*. Vol. 1. Translated by Ben Fowkes. London: Penguin.

Marx, Karl. 1988. *Economic and Philosophic Manuscripts of 1844*. Translated by Martin Milligan. Amherst, MA: Prometheus Books.

Read, Jason. 2003. *The Micro-Politics of Capital: Marx and the Prehistory of the Present*. Albany: State University of New York Press.

Schabas, Margaret. 2003. *The Natural Origins of Economics*. Chicago: University of Chicago Press.

Schiebinger, Londa. 1993. *Nature's Body: Gender in the Making of Modern Science*. Boston: Beacon.

Sharp, Hasana. 2011. *Spinoza and the Politics of Renaturalization*. Chicago: University of Chicago Press.

Simondon, Gilbert. 2005. *L'individuation à la lumière des notions de forme et d'information* (*Individuation in the Light of the Concepts of Form and Information*). Paris: Jerome Millon.

Simondon, Gilbert. 2009. "The Position of the Problem of Ontogenesis." Translated by Gregory Flanders. *Parrhesia*, no. 7: 4–16.

Simondon, Gilbert. 2011. *Two Lessons on Animal and Man*. Translated by Drew S. Burk. Minneapolis: Univocal.

Smith, Neil. 1984. *Uneven Development: Nature, Capital, and the Production of Space*. New York: Blackwell.

Spivak, Gayatri Chakravarty. 1999. *A Critique of Postcolonial Reason: Toward a History of the Vanishing Present*. Cambridge, MA: Harvard University Press.

Stengers, Isabelle. 2005. "Introductory Notes on an Ecology of Practices." *Cultural Studies Review* 11, no. 1: 183–96.

Stiegler, Bernard. 1998. *Technics and Time, 1: The Fault of Epimetheus*. Translated by Richard Beardsworth and George Collins. Stanford, CA: Stanford University Press.

Toscano, Alberto. 2007. "The Disparate: Ontology and Politics in Simondon." Paper presented at the Society for European Philosophy / Forum for European Philosophy annual conference, University of Sussex, Brighton, UK, September 9. www.after1968.org/app/webroot/uploads/Toscano_Ontology_Politics_Simondon.pdf.

Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton, NJ: Princeton University Press.

Uexküll, Jakob von. 2010. *A Foray into the Worlds of Animals and Humans: With a Theory of Meaning*. Translated by Joseph D. O'Neil. Minneapolis: University of Minnesota Press.

Virno, Paolo. 2004. *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Virno, Paolo. 2005. "Interview with Paolo Virno." Conducted by Brandon W. Joseph. Translated by Alessia Ricciardi. *Grey Room*, no. 21: 26–37.

Virno, Paolo. 2008. *Multitude: Between Innovation and Negation*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Virno, Paolo. 2009. "Angels and the General Intellect: Individuation in Duns Scotus and Gilbert Simondon." Translated by Nick Heron. *Parrhesia*, no. 7: 58–67.

Virno, Paolo. 2010. *E così via, all'infinito: Logica e antropologia* (*And So Away with Infinity: Logic and Anthropology*). Turin: Bollati Boringhieri.

Virno, Paolo. 2011. *Convenzione e materialismo: L'unicità senza aura* (*Convention and Materialism: Uniqueness without Aura*). Rome: DeriveApprodi.

Virno, Paolo. 2015. *When the Word Becomes Flesh: Language and Human Nature*. Translated by Giuseppina Mecchia. Los Angeles: Semiotext(e).

Jason Read

Anthropocene and Anthropogenesis: Philosophical Anthropology and the Ends of Man

"Humanity," "man," or "anthropos" is once again a topic of discussion. Having somehow outlived its erasure as lines in the sand, as well as the proclamations of the posthuman epoch, humanity has returned with a vengeance. The first point of return, and the most prominent, is in the push to label the current geological epoch the "Anthropocene," an epoch in which the defining characteristic is humanity's effect on the environment, such that plants, animals, water, and virtually everything from the outer reaches of the atmosphere to the soil and bedrock have been chemically or physically altered. The concept or term *Anthropocene* has moved beyond the small circle of earth scientists who coined it to become an object of not only multiple disciplines but politics as well. It might seem odd to identify the Anthropocene with the return of humanity since anthropos, man, is primarily named as placeholder. The emphasis is on humanity's effect on the natural world, not on humanity as such, on humanity's putative essence. In contrast to this the second return to the anthropos is explicitly about the question of the human, of its particular anthropogenesis, or constitution; I am referring to the work of Paolo Virno. His recent works have taken

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up the question of human nature and its connection to politics. This turn is not a return to the designation of a human essence outside of history, but an understanding of the way in which the human is constituted, and constitutes itself, in and through specific institutions and practices. Such a turn is not without its precedents in the post-autonomist tradition: Antonio Negri and Michael Hardt wrote in *Empire* of a "humanism after the death of man" in which "humanity" is defined less as an essence than an activity, a practice. Beyond this a broader return to a political, or political economic, anthropology can be found in the work of Etienne Balibar and Bernard Stiegler.

What is the relationship between these two different invocations of the "human," other than appearing at the same time in different theoretical discourses? What do they have in common beyond a particular challenge to an old consensus that dictated that there is no humanity, no human nature as such, just different social constructions? Why is humanity, or human nature, returning at this point, and what does this return have to say about our need to rethink the contours of nature and society? Or, put more provocatively, why might the Anthropocene demand a reinterrogation of anthropogenesis, of the constitution of the human, and vice versa?

Prehistory of the Anthropocene

There are as many dates to mark the beginning of the Anthropocene as there are concepts of it; precisely when it begins already says something about how it is conceptualized. The question of periodizing the Anthropocene raises the question of the anthropos, of humanity, albeit obliquely. If it is traced back to events such as the "megafauna extinction" that wiped out the mastodon, the giant sloth, and other creatures, then it is hard not to trace it to something in humanity, some fundamental errancy, driving us beyond territory and limit, but if it begins with the "industrial revolution" then it is possible to call it the Capitalocene (Kolbert 2015: 44). The question of when the Anthropocene begins is also a question of what it is, or what it is the effect of; if it begins with the megafauna extinction at the beginning of the Holocene, under radically different social and technical conditions, then it would be possible, perhaps even necessary, to understand the Anthropocene as something that began with humanity as a species. In such a case, as in Elizabeth Kolbert's *The Sixth Extinction: An Unnatural History*, the story of this prehistorical mass extinction is often coupled with the extinction of the Neanderthals. Taken together we get the impression of mankind as a species that spread far and wide, overcoming the barriers of ecological niche, pre-

cisely because of the lack of instinctual determinates. The Neanderthal, our close cousins, left no cave paintings, no culture, no artifice, and thus it can be posited that our eradication of the Neanderthal can be traced to our ability to create culture and invent tools and ways of managing the world (Scranton 2015: 31). By this logic, the Anthropocene is not only a product of human nature, stemming directly from our capacities as animals defined as either "speaking" or "tool making," but also an effect of our fundamentally errant nature. We are the species that lacks instinctual determination, open instead to the influence of culture and history, and thus we are the species that lacks any particular ecological niche. A focus on the lack of instinctual determination and ecological niche and the spread of *Homo sapiens* across nearly every continent and across multiple ecosystems does not just offer an explanation of the great extinctions of the mammoth and Neanderthal. It also explains the gradual transformations brought about by human migration and communication, both intentional; the transportation of crops from the old world to the new and vice versa; and, unintentional, the introduction of the Norway rat to islands and continents (Kolbert 2015: 105). Humanity since its conception has transformed nature. The Anthropocene is in some sense naturalized, suggesting that we humans are not unlike a meteor or a volcano or, in the words of Agent Smith from *The Matrix*, "a virus" infecting the planet.

From this periodization, definitions of the Anthropocene end up duplicating definitions of the human, of the anthropos from philosophical anthropology. Two ideas are most relevant. First, humanity as a species is defined by lack of instinctual determination. This idea was developed most strongly by Arnold Gehlen, for whom humanity's openness, its capacity to develop language and culture, is primarily defined as a lack, as a lack of instinctual determination and organ specialization. "In terms of morphology, man is, in contrast to all other higher mammals, primarily characterized by deficiencies, which, in an exact, biological sense, qualify as lack of adaptation, lack of specialization, primitive states, and failure to develop, and which are essentially negative features" (Gehlen 1980: 26). Second, there is the idea developed by André Leroi-Gourhan (1993: 188) that the defining feature of humanity is the externalization of memory, habits, and knowledge in the form of tools, signs, and images. This artificial memory supplants the missing instincts, with tools replacing biological specialization to enable adaption to any ecosystem. This is the "anthropos" remaining off scene in most definitions of the Anthropocene, humanity as the undetermined and thus unlimited maker of tools and environments and transgressor of limits and transformer of nature (Scranton 2015: 94).

However, if we start with a later date, placing the Anthropocene with the industrial revolution and the world transforming effects of the exploitation of fossil fuels, placing it not with the specific ecological effects of mankind's spread across the globe and interspecies competition with other hominids but within the effects of capitalism and industrialization, the very nature of the anthropos in question changes as well. Such a periodization is less about the essence of man, or mankind as a species, than the particular institutions of capitalism, industrial production, and fossil fuel use. The turn to fossil fuels unleashed potentials for work and movement unimaginable in agricultural society (Scranton 2015: 57). At the same time, the turn toward carbon in the ground as a source of fuel and energy deepens the "metabolic rift," as carbon, nitrogen, and methane are unleashed from the ground but never returned (Wark 2015: xiv). The merits of such an explanation, tying the Anthropocene to capitalism and the rise of technology, are that it is less about a species than particular economic and social structures, history rather than nature. Whereas the first periodization suffers from an almost neo-Malthusian account of natural competition between species, the second renders the Anthropocene itself contingent, even historical. There is little that can be done to address the fundamentally expansive and undetermined nature of *Homo sapiens* as a species, except perhaps to genetically modify it, or repress its necessarily rapacious nature, whereas capitalism as an institution can be replaced or at least transformed. The second narrative is not only less concerned with human nature; it places humanity outside of nature, as a destructive force (Moore 2015: 175).

There are of course other dates, other periodizations—the Neolithic revolution, the birth of agriculture, and so on—but the two selected above are remarkable in that they run the gambit of the nature/social divide. In the first, the Anthropocene is a product of human nature, of our paradoxical status as a species that has no defined place or determined behavior; while in the second, it is entirely the product of culture, of politics, of our existence as something outside of nature. These periodizations mirror what could be called, following Michel Foucault's description of empirico-transcendental doublet of humanism, the natural/social doublet of environmentalism, or what Jason W. Moore calls "Cartesian dualism." In the first, humanity and the Anthropocene are entirely a part of nature. Humanity becomes one more natural calamity affecting the surface of the earth, like an ice age or the eruption of a giant volcano. In the second, the Anthropocene is entirely artificial, social; it is a product of technology, capitalism, and industrialization. Thus what is played out in the different periodizations of the Anthropo-

cene is nothing other than the entire ambiguous status of humanity as a species at once internal and external to nature (Viveiros de Castro 2014: 44). Moore argues that such a simple inclusion or opposition fails to grasp the actual relation between human society and nature. He replaces the simple inclusion or opposition of humanity and nature with what he refers to as the history of the double inclusion of humanity and nature. "History," in this sense, is the history of a "double internality": humanity-in-nature/nature-in-humanity. (And yes, there is a longer history of earth and all the rest that precedes humans.) In this double internality, everything that humans do is already joined with extrahuman nature and the web of life: nature as a whole that includes humans (Moore 2015: 5). There is no nature as such, just different historically produced natures, but these natures are produced not by some society, industry, or capital, something outside of nature, but by a species (us) that is always simultaneously producing and produced by nature.

Historicizing this double inclusion means understanding the relationship between capitalism and nature, which demands moving beyond such concepts as commodification or exploitation. Capital must be understood as not just a mode of production but as a way of organizing nature, as process of both exploiting labor power and appropriating nature. "The first is premised on exploitation: abstract social labor/capital and wage labor. The second is premised on appropriation: abstract social nature/capital and unpaid work/energy" (Moore 2015: 214). In positing such a double relation, Moore takes his initial bearings from feminist critiques of Marx. As Silvia Federici, Mariarosa Dalla Costa, and others argued, the exploitation of wage labor power does not constitute the entirety of capitalism as social relation (Dalla Costa and James 1972: 27). Such exploitation is only possible, only profitable, if it is founded on the appropriation of unpaid work of reproduction, housework, and care work and the reproduction of children. Moore extends this principle to argue that the capitalist exploitation of labor is dependent on cheap nature, cheap labor power (made cheap by unpaid housework), cheap food (made cheap by agricultural revolutions), and cheap fuel (made cheap by failures to pay for its ecological costs). It is not just reproductive work, the work of housework that keeps labor costs, necessary labor, low; it is also cheap food and energy. Of course the "cheapness" of these various commodities is not fixed, and the changing costs of nature explain capital's transformation from agricultural production to industrial production, as well as the shift from coal to oil, and so on. Capital must find new cheap natures to reproduce the ones that are exhausted or used up. To understand this, it is necessary to understand what drives the cost of nature, at what point it ceases to be cheap.

The cheapness of various natures is often the cumulative effect of millennia of biological and physical processes. The vast nitrogen stores that have made possible the various "breadbaskets" of civilization, and the buried carbon of the various fossil fuels, cannot be reproduced in human history. Their appropriation constitutes a kind of ecological primitive accumulation, an initial exploitation that makes capitalization possible. As with the reproduction of labor power in the home, what makes these natural processes cheap is simply that they are not paid for, or, put differently, that there is no attention paid to their reproduction and to the negative effects of their appropriation. These externalities, effects not included in the cost, eventually undermine the appropriation; nature gets less cheap (Moore 2015: 120). This rising cost is in part due to the way that nature is appropriated (cheapness comes at a cost of not including negative effects or long-term costs of reproduction), but it also comes from capital's own tendencies toward commodification and subsumption. As much as capital relies on the uncommodified labor of reproduction and the uncommodified nature that constitutes the basis for cheap nature, it also tends toward the capitalization of reproduction, commodifying the uncommodified world of nature. Capital is divided between its tendency to rely on cheap nature, on an outside of wage labor and commodities that it ceaselessly appropriates, and its tendency to subsume more and more of life, commodifying needs and transforming the social relations that exist outside of it into jobs (Moore 2015: 238). The first keeps labor costs low, but the second provides the conditions for realizing the value that is produced. Capital destroys the very uncommodified ground it stands on, constantly seeking new territories, new cheap natures.

Moore's account of capitalism, of its history and dynamic, is in part one of competing and conflicting tendencies, commodification and appropriation, the exploitation of labor power against the appropriation of energy. In that sense capitalism is doomed by its own contradictions. At the same time, however, this contradiction between tendencies, between cheap nature and commodification, is itself the effect of another contradiction, a contradiction between the nature that is internal to its historical production and the nature that is in excess of it. It is a contradiction between the nature that is produced and the natural limit of that production. As Moore (2015: 205) writes: "At some level, all life rebels against the value/monoculture nexus of modernity, from farm to factory. No one, no being, wants to do the same thing, all day, every day. Hence, the struggle over the relation between humans and the rest of nature is necessarily a class struggle." Capital comes up not only against the limits of its own conflicting tendencies but against the limits of nature itself; or, more to the point, these limits are themselves intertwined. Nature is

always more than the nature that is historically produced, hence the double internality: nature is inside of history, constituting different "natures" in terms of agriculture, fossil fuel extraction, genetic manipulation, and so on, but history is also inside of nature, inside of processes that exceed it. As much as capital can be identified with the process of creating abstract social nature, a nature that can be mapped, quantified in units, and thus extracted, nature exceeds this. There are always externalities that are not included in this abstraction, qualities not quantified and costs not included in the price.

Moore's formulation here is provocative to say the least, on two counts. First, it posits a "life" that is something other than the abstract nature required by capital, but this life is conceived of not in primarily vitalist terms but as itself an instance of class struggle. One could argue that Moore's thesis returns us to the earliest readings of Marx, to alienation, to the idea of something in humanity that resists its transformation into labor power, only now alienation is expanded to include the natural and animal worlds as well. It is not just human life that resists being made into a means of mere life, to abstract labor power, but all of life that resists being transformed into calories and kilowatts, energy and fuel. It is a nonhumanist concept of alienation in that it extends the very problem of alienation beyond the human.[1] Moore's critique of "Cartesian dualism" means that neither "nature" nor "society" can be used as an explanatory principle of either the Anthropocene or the limits to capitalism. The Anthropocene is neither an effect of a rapacious and unlimited species, humanity, nor the effect of an unnatural technology on nature, but the intersection of both. Or put differently, the limit of capital is nature, but not nature as such but nature's inability to completely coincide with cheap nature, living labor with abstract labor. These limits, like capital itself, must be thought of as both natural and social. As Timothy Mitchell argues, the shift from coal to oil as an energy source is driven as much by the political struggle over the conditions of extraction as by the natural limits. Coal requires a mass of workers, and the means of extraction make strikes incredibly disruptive. Oil, by contrast, requires fewer workers, can be shipped and stockpiled easily, and, thus, implies a necessarily diffuse form of struggle (Mitchell 2011: 21).

Natural/Historical

What I referred to above as the anthropology underlying the Anthropocene was, by and large, implicit and unstated. Writers and thinkers on the Anthropocene are primarily concerned with theorizing the environmental and ecological effects of mankind's activity on earth, not with understanding what

this implies for a definition of humanity. However, as we have seen with Moore, accounts of the Anthropocene reproduce the "natural/social" divide, placing man on one side or the other. Despite Moore's critical points, he does not develop specifically what the Anthropocene means for human nature. It would seem, then, that the Anthropocene also demands a new understanding of anthropos, of humanity as something irreducible to nature, a dominant species or natural calamity, or society, an artificial order. Virno has taken up this problem from a different angle, one associated not with capital's exploitation of nonhuman nature but with its relationship with human nature. Despite these differences, it has strong points of intersection with Moore's double internality.

For Virno humanity is defined by particular attributes that can best be defined as natural-historical. The capacity for language, for developing new customs, habits, and fashion, all have at their basis particular natural or species-specific qualities. Language is dependent on the mental and physical characteristics of human beings, the formation of the tongue and lips as well as speech centers in the brain. Habits and clothing too have a natural basis in the lack of instinctual determination or need for shelter. Despite the natural basis of these activities, or faculties, their actualization is not determined by nature itself. Nothing in nature dictates a particular language, a particular set of customs, or a particular fashion's passing; such things are part of the contingency and conflict of history. There is nothing natural in humanity that can come to pass outside of history and nothing in society, in history, that is not an articulation of natural potentials. History is not just the actualization of these potentials, the resolution of possibility into fact, but carries with it the generic capacity. The capacity for speech is in every utterance, the capacity to form habits in every sedimented behavior. As Virno (2008: 47) writes with respect to language: "The difference between the faculty of language and historically determined languages confers an institutional tonality upon the natural life of our species; this difference, far from healing itself, persists even into adulthood, making itself evident every time someone produces an utterance. It is exactly this difference that implies an extremely strong connection between biology and politics, between *zoon logon ekon* and *zoon politikon*." Moreover, these faculties are not attributes of the individual human animal, nor could they be. Language, habits, customs, fashion, only exist in relation with others; they are necessarily transindividual. These attributes are not faculties of the individual mind, but the potential of humanity as a species—part of species being, to use Marx's term. The individual's utterance, gesture, and action are situated between a preindivid-

ual condition, the capacity for speech, habits, and custom, and their transindividual articulation.

Virno's philosophical anthropology could then be considered part of a general revival of the anthropological question, a revival that includes Balibar and Stiegler. This revival is best considered "postanthropological," in that humanity, the essence of humanity, is defined in such a way that it exists only in its specific historical articulations. Such an anthropology can be considered a variant of Marx's sixth thesis on Ludwig Feuerbach, which defines the human essence as existing only in and through the ensemble of social relations (Balibar 2012). The essence of humanity is less something outside of history than it is something that can be only thought in its singularity, relationality, and historicity. The very things that define humanity, constituting its particular anthropogenesis, the capacity for language, habits, and culture, exist only in and through the historical ensemble of social relations. Virno maintains the general idea of humanity as undetermined and open to cultural reinvention, a defining characteristic of philosophical anthropology that can be found throughout the field. Where he differs from this tradition is his insistence that this nature must be thought in its specific historical articulation. Human nature is its history.

It is possible to consider Virno's philosophical anthropology as a kind of anthropology for the Anthropocene. It runs the gambit between the generic species definition of man, man as the creature unmoored from any instinctual determination and thus an environment, a creature that constitutes its own habits, signs, and references, and the specific organization of those capacities that constitute the institutions of capitalism. In this way Virno's "historico-natural" has strong parallels with Moore's concept of the double internality of nature in history and history in nature. It could even be considered the anthropological corollary of the latter. They are both in a certain sense variants of a kind of natural history in which nature exists and only exists in its historical articulation. As Virno (2009: 135) writes, "Natural history inventories the way in which human beings experience human nature." In each case, nature only exists as it is both articulated in and the limit of a specific historical manifestation. Nature is nothing other than its unfolding in history, and history is nothing other than a particular articulation of nature.

However, as much as those parallels exist there are important differences as well, differences that stem from two added dimensions of Virno's analysis. As much as Virno asserts the "historico-natural" as a general anthropological principle, as the intersection between nature and history,

biology and culture, he argues that the intersection of the historical and natural takes on a particular valence in capitalism. The relation between potential and capitalism is framed through two historical moments: the formation of capitalism, or formal subsumption, and the transformation of capitalism to encompass communication, intelligence, and affects, or real subsumption. "The capitalist production relation is based on the difference between labour-power and effective labour" (Virno 2015: 159). What capital purchases is a potential, a capacity to do work, but what is actually done is a concrete action of this or that variety (Virno 2016: 33). The difference between potential and actuality, the condition of any history, any anthropology, becomes itself a "historical fact." Capitalism historicizes metahistory (Virno 2015: 161). What Virno posits in his early writings on formal subsumption is further developed in his later writings on post-Fordism and real subsumption. What contemporary capitalism puts to work is not just actualized potential, not this or that habit, but the very potential to create habits itself. As Virno stresses with respect to the "general intellect," the socialized knowledge that has become a productive force, this intellect is not the specific knowledge of the sciences or computer programing, but the very capacity to learn and create. "General intellect should not necessarily mean the aggregate of the knowledge acquired by the species, but the faculty of thinking; potential as such, not its countless particular realizations. The general intellect is nothing but the intellect in general" (Virno 2004: 66).[2] Contemporary capitalism, the capitalism of services, precarity, and mobility, is not just one historical articulation of the actualization of these natural capacities but is, in some sense, the exploitation of these very capacities. What capital puts to work is not this or that specific manifestation of human nature, but human nature, humanity as potentiality, itself. "Human nature returns to the centre of attention not because we are finally dealing with biology rather than history, but because the biological prerogatives of the human animal have acquired undeniable historical relevance in the current productive process" (Virno 2009: 142).

Previous societies, even earlier stages of capital, were grounded on the production and reproduction of a particular set of habits, concepts, and comportments, but with capitalism, all that is solid melts into air, and what comes to light is not this or that habit, but the very capacity of gaining (and losing) them. "Precarity and nomadism lay bare at the social level the ceaseless and omnilateral pressure of a world that is never an environment" (Virno 2009: 143). Virno's argument is a variant of the precapitalist/capitalist divide found in Marx and Engels's *Manifesto*, in which capitalism is identified with abstraction and indifference. The important difference is that for Virno this differ-

ence between capitalism and precapitalism takes on an anthropological, or even biological, significance: capitalism is the direct exploitation of anthropogenesis. It puts to work the very capacity to learn new habits, to adopt new characteristics, which is the paradoxical artifice of human nature.

It is at this point that Virno's argument comes very close to asserting, in its own strange way, that capitalism is human nature. Or that in capitalism, all the various codes, or norms of society, are stripped bare, and humanity is left face-to-face with the natural fact of anthropogenesis, with its own potential. However, as much as Virno asserts a significant mutation in the intersection between nature and history at the heart of capitalism, this is not an identity. Human capacities, the capacity for speech, customs, and habit, precisely as capacities, can never be actualized, can never be realized as such. There must be an irreducible difference between humankind's capacities and their actualization in any historical formation. "Potential does not, as such, fall in time" (Virno 2015: 68). Even as one sells one's potential to learn new habits, languages, and ways of thinking, one can never actually put to work a potential as such. As much as one sells labor power, one is engaged in effective labor: as much as one puts to work the general intellect, it is actualized in specific forms of knowledge. Knowledge as such can never be a productive force, just as abstract labor must always be concretized. For Virno, the very exploitation of the generic capacity in contemporary capitalism leads to a kind of confusion; the present moment is taken not as an instantiation of the generic faculty, one other historical articulation of its condition, but as the manifestation of the generic faculty itself. Virno compares this historical confusion with the temporal confusion of déjà vu. He argues that the experience of déjà vu is best understood from the perspective of Henri Bergson, from the memory that is internal to the experience of the present. Memory, the difference of past and future, is integral to every actual temporal experience (Virno 2015: 17). Déjà vu confuses this memory that makes the present possible with the present as a memory. Rather than memory being a condition of the present, it seems as if the present itself is being remembered, that everything happened before. The faculty is manifest not as a potential but is confused with a fact. This psychological confusion explains, or is analogous to, our historical confusion in which the current historical organization of language, thought, and habit appears as the manifestation of the very capacity for thought, language, and habit. Déjà vu and our historical condition are both defined by the apparent presence of what is a potential. The condition of memory appears as a memory, the condition of history appears in history. The end of history is analogous to a cultural déjà vu. As Virno (2015: 55)

writes: "To put it another way: the spectacle is the form that the déjà vu takes, as soon as this becomes an exterior, public form beyond one's own person. The society of the spectacle offers people the 'world's fair' of their own capacity to do, to speak, and to be—but reduced to already-performed actions, already-spoken phrases and already-complete events." Or, put differently, everything appears to be already done, said, or thought. Capital appears to offer everything, or at least the possibility of offering everything. The immense accumulation of commodities is but an immense accumulation of experiences and capacities.

To risk an immediate connection to the Anthropocene, it is possible to see this historical déjà vu, this tendency to misrecognize the present conditions as the fulfillment of potential, in order to explain one of the difficulties in coming to grips with the Anthropocene. Roy Scranton has argued that we will never deal with the Anthropocene unless we as a society learn how to die, how to accept that this way of life, carbon fueled and based on high levels of consumption, cannot go on (Scranton 2015: 207). Virno's concept of déjà vu helps us understand why this is so difficult. If the current historical condition appears to us as the very realization of humanity as such, of our potential, desires, and activities, then any transformation of it would necessarily seem like a destruction of human nature. We can only imagine getting out of the Anthropocene by some repression of our needs, desires, and potential. We have made this particular organization of nature our environment; we are unable to imagine a life or a humanity outside of it. To cite the oft-repeated phrase from Fredric Jameson, it is easier to imagine the end of the world than the end of capitalism because the end of the latter seems like the end of the former to us. If nature, including human nature, only appears in particular historical moments, then it has perhaps always been possible for a given historical articulation to pass its conditions off as natural. It is for this reason that denaturalization has been an important critical strategy.[3] What Virno is arguing is different; it is that capitalism's ceaseless transformation appears as the very realization of human potential for learning new habits.

Politics of Renaturalization/Historicization

What then does Virno's concept of anthropogenesis offer the idea of the Anthropocene? I imagine that many would argue that it is beside the point. That the Anthropocene is not really a matter of "anthropos," of man, but what is at stake in the concept of the Anthropocene is precisely what is happening to the natural world, the nonhuman. As we have seen, however,

every concept of the Anthropocene hinges on a concept of humanity that is often wise enough to remain out of sight, whether this concept is in some sense about *Homo sapiens* as a fundamentally rapacious species or about man as the species that breaks with nature, creating an industry that is unnatural. Against this dualism of nature and history, what is needed is an understanding of how the Anthropocene is both nature (including human nature) and history, including natural history. This explains both its contingency and stability: it is a historically specific, and thus nonnecessary, organization of human society, but as such it produces not only its own culture, its justification, but also its own nature.

Moore argues that the limit that capital comes up against is the limit of cheap nature; this limit is the limit not just of fuels and calories but also of the cheap labor of reproducible labor power. This is the corollary of the statement that the resistance of nature to capital is a kind of class struggle. It is possible to consider the struggle over labor power as itself a struggle over nature, over the attempt to make human nature repeatable, flexible, and abstract, or, alternately, it is just as possible to consider the limitation of different strategies of the appropriation of nature as class struggle, to see conflict in the appropriation of the earth. We are part of nature, and nature is part of history. Moore's analysis, or, more to the point, his terminological linking of class struggle and alienation across the natural and human divide, makes possible a new way of conceptualizing the struggle against capital. Workers' struggle and the ecological struggle would not be two separate struggles with their own different logics and underlying ontologies. They are linked through the similar themes of exhaustion, the limits of reproduction, and the demand for life beyond abstract nature.

As much as Moore pushes class struggle and alienation beyond the nature/society divide, seeing both in nature, we might ask what remains of fetishism and ideology, those concepts that Marxist thought has used to explain the barriers to revolution, beyond the nature/society divide. As Moore (2015: 195) argues, human thought is embodied in the web of life, and this must include its mystifications as well as its realizations. Virno offers another way of theorizing the embodiment of thought in the historical conditions of capital, of arguing why we cannot imagine a possible solution to our ecological peril and seem so oddly content to continue living out each day until the seas rise, the oceans die, and the soil blows away. We have confused this particular organization of our capacities with their very existence. Capital appears not just as one historical organization of our desires, but as their very condition. The current historical conditions appear as the condi-

tions of any history whatsoever. Of course, one could argue that this has always been the case, that every historical formation has imagined its conditions to be the eternal conditions of any social relation. However, where capital differs from this general foreclosure of the historical imagination is that the confusion here has to do with capital's proximity to the generic conditions of existence, that it does not elicit specific beliefs or practices but exploits the very capacity or potential to act, speak, and create habits. It is capital's abstraction from the specificity of belief and norms, its ability to act on the potential for norms and beliefs, that makes it so pervasive. That with capital "all that is holy is profaned, and all that is solid melts into air" is an observation as old as the *Communist Manifesto*, but one in need of revisiting. Whereas Marx understood capitalism's destruction of beliefs, prejudices, and hallowed ideals to be part of its eventual demise, stripping exploitation of any theological or ideological justification, it is necessary to understand how capital sustains itself precisely through its abstraction from specific beliefs and norms. Virno's philosophical anthropology in many ways addresses this question, arguing that the capitalist mode of production appears to be identical with human nature. Capital is human nature, but not in the sense that it realizes some naturally existing drive toward competition but that it appropriates and exploits the very thing that defines our status as human, putting our anthropogenesis to work.

What connects these two is the recognition that we, our thoughts, are part of nature too. If we are natural and historical, then our actions, including our reflections, fears are not something outside of the economy, or the existing historical articulation of nature, but part of its organization. Moore offers a way to reorganize our hopes and desires. The worker who can barely make it through another day, the parent exhausted by the demands of caring for children, and the ocean on the point of crises can be seen as different "cheap natures" struggling against their appropriation and exploitation. Moore's theoretical articulation of the intersection of capital and nature can thus become a basis for redrawing lines of struggle. What Virno reminds us, however, is that our thoughts and ideas are already part of the historical articulation of nature, part of the mode of production. Capitalism does not just exploit a specific set of habits or put to work specific actions or thoughts; it exploits the very capacity to form habits and communicate. It exploits our very potential as potential. It appears to us as the only possible way to live, as the fullest realization of our potential. If the Anthropocene can in part be understood as a kind of multiplication of natural limits, as oceans, the atmosphere, and various

ecosystems reveal their irreducibility to abstract nature, to nature for capital, then anthropogenesis can in part explain why resistance to capital is found more on the side of nature than culture. Nature is surprisingly resistant, and we ourselves are incredibly inert. Or, more to the point, some aspects of nature are rebellious, constantly rebelling against its status as cheap nature, imposing the costs of ecological collapse, antibiotic-resistant bacteria, and desertification. Other aspects are more compliant; for every destroyed species, there are others that adapt all too well to capital. Humanity has demonstrated an amazing ability not only to adapt to the existing demands of capitalist exploitation but also to see that adaptation as activity, as new possibilities for activity and entrepreneurism, to borrow two words. As Jonathan Crary (2013: 100) writes: "Now there are numerous pressures for individuals to reimagine and refigure themselves as being of the same consistency and values as the dematerialized commodities and social connections in which they are immersed so extensively. Reification has proceeded to the point where the individual has to invent a self-understanding that optimizes or facilitates their participation in digital milieus and speeds." As with nature's resistance, this adaptation is partial to say the least, affecting only those in the countries and cities most subject to the neoliberal transformations, and it might even be temporary; perhaps the atmosphere of acquiescence and complacency can change with the change of the earth's atmosphere. Perhaps we too will show our resistance to be transformed into abstract nature. Until that moment, however, thinking anthropogenesis in the Anthropocene is a matter of thinking beyond the nature/society divide, recognizing that there are aspects of nature that rebel and aspects of humanity that reify their very nature.

Moore offers a powerful way of linking together resistance to the capitalist exploitation of work with the capitalist appropriation of nature, recognizing that both are struggles of a nature irreducible to its abstraction and appropriation.[4] Virno reminds us that we, humanity, are the weak link in this chain of struggles; our nature is malleable, not only less resistant to its abstraction but an active agent. If this seems too pessimistic, it is important to remember that the flip side of this reorganization of our nature is the increase in its communicative potential; thought is part of the web of life, and that web covers the entirety of the planet. If capitalism organizes nature, then we have to take seriously its ability to organize human nature as well, ultimately appearing as the fullest realization of human capacities. We are internal to the system in both our resistance and subjection; this fact constitutes both the limit of transformation and its necessity.

Notes

1 In a similar manner, Barbara Noske (1997: 20) has referred to the conditions of animals in factory farming and industrial activity as an "alienation from species life," as a loss of such species-specific characteristics as communication, hierarchy, and social existence.

2 The term *general intellect* is drawn from the "Fragment on Machines" in Marx's *Grundrisse*. As he writes: "Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature. They are *organs of the human brain, created by the human hand*; the power of knowledge, objectified. The development of fixed capital indicates to what degree general social knowledge has become a *direct force of production*, and to what degree, hence, the conditions of the process of social life itself have come under the control of the general intellect and been transformed in accordance with it" (Marx [1939] 1973: 706). Virno has offered two correctives to this concept. First, he has argued that this general intellect is not just manifest in machines, as science is a part of technology, but must be thought of as the general social knowledge. Second, this social knowledge is not to be found exclusively in specialized knowledge, but is the set of general capacities put to work any time language or social cooperation is relied on (Virno 2004: 64).

3 Hasana Sharp has detailed the merits and limits of this critical strategy. Virno's renaturalization has important intersection with what she argues with respect to Spinoza (Sharp 2011: 9).

4 Along these lines, Yves Citton (2012: 13) has offered an interesting and provocative way of thinking together the "unsustainable" nature of economic, ecological, and media practices.

References

Balibar, Etienne. 2012. "From Philosophical Anthropology to Social Ontology and Back: What to Do with Marx's Sixth Thesis on Feuerbach?" *Postmodern Culture* 22, no. 3. doi:10.1353/pmc.2012.0014.

Citton, Yves. 2012. *Renverser l'insoutenable* (*Reversing the Unsustainable*). Paris: Seuil.

Crary, Jonathan. 2013. *24/7: Late Capitalism and the Ends of Sleep*. New York: Verso.

Dalla Costa, Mariarosa, and Selma James. 1972. *The Power of Women and the Subversion of the Community*. Bristol, UK: Falling Wall.

Gehlen, Arnold. 1980. *Man in the Age of Technology*. Translated by Patricia Lipscomb. New York: Columbia University Press.

Kolbert, Elizabeth. 2015. *The Sixth Extinction: An Unnatural History*. New York: Picador.

Leroi-Gourhan, André. 1993. *Gesture and Speech*. Translated by Anna Bostock Berger. Cambridge, MA: MIT Press.

Marx, Karl. (1939) 1973. *Grundrisse: Foundations of the Critique of Political Economy*. Translated by Martin Nicolaus. Harmondsworth, UK: Penguin.

Mitchell, Timothy. 2011. *Carbon Democracy: Political Power in the Age of Oil*. New York: Verso.

Moore, Jason W. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso.

Noske, Barbara. 1997. *Beyond Boundaries: Humans and Animals*. Montreal: Black Rose Books.

Scranton, Roy. 2015. *Learning to Die in the Anthropocene: Reflections on the End of a Civilization*. San Francisco: City Lights.

Sharp, Hasana. 2011. *Spinoza and the Politics of Renaturalization*. Chicago: University of Chicago Press.

Virno, Paolo. 2004. *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Virno, Paolo. 2008. *Multitude: Between Innovation and Negation*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Virno, Paolo. 2009. "Natural-Historical Diagrams: The 'New Global' Movement and the Biological Invariant." Translated by Alberto Toscano. In *The Italian Difference: Between Nihilism and Biopolitics*, edited by Lorenzo Chiesa and Alberto Toscano, 131–47. Melbourne: re.press.

Virno, Paolo. 2015. *Déjà Vu and the End of History*. Translated by David Broder. New York: Verso.

Virno, Paolo. 2016. *L'usage de la vie et autres sujets d'inquiétude* (*The Usage of Life and Other Subjects of Instability*). Translated by Lise Belperron, Véronique Dassas, and Patricia Farazzi. Paris: Editions de l'Eclat.

Viveiros de Castro, Eduardo. 2014. *Cannibal Metaphysics: For a Post-Structural Anthropology*. Translated by Peter Skafish. Minneapolis: Univocal.

Wark, McKenzie. 2015. *Molecular Red: Theory for the Anthropocene*. New York: Verso.

Elizabeth R. Johnson

At the Limits of Species Being: Sensing the Anthropocene

> For labor, life activity, productive life itself, appears to man in the first place merely as a means of satisfying a need—the need to maintain physical existence. Yet the productive life is the life of the species. It is life-engendering life. The whole character of a species, its species-character, is contained in the character of its life activity; and free, conscious activity is man's species-character. Life itself appears only as a means to life.
> —Karl Marx, *The Economic and Philosophical Manuscripts of 1844*

> Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature. They are organs of the human brain, created by the human hand; the power of knowledge, objectified.
> —Karl Marx, *Grundrisse*

Introduction

The US Defense Threat Reduction Agency's (DTRA) mandate is to make the world safer by neutralizing the threat of weapons of mass destruction. As part of that mandate, it maintains a

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research and development portfolio of $1.8 billion. Successor to the Defense Nuclear Agency, DTRA has funded cutting-edge science on the detection and management of the world's most dangerous—and weaponizable—forms of matter including radioactive materials as well as biological agents (recently Ebola) and chemical weapons.

In 2015 DTRA, along with the National Science Foundation, the Department of Energy, and the National Institutes of Health, contributed grant funding to labs at Harvard's Wyss Institute for Biologically Inspired Engineering to develop genetically engineered eukaryotic cells (the cells in plants, yeast, and mammals) capable of registering the presence of certain molecules. In one experiment, scientists tailored plants with receptors for recognizing the heart-care drug digoxin. By incorporating green fluorescent protein (GFP) alongside the receptors, the reengineered plant not only recognized but also communicated the presence of the drug (Feng et al. 2015).

According to the scientists responsible, the value of the experiment lay not just in a new biosensor produced but also in the versatility of the method developed. With this method, scientists can make virtually any eukaryotic cell a biological sensor capable of indicating the presence of specific environmental conditions. The applications are wide reaching. According to the project's primary investigator, George Church, "You can imagine if [this method was] used in agricultural plants, they can tell you about the condition of the soil, the presence of toxins or pests that are bothering them" (quoted in McAlpine 2016). The paper's coauthor, Dan Mandell, explained further that the plants could be used to signal threats not only to themselves but also to other species (McAlpine 2016). As the director of the Wyss Institute, Donald Ingber, noted: "These new reprogramming capabilities . . . open up an entirely new realm where ordinary organisms can be transformed into extraordinary living cellular devices that can sense specific signals and produce appropriate responses" (quoted in McAlpine 2016).

In the newly named era of the Anthropocene, the meaning of "mass destruction" has shifted. With it, biosensing has taken on new urgency. Scholars and the popular press now attribute the potential for environmental catastrophes, once considered the products of "natural" disasters, to a range of causes: large-scale monoculture farming, industrial effluents, or excessive atmospheric carbon dioxide. The field of biosensing ostensibly harnesses biological capacities to identify these threats and subsequently ensure survival—of humans and other organisms—amid these forms of ecological precarity as well as geopolitical instability. In doing so, biosensing joins biomimicry and biotechnology in changing the role that organisms and their

components play in the production of knowledge. Even more, as metabolic processes are increasingly used in biomining (see Labban 2014), fuel refining, plastics manufacture, or pharmaceutical engineering, the field of biosensing also promises to regulate the effectiveness of biomaterials. By signaling which "microbial 'workers' are the most efficient," the Wyss Institute's techniques "give microbes a voice to report on their own efficiency" in the production process (McAlpine 2015).

Marx maintained that living labor endowed humans with the capacity to reproduce not only their own life but also "the whole of nature" (Marx and Engels 1978: 76). The fields of biosensing, biomimicry, and synthetic biology seem to bear this out. Their products, like Harvard's plants, are "natural materials" transformed into organs of "human participation in nature" (Marx 1993). But while fields like biosensing seem to bring these biomaterials into hand, channeling their capacities for human production, they simultaneously disrupt boundaries between human and animal, animal and machine, and living and dead labor. By combining the cognitive capital of technological innovation with the biological capacities of nonhuman organisms, biosensing at once draws out and redistributes the earth's own "inventive" capacities (Braun 2008). This presents a challenge to Marxist analysis. Marx named the capacity to transform our collective development "species being." With "free, conscious activity," he claimed, humans mold material into objects of personal and social use. To be human, for Marx, was to remake: to unsettle and reshape the whole of the world. As Antonio Negri (2003: 165) put it, living labor names that within us that is a "restless creator." Autonomous Marxism, in turn, has generated a lexicon for responding to transformations in labor, paying particular attention to the ways that labor is facilitated by technological development. Autonomists have mapped how the conditions of post-Fordism have put elements of the mind, sociability, virtuosity—or "the soul" in Franco Berardi's (2009) terms—to work (see also Virno 2004; Lloyd 2010; Crary 2013; Pasquinelli 2014). But that labor, in accordance with capitalist valorization, is nearly always conceived as human labor. At best, it is human labor supplemented with machines. But what are we to make of—and with—the capacities of nonhuman life that are now put to work alongside us? And what are we to do with the "restless" and dynamic physical processes and ecological transformations that with increasing urgency require a heightened sensitivity to nonhuman life and, in turn, call forth nonhuman life as coworkers? Finally, amid these redistributions of nonhuman capacities, how, if at all, do notions of "species being" and "living labor" still possess revolutionary force?

In what follows, I take up these questions in an analysis of the field of biosensing. I begin with an exploration of Marx's concepts of species being, living labor, and the general intellect to reconsider how the boundaries and relations between human and nonhuman life are being reworked in contemporary capitalism. I suggest that alongside the so-called Anthropocene, biosensing marks a redistribution of both the work and the precarity associated with the capitalist mode of production. Moreover, while the field forges engagements with nonhuman others and a growing awareness of planetary life, it also operates according to an imaginary of planetary management, one that enrolls nonhuman forms of life as "workers" in the bioeconomy, rather than attending to multispecies entanglements with an ethics of care.

Beyond Human Hands: Species Being and the General Intellect

> Labour is the living, form-giving fire; it is the transitoriness of things, their temporality, as their formation by living time.
> —Marx, *Grundrisse*

> The capitalist process has subsumed the world, turning it into a dead creature, . . . on the contrary living labour is *kairòs*, the restless creator of the *to-come*.
> —Negri, *A Time for Revolution*

Marx's *Economic and Philosophical Manuscripts of 1844* defined the human species by its capacity to transform the conditions of its existence. Living labor named the conscious activity of transforming the material conditions of the world, an activity attributable to humans alone. An animal creates, but its products belong only "immediately to its physical body" (Marx 1974: 76). Humans, by contrast, express a capacity to confront their products as external objects. Marx named this capacity to engender transformation in our collective development "species being." Marx's human in those early texts is a species that knows itself in what it makes, that sees itself in the "world that [it] has created" (Marx and Engels 1978: 76). Capitalism perverted this capacity. The products of wage labor reflected not the world the worker had created but rather the world the capitalist had created. Replacing capitalism with a communism-to-come would restore the world to those who made it.

Yet in Marx's other writings, to be human also meant to be unsettled, to be affected by the changes wrought in the processes of production. As Nick Dyer-Witheford (2006: 23) put it, new forms of production spark "'species changing' shifts in techno-social conditions." In the *Grundrisse*, Marx

(1993: 706) explored how the dead labor concretized within machines mixed with living labor to make social knowledge—rather than the human as such—"a direct force of production." In the "Fragment on Machines," Marx refers to this social knowledge forged in a relationship between the past of production and its transformative present as the general intellect.

While Marx maintained a focus on the industrial machinery of the factory, feminist Marxists and autonomists have shown how the constitution of this general intellect is not bound up in official sites of production; it takes shape in spaces of reproduction as well (Federici 1975; Mies 1999; Hardt and Negri 2004; Negri 2003; Virno 2004; Weeks 2011). Feminist Marxists have shown how capitalism's dominance as a mode of production always relied on the unpaid domestic labor of women, chattel slaves, and colonial subjects (Federici 1975; Mies 1999). Meanwhile, and following the rise of advanced computing technology and declines in labor union memberships, autonomists have followed the rise of service and affective labor, of the growing primacy of cognitive capital in the West, and of piecemeal labor and the "sharing" economy (Berardi 2009; see also Virno 2004; Crary 2013; Pasquinelli 2014; Bogost 2013).

Considering these emerging forms of labor, Negri (2003) has suggested an end to the very concept of the human. In its place, he writes of the "[hu]man-machine," a term that better represented how "the production of man [*sic*] as multitude, gathered up in the common name, becomes indistinguishable from that of the production of the natural and historical *Umwelt*" (Negri 2003: 129). Matteo Pasquinelli has further argued for greater recognition of the recursive nature of technologies. They produce—and reproduce—a form of machinic intelligence that "keeps returning to challenge and capture the general intellect of the cognitive workers" (Pasquinelli 2014: 6). Through time, this machinic intelligence, rather than human intuition, comes "to shape the world after its original epistemic imprint" (6). Technology enrolls and codifies the cognitive and material futures we inhabit. The human brain, then, has become an organ of the machine rather than the other way around. Through Pasquinelli and others, we can understand the general intellect to describe how what we make shapes our ways of knowing. We apprehend the world through the tools and prosthetic technologies we use to modify it.

Crafting a political response to the continued alienation of human labor within such a world is no easy task. Much of the autonomous tradition has called for the restoration of the power of living labor to workers. Here innovation plays an extraordinary role: despite the recursive nature of post-Fordist

technology, the capacity of living labor can ostensibly be organized otherwise. As the primary expression of Marx's species being, the living labor of the "(hu)man-machine" is the "power of the world," the sole progenitor of a new world to come. It is "*kairòs*, the restless creator of the *to-come*" (Negri 2003: 165). The restoration of that power is crucial if we are to take "the world in hand" (165) and forge a postcapitalist future in common.

With a few notable exceptions (Dyer-Witheford 2006; Papadopoulos 2010), nonhuman life-forms are rarely understood within the autonomist tradition as part of this world to be taken "in hand." The naming of the Anthropocene, however, attempts to account for other elements of production, including extraction, the afterlife of production processes, and the effects of both on nonhuman life.[1] While global capitalism has built cities, manufactured airplanes, or developed the pharmacological cornucopia now part of everyday life, our products and machines of production are not dead but have an afterlife, transforming nature in ways that go unseen. In addition to increased concentrations of atmospheric carbon dioxide, writing on the Anthropocene typically emphasizes ocean acidification, residues of nuclear weapon testing from the mid-twentieth century, the spread of microplastic particles throughout all of the earth's bodies of water, and the accumulation of nitrogen and phosphorous across land and seas (Macfarlane 2016; Vaughn 2016). This newly named era therefore conjures geologic and biologic destruction both widely distributed and often imperceptible to the naked eye. We know the Anthropocene primarily through these lists of unseen matter, the residues of production.

The nomination of the Anthropocene registers not only a denigration of life well beyond our lived experience and singular species being; it also highlights a catastrophe of productive social relations that, paralleling humans' capacity for production itself, extends across the "whole of nature" (Marx and Engels 1978: 76). Read one way, the naming of this era reflects the potency of our capacity to transform the world. It names a world that has been taken "in hand." But rather than a celebration of humankind's ascension to a geologic force, it also forces a recognition that the world is being turned into "a dead creature" (Negri 2003: 165). The Anthropocene, then, also invokes a radical impotency, a knowledge that our productive efforts over the past three centuries are decidedly "out of hand." Whether caused by humans as a whole, or by capitalist alienation and a bourgeois society that allows its resources to be dominated by a "blind power" (Foster 2000: 159), it is as if the violence of capitalist social relations has "gone rogue," expanding outward to systems of ecological reproduction.

That such a world could be taken back "in hand" suggests a techno-utopian imaginary. It is just such an imaginary that legitimates the possibility of geoengineering the climate and micromanaging every ecosystem. In direct opposition to this tendency, Donna Haraway has given us another name for this era, the "Chthulucene." Haraway's (2015: 160) Chthulucene gives voice not to the power of the human hand but rather to the "entangled myriad temporalities and spatialities and myriad intra-active entities-in-assemblages—including the more-than-human, other-than-human, inhuman, and human-as-humus." In the Chthulucene, we must act knowing that our actions—and their often unintended consequences—will be woven into the fabric of living processes on earth.

Consistent with this view, analyses of ecological conditions find that neither living labor nor the human body alone are the sole "bearers" of *kairòs* (Negri 2003: 163). As Myra Hird and Nigel Clark (2014) have noted, the earth's own metabolic processes—in the effluents of production or elsewhere—continuously transform the earth and its forms of life. Ecological and physical dynamics are also restless creators of the "to come" (Negri 2003: 163). Accordingly, and along with the unpaid labor of women and the marginalized lives of colonial expansion, a wide swathe of literature in the social sciences and humanities has encouraged greater recognition of the social contributions of nonhuman animals (Derrida 2008; Haraway 2008; Buller 2013), nonliving things (Bennett 2010; Clark 2011; Harman 2011; Yusoff 2013), and configurations of technobiological systems (Franklin and Roberts 2006; Braun and Whatmore 2010). In so doing, many of these accounts show that the world was never entirely in human hands, never fully the product of self-possessed "free, conscious" activity even for those (mostly white Western men) whose activities were the bearers of economic and social value (Haraway 2015).

"Our" capacity for transformation has always been more than human. Workhorses, oxen, mules, bees, and so on have and do work alongside the living labor of humans. Like machines, these organisms facilitate the transformation of the earth's material, adjusting the parameters of space and time. With them, we have accelerated planting and harvesting, extraction, acts of war, and migration across landscapes. But other-than-human organisms are not merely "natural resources," the products of human innovation, or engines of extraction. They are biological entities that we have shaped and that shape us. At times their labor or lives are appropriated in ways that enhance human life. Most directly, the animals we reproduce, grow, and consume are living—and ultimately dead—commodities that facilitate our

own daily reproduction. And as Nicole Shukin's *Animal Capital* (2009) has shown us, the circulation of animal symbols and animal flesh was central to capitalism's historic expansion. Just as often, however, nonhuman life is blamed for laying our best plans—and our lives—to waste (see Mitchell 2002).

Many accounts of nonhumans continue to detail these ways that animal bodies are either victims of capitalist production or recalcitrant vehicles of transgression (Papadopoulos 2010; Moore 2014). But nonhuman organisms do not only act in concert with or in opposition to human action. They also possess many of the world-shaping capacities that we claim as our own (Hird and Clark 2014). This becomes particularly clear when considering the ways that animals and plants reveal the world to us, conditioning our ways of knowing. Like technology, nonhuman life shapes human apprehension of nonliving materials—and ourselves. Indeed, nonhumans have always been a part of our technological apparatuses.

At once old and incredibly novel, biosensing uses animal bodies and animal capacities as a means of expanding human capacities for making and knowing. The concerted use of certain nonhuman animals to expand our senses dates back at least to preagricultural times. The heightened olfactory and aural capacities of domesticated dogs enhanced human abilities in tracking, hunting, and community protection. Today canine noses help find lost humans, drugs, explosives. Rats help clear buried landmines. Scientists have trained bees to "sniff out" explosive devices, radioactive materials, and even certain forms of cancer (Kosek 2010; Grozdanic 2014). For many, these circulations of animal flesh (living and dead) are merely one expression of an economy rooted in exploitation. If it is the exploitation of human labor that generates value in capitalism, the labor of animals represents what Jason W. Moore (2014) refers to as the extraction of the "four cheaps," which Moore identifies as labor-power, food, energy, and raw materials. But it is not merely the labor of the animal (as those of the dog and rat here, or the work of mules in coal extraction) that is enrolled in human reproduction today. It is also the labor of living itself that produces knowledge of a changing world. Nonhuman life enables us to mark the boundary between conditions conducive to life and those destructive of it. Ever since John Scott Haldane introduced canaries and white mice into Great Britain's coal mines as a way to register threats associated with extraction, the heightened sensitivity of nonhuman life itself—or, more pointedly, its passage into death—has been crucial in industrial production (Goodman 2007). And as Joseph Masco has written in the context of nuclear testing, pigs and other living organisms are instruments indicative of the trauma inflicted on biological beings. In nuclear arms tests, the fragility

of the human body was prefigured by "the vaporized, mutilated, and traumatized animal body" (Masco 2004: 529). Finally, animals' bodies also help mark the internal boundary of our chemical and biological pharmakon. The sensitivity of rats, mice, rabbits, and other nonhumans helps scientists demonstrate which chemicals cure and which accelerate death.

Just as technologies condition the ways that we encounter, apprehend, and transform the world, this more-than-human sensorium facilitates the marking and measuring of our world. Today, as humans are grasping in the dark to understand what is coming, biological processes are being studied in new ways to shed light on, and respond to, the precarity of the world as a whole. Kathryn Yusoff (2013) and others have suggested that recognizing these entanglements and expanding our sensorium in the face of ecological degradation will lead to new regimes of care. But the growing enrollment and reorganization of the more-than-human sensorium in new efforts of planetary management would seem to contradict this hope.

A More-than-Human Sensorium for the Anthropocene

The recent explosion of the field of biosensing has entailed a redistribution and reaggregation of nonhuman processes and their capacities. The field encompasses a wide range of techniques designed to reveal matter that is either imperceptible or imperceptibly dangerous to life. Scientists have refined their ability to identify ecological change (and, with it, ecological norms) by examining an array of biological factors and processes. Through these mechanisms of knowledge production, nonhuman life is revalorized for what it can communicate to humans about the vulnerability of life in the material world. Accordingly, the capacity to live and bear witness to that living becomes a productive enterprise. The making of multispecies biosensory arrays offers a unique window into this process.

While the Wyss Institute has heightened the sensory and communication capacities of eukaryotes through bioengineering, other scientists have drawn on the study of whole organisms. Consider, for example, the work of LimCo International. Based in Germany, the corporation has developed what it calls a "unique LimCo BioSensor system" (LBS) (LimCo International 2016; see also Kokkali, Katramados, and Newman 2011**)** that uses multiple species of whole body organisms to monitor fresh and marine water sources for pollutants. The LBS contains anywhere between eight and ninety-six "sensor chambers" that house an array of animal species—small fish, worms, mollusks, crustaceans, and microorganisms—whose expressions of life are under

constant surveillance. The crude boundary between life and death is no longer the only indicator of environmental harm here. Having established a set of measurable norms around the functioning of these organisms, the LBS monitors a suite of "behavioral fingerprints" as these organisms are exposed to different systems. Locomotor activity, reproductive rates, and embryonic development are measured together to indicate the severity of hazardous anthropogenic chemicals as well as biologically produced toxins, such as blue-green algae. In this way, the company boasts, it can make "pollution measurable."

The scientific analysis of these lively metrics renders potential harms—both acute and chronic—knowable. These biological systems are therefore capable of registering the multiple temporal and spatial dynamics at play in the Anthropocene, making imperceptible harms perceptible. While chemical trace analysis is typically used to detect known hazardous substances, exposing multiple species to potential ecotoxilogical hazards enhances the ability to identify harms that would otherwise go undetected (LimCo International 2016). Even unknown substances can be identified "in due time before pollution irreversibly spreads in the environment or even harms human health" (LimCo International 2016).

As described in this essay's opening pages, the capacity to register ecotoxilogical or human-intended harms has also been distributed through and across technobiological apparatuses. These involve the isolation or transformation of particular biomaterials or processes. Cornell University's Bioanalytical Microsystems and Biosensors Laboratory (BMB), for example, has synthesized liposomes for use in small-scale technological devices. The BMB (2016) has tested how these fatty structures can be used to signal the presence of pathogenic organisms, as well as toxins in food, drinking water, or the generalized environment. Like the products of the Wyss Institute, the BMB's liposomes are most useful because of their wide applicability. From "hamburger meat to apple cider, from surface water to manure, from whole blood to saliva," the BMB biosensors are capable of detecting the slight presence of harmful agents like *Cryptosporidium parvum*, *Escherichia coli*, and Dengue virus and even biological warfare agents (BMB 2016).

Across the spectrum of biosensory techniques, the most widely used biological tool is the GFP. It is what makes the Wyss Institute's reengineered plants glow. Identified in 1961 in the jellyfish *Aequorea victoria*, the GFP was initially considered structurally unique as a chromatic expression. In most luminous organisms, the capacity for fluorescence is found in chromophores that exist alongside amino acid sequences of proteins. In contrast, the part of *A. victoria*'s molecular structure responsible for its color and iridescence is

generated *by* an amino acid reaction. Because it requires no special substrate or external enzyme to produce fluorescence, it can therefore be used in vivo, the chromophores forming in live tissue or cells (Stepanenko et al. 2008). This reaction has proved easy to clone and modify for use in an array of bioimaging and biomarking methods in the biosciences. Fluorescent proteins (FPs) of any hue can help signal a wide range of both toxic and therapeutic elements (Labas et al. 2002). Like the BMB's liposomes, FPs can be used to identify the presence of pathogens like *E. coli*, as well as minor changes in acidity and alkalinity, the presence of cancer cells, cancer-causing genotoxic agents (in water, food, or tissue), copper ions, heavy metal pollution, and a host of other toxic compounds. And like LimCo's BioSensor system, FPs are often used to pick up on potential contaminants for which scientists have not thought to look.

As a response to the conditions of the Anthropocene, biosensor systems, GFPs, and synthesized liposomes enable us to identify potential harms. In spite of the differential temporalities and scales of ecological degradation, the violence of past labors is made visible and measurable. In the process, risk is not only generalized but also made generic. The planet appears through biosensing as beset on all sides by potential toxins. Wherever we choose to place the origins of the Anthropocene, whatever markers of potential "mass destruction" we wish to identify—whether threats to the security of the nation or that of the species—biosensing produces an imaginary in which those threats are now identifiable and manageable, not by humans but by ecological processes themselves. Here it is not that, as Marx wrote, humans have harnessed living labor to reproduce "the whole of nature" but that the whole of nature has been enrolled in maintaining the conditions for human life and its current form of production.

Recursions of Productive Life

Investments in the biosciences are producing new ways of harnessing nonhuman capacities and putting biomaterials to "work" in industrial production and extraction (Labban 2014; Johnson and Goldstein 2015; Barua 2016). This goes well beyond biosensing. As Mazen Labban (2014: 562) has recently noted, for example, practices of biomining and bioleaching—part of efforts to extend mineral extraction beyond the mine—have affixed "the metabolic and reproductive functions of microorganisms" to vast networks of value production. Alongside extraction, the growing bioeconomy has sutured the biosciences and their lively subjects of inquiry to economic and

legal infrastructures of accumulation (Sunder Rajan 2006, 2012; Dumit 2012; Franklin 2013; Cooper and Waldby 2014). However, endeavors in bioinnovation are also reconfiguring the parameters of capitalist production. Human bodies now take on a panoply of roles that are, arguably, more-than-human. Cathy Waldby and Melinda Cooper (2010; see also Cooper and Waldby 2014) have shown, for example, how clinical trial patients and reproductive materials are "soaked" in the chemical and intellectual labor of medical industries to perform as materials of production, wage labor, and commodity, often simultaneously. Similarly, nonhuman life-forms are put to work in ways that resemble human categories of labor. The Wyss Institute's biosensors-cum-middle-management, which monitor the productivity of biological workers, attest to this. Encoded within these organisms is an imperative to produce or die. In the making of these biological entities that signal their own productive capacities, productivity itself becomes the most essential feature of life. Accordingly, production—not for the reproduction of a species or an ecosystem but for profit—becomes the very condition of life.

Like the machinery of post-Fordist capitalism, the emerging fields of biosensing and biomimicry are recursive. Paralleling the rise of the "social factory" that has been so central to autonomous Marxism, biosensing appropriates and enrolls nonhuman life in cognitive and communicative endeavors. The field has given rise to the production and appropriation of "biological intelligence," alongside "artificial intelligence" and computing algorithms (Pasquinelli 2014; Johnson and Goldstein 2015). But it also blurs the boundary between technology and biology, making and knowing, producing and reproducing. As a result, biosensing enables a way of seeing *with* nonhuman life. There is no denying that fields like biosensing expand our sensorium and potentially shift perspectives in environmental health. There is some hope here, that by enrolling animal life in these ways, we humans might be more deeply affected by the world around us, shifting our ethical and political frameworks. Like technological machinery, nonhumans are increasingly part of the knowledge-making capacities of the world. These organisms and our knowledge of them are not outside of capitalism, but neither are they limited to it. They operate with alternative logics, temporalities, and dynamics to which we might find ourselves responding with something like care. This is not "the power of knowledge, objectified" (Marx 1993: 706) but rather the power of knowledge revivified. Rather than the objects of scientific inquiry, organisms have also been rendered collaborative participants (see Johnson and Goldstein 2015). However, as nonhuman capacities are enrolled in the endeavor to prolong or enhance the reproduction of human life as well

as "the whole of nature," value and productivity both become naturalized. The productive survival of the species becomes synonymous with the reproduction of life on earth.

As Jason Read (2003: 117) has written, labor's displacement is made possible by the rise of machinic production and its "incorporation of science, chemistry, and even what Marx refers to as 'accumulated experience' on a large scale." But that "accumulated experience" has been largely confined to human experience. Marx's general intellect was after all built on human ingenuity and the architectural logics of machinery. Pasquinelli's writing on algorithms is an updated expression of this. As he describes, it is internally recursive: machines produce a form of machinic intelligence that "keeps returning to challenge and capture the general intellect of the cognitive workers" (Pasquinelli 2014: 6). It is this machinic intelligence—produced by and for capital—rather than human intuition, that comes "to shape the world after its original epistemic imprint" (6). Through this lens, biosensing creates a way of reading matter and biological processes in conjunction with what Helen Pritchard (2015) has referred to as a "computational aesthetics." The field allows us to see matter in particular ways, lighting up certain transformations in our ecological systems, while allowing others to remain dark.

These trends are accelerated by the conditions of the Anthropocene, as a growing emphasis on environmental "costs and benefits" has intensified the need to "see" connections across matter, materials, and forms of life and register the value of ecosystem "services" (Robertson 2012; Schrader 2012; Nelson 2014; Pasquinelli 2014). Alongside Pritchard's computational aesthetics, biosensing in the Anthropocene also enables a vision of the earth as a solution space, a repository of ecological systems to be surveilled and potential solutions to be enacted. This requires a narrowing of what we see, where we look, and where we look away. The earth as solution space offers us only one reading of the multiple temporal, geologic, and spatial shifts that accompany the era of the Anthropocene. This linear narrative of history reads the past as an accrual of trauma (to humans and nonhumans alike), while the present is a pivot point from which to launch a future transformed. In this version of history, we find a clear set of possible solutions, rationalized responses, and prescriptive measures that promise to continue a progressive path into the future. As a result, "fixing" ecological degradation relies on innovation rather than on the forms of organization and modes of becoming with which we enjoin with nonhumans in a struggle for collective existence. This multispecies worlding creates conditions for extending the capacities of capitalist production rather than capacities of care.

But the nomination of the Anthropocene and the development of biosensing both offer a wider and less cohesive view of accumulated experience. Like the dead labor of machinery, waste materials return as a disaggregated, diffused threat, capturing the intellect of cognitive workers, but in ways that threaten to destabilize production rather than sustain it. We might also take recursion and the more-than-human general intellect further. By incorporating the productive capacities of life within production, we also open it to alternative logics—other than human logics—that do not necessarily conform to the computational aesthetic. A more expansive aesthetic, one that is neither strictly machinic nor biological, may provide resources for alternative ways of reproducing life. Such a transition will certainly not happen "naturally," however. The question that remains, then, is this: What would the reorganization of a more-than-human general intellect for the collective look like?

Conclusion

There may be no better area of research than biosensing through which to consider the ways that technological advance has made the production of humans, as Negri (2003: 192) has written, "indistinguishable from that of the production of the natural and historical *Umwelt*." In the first decades of the twenty-first century, the ills of industrial production come as a surprise only to those who have been relatively shielded from them. The bodies of laborers (waged and enslaved) who engaged in the extraction of fossil fuels or the transformation of materials to commodities have directly borne the precarity required by capitalist production. The naming of the Anthropocene, however, marks a shift in where we identify a redistribution of both the work and the precarity associated with our mode of production. Biosensing stands here as a response to biotechno worlds in which new threats—to human health and to forces of production—are ever more entangled. It appears as a way to reconnect with the liveliness of other living things. Its engagements with nonhuman others promote a growing awareness of planetary life. But it risks organizing the knowable (and even unknowable) world around the collection of planetary threats. And as Moore (2014: 2) has argued, such a characterization makes it easy to struggle against threats to production rather than the violence of our "strategic relations of power and production."

Considering biosensing and other bioeconomies makes clear that it is no longer enough to consider the "matter" of the Anthropocene or our engagements with nonhumans. The injunction of living labor to "take the world in hand" also no longer seems a viable response to contemporary capi-

tal or to the conditions of the Anthropocene. While the autonomists effectively displaced labor from the confines of the human body, the failure to consider animal and biological processes has hamstrung an ability to respond to these ecological concerns. An alternative may lie in a growing attention to cognitive capital and its circulation as the product not only of human labor but of animal reproduction and the forces of evolution and development—that is, a heightened attention to the way that the generative (and destructive) processes of living things constitute our social lives. In light of biosensing and the bioeconomy, the more-than-human common appears utterly recuperable by capital and national interests in securitizing the planet. Perhaps what we need to work toward is a more-than-human undercommon (Harney and Moten 2015) that has as its goal the active subversion of the enclosure of knowledge and life's generative processes. Perhaps this was the power of species being all along: that it drew together a critique of the mode of production with concerns about reproduction. Taking those concerns beyond the reproduction of selves to that of whole ecosystems, it may be possible for us to imagine enjoining with nonhuman life in a refusal of capitalism's ultimatum to produce or wither away.

Note

1 The debates over the term *Anthropocene* are well rehearsed elsewhere. Among the chief complaints is the term's false invocation of a universal, undifferentiated humanity. The term *Anthropocene* explicitly attributes geological change to the species as a whole, erasing a 300-year history of uneven development, colonialism, and resource and labor exploitation. As many have argued, this era might be better named the Capitalocene (Moore 2014; Malm 2016; Haraway 2015). Donna Haraway marks an important tension that accompanies these conflicts on the causal mechanisms of ecological degradation. While laying blame at the feet of an undifferentiated humanity is an obvious injustice, Haraway (2015: 164) nevertheless insists that "blaming Capitalism, Imperialism, Neoliberalism, Modernization, or some other 'not us' for ongoing destruction webbed with human numbers will not work either."

References

Barua, Maan. 2016. "Lively Commodities and Encounter Value." *Environment and Planning D: Society and Space* 34, no. 4: 725–44.

Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Durham, NC: Duke University Press.

Berardi, Franco. 2009. *The Soul at Work: From Alienation to Autonomy*. Los Angeles: Semiotext(e).

BMB (Bioanalytical Microsystems and Biosensors Laboratory), Cornell University. 2016. http://biosensors.bee.cornell.edu/ (accessed June 17, 2016).

Bogost, Ian. 2013. "Hyperemployment, or the Exhausting Work of the Technology User." *Atlantic*, November 8. www.theatlantic.com/technology/archive/2013/11/hyperemployment-or-the-exhausting-work-of-the-technology-user/281149.

Braun, Bruce. 2008. "Environmental Issues: Inventive Life." *Progress in Human Geography* 32, 5: 667–79.

Braun, Bruce, and Sarah J. Whatmore. 2010. *Political Matter: Technoscience, Democracy, and Public Life*. Minneapolis: University of Minnesota Press.

Buller, Henry. 2013. "Animal Geographies I." *Progress in Human Geography* 38, no. 2: 308–18.

Clark, Nigel. 2011. *Inhuman Nature: Sociable Life on a Dynamic Planet*. London: Sage.

Cooper, Melinda, and Catherine Waldby. 2014. *Clinical Labor: Tissue Donors and Research Subjects in the Global Bioeconomy*. Durham, NC: Duke University Press.

Crary, Jonathan. 2013. *24/7: Late Capitalism and the Ends of Sleep*. New York: Verso.

Derrida, Jacques. 2008. *The Animal That Therefore I Am*. Edited by Marie-Louise Mallet. Translated by David Wills. New York: Fordham University Press.

Dumit, Joseph. 2012. *Drugs for Life: How Pharmaceutical Companies Define Our Health*. Durham, NC: Duke University Press.

Dyer-Witheford, Nick. 2006. "Species-Being and the New Commonism: Notes on an Interrupted Cycle of Struggles." *Commoner*, no. 11: 15–32.

Federici, Sylvia. 1975. *Wages against Housework*. Bristol, UK: Power of Women Collective and Falling Water.

Feng, Justin, et al. 2015. "A General Strategy to Construct Small Molecule Biosensors in Eukaryotes." *eLife*, December. doi:10.7554/eLife.10606.

Foster, John Bellamy. 2000. *Marx's Ecology: Materialism and Nature*. New York: Monthly Review.

Franklin, Sarah. 2013. "Embryo Watching: How IVF Has Remade Biology." *Tecnoscienza* 4, no. 1: 23–43.

Franklin, Sarah, and Celia Roberts. 2006. *Born and Made: An Ethnography of Preimplantation Genetic Diagnosis*. Princeton: Princeton University Press.

Goodman, Martin. 2007. *Suffer and Survive: The Extreme Life of J. S. Haldane*. New York: Simon and Schuster.

Grozdanic, Lidija. 2014. "Susana Soares' Glass Device Uses Bees to Detect Disease." Inhabitat, May 18. http://inhabitat.com/susana-soares-diagnostic-glass-device-uses-honey-bees-to-detect-cancer-in-human-breath.

Haraway, Donna. 2008. *When Species Meet*. Minneapolis: University of Minnesota Press.

Haraway, Donna. 2015. "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6: 159–65.

Hardt, Michael, and Antonio Negri. 2004. *Multitude: War and Democracy in the Age of Empire*. New York: Penguin.

Harman, Graham. 2011. *The Quadruple Object*. Washington, DC: Zero Books.

Harney, Stefano, and Fred Moten. 2015. "Mikey the Rebelator." *Performance Research* 20, no. 4: 141–45.

Hird, Myra, and Nigel Clark. 2014. "Deep Shit." *O-Zone* 1, no. 1: 44–52.

Johnson, Elizabeth, and Jesse Goldstein. 2015. "Biomimetic Futures: Life, Death, and the Enclosure of a More-than-Human Intellect." *Annals of the Association of American Geographers* 105, no. 2: 387–96.

Kokkali, Varvara, Ioannis Katramados, and Jeffrey D. Newman. 2011. "Monitoring the Effect of Metal Ions on the Mobility of *Artemia salina* Nauplii." *Biosensors* 1, no. 2: 36–45.

Kosek, Jake. 2010. "Ecologies of Empire: On the New Uses of the Honeybee." *Cultural Anthropology* 25, no. 4: 650–78.

Labas, Yulii. A., et al. 2002. "Diversity and Evolution of the Green Fluorescent Protein Family." *Proceedings of the National Academy of Sciences of the United States of America* 99, no. 7: 4256–61.

Labban, Mazen. 2014. "Deterritorializing Extraction: Bioaccumulation and the Planetary Mine." *Annals of the Association of American Geographers* 104, no. 3: 560–76.

LimCo International. 2016. "LimCo International GmbH, Toximeter, Konstanz." www.limco-int.com/ (accessed June 13, 2016).

Lloyd, Richard. 2010. *Neo-Bohemia: Art and Commerce in the Postindustrial City*. London: Routledge.

Macfarlane, Robert. 2016. "Generation Anthropocene: How Humans Have Altered the Planet for Ever." *Guardian*, April 1. www.theguardian.com/books/2016/apr/01/generation-anthropocene-altered-planet-for-ever.

Malm, Andreas. 2016. *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming*. London: Verso.

Marx, Karl. 1974. *Economic and Philosophical Manuscripts of 1844*. Moscow: Progress Publishers.

Marx, Karl. 1992. *Capital: A Critique of Political Economy*. Vol. 1. Translated by Ben Fowkes. London: Penguin Classics.

Marx, Karl. 1993. *Grundrisse: Foundations of the Critique of Political Economy*. Translated by Martin Nicolaus. London: Penguin Classics.

Marx, Karl, and Friedrich Engels. 1978. *The Marx-Engels Reader*. Edited by Robert C. Tucker. New York: Norton.

Masco, Joseph. 2004. "Mutant Ecologies: Radioactive Life in Post-Cold War New Mexico." *Cultural Anthropology* 19, no. 4: 517–50.

McAlpine, Katherine. 2015. "New Biosensors for Managing Microbial 'Workers.'" Wyss Institute. wyss.harvard.edu/viewpressrelease/213/new-biosensors-for-managing-microbial-workers.

McAlpine, Katherine. 2016. "Plants with Biosensors May Light the Way." *Harvard Gazette*, February 1. http://news.harvard.edu/gazette/story/2016/02/plants-with-biosensors-may-light-the-way.

Mies, Maria. 1999. *Patriarchy and Accumulation on a World Scale: Women in the International Division of Labour*. London: Zed Books.

Mitchell, Timothy. 2002. *Rule of Experts: Egypt, Techno-Politics, and Modernity*. Berkeley: University of California Press.

Moore, Jason W. 2014. "The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis." www.jasonwmoore.com/uploads/The_Capitalocene__Part_I__June_2014.pdf.

Negri, Antonio. 2003. *Time for Revolution*. Translated by Matteo Mandarini. New York: Continuum.

Nelson, Sara Holiday. 2014. "Resilience and the Neoliberal Counter-Revolution: From Ecologies of Control to Production of the Common." *Resilience* 2, no. 1: 1–17.

Papadopoulos, Dimitris. 2010. "Insurgent Posthumanism." *Ephemera* 10, no. 2: 134–51.

Pasquinelli, Matteo. 2014. "The Eye of the Algorithm: Cognitive Anthropocene and the Making of the World Brain." *Fall Semester*. https://static1.squarespace.com/static/56ec53dc9f7266dd86057f72/t/56ecd9292482eaae2be4e9c/1458362665892/BookletMP-online.pdf: 1–12.

Pritchard, Helen. 2015. "H 2015 FF: 'Trace Fossil FOBU-1379.'" *Society and Space* (blog), August 26. https://societyandspace.com/material/discussion-forum/greenhough-lorimer-and-yusoff-2015-ff-future-fossils-exhibition/prichard-2015-ff.

Read, Jason. 2003. *The Micro-Politics of Capital: Marx and the Prehistory of the Present*. Albany: State University of New York Press.

Robertson, Morgan. 2012. "Measurement and Alienation: Making a World of Ecosystem Services." *Transactions of the Institute of British Geographers* 37, no. 3: 386–401.

Schrader, Astrid. 2012. "The Time of Slime: Anthropocentrism in Harmful Algae Research." *Environmental Philosophy* 9, no. 1: 71–94.

Shukin, Nicole. 2009. *Animal Capital: Rendering Life in Biopolitical Times*. Minneapolis: University of Minnesota Press.

Stepanenko, Olesya, et al. 2008. "Fluorescent Proteins as Biomarkers and Biosensors: Throwing Color Lights on Molecular and Cellular Processes." *Current Protein Peptide Science* 9, no. 4: 338–69.

Sunder Rajan, Kaushik. 2006. *Biocapital: The Constitution of Postgenomic Life*. Durham, NC: Duke University Press.

Sunder Rajan, Kaushik, ed. 2012. *Lively Capital: Biotechnologies, Ethics, and Governance in Global Markets*. Durham, NC: Duke University Press.

Vaughn, Adam. 2016. "Human Impact Has Pushed Earth into the Anthropocene, Scientists Say." *Guardian*, January 7. www.theguardian.com/environment/2016/jan/07/human-impact-has-pushed-earth-into-the-anthropocene-scientists-say.

Virno, Paolo. 2004. *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Waldby, Catherine, and Melinda Cooper. 2010. "From Reproductive Work to Regenerative Labour: The Female Body and the Stem Cell Industries." *Feminist Theory* 11, no. 1: 3–22.

Weeks, Kathi. 2011. *The Problem with Work: Feminism, Marxism, Antiwork Politics, and Postwork Imaginaries*. Durham, NC: Duke University Press.

Yusoff, Kathryn. 2013. "Geologic Life: Prehistory, Climate, Futures in the Anthropocene." *Environment and Planning D: Society and Space* 31, no. 5: 779–95.

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The Ends of Humans: Anthropocene, Autonomism, Antagonism, and the Illusions of Our Epoch

> The premises from which we begin are not arbitrary ones, not dogmas, but real premises from which abstraction can only be made in the imagination. . . . The first premise of all human history is, of course, the existence of living human individuals.
> —Karl Marx, *The German Ideology*

The Illusion of the Epoch

The opportunities and problems that face left critical theory in the current climate appear in its first premises. What was once thought to be beyond dogma, to be real and necessary, is now not as certain. If humans exist, then we can ask how they exist and how this existence affects and is affected by the natural conditions in which they find themselves—the "geological, oreohydrographical, climatic and so on" (Marx and Engels [1970] 2004: 42). But as Dipesh Chakrabarty (2009: 201, 207) has argued, in the natural conditions of anthropogenic climate change the "age-old humanist distinction between natural history and human history" has ended and has severely qualified "humanist histories of modernity/globalization." The unsettling consequence is that the histories

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of colonial capital, and thus contemporary subaltern politics premised on its injustices, becomes a minor moment in the history of humanity and humanity becomes a blip in the history of the planet. Chakrabarty is not demanding the subaltern set aside the injustices of colonial capital. He asks *how* left critical theory can hold on to and discern the relevant categories of *antagonism* in this new climate.

What has placed people on edge is a new set of antagonists and the nature of their unpredictable interactions—the clash between human beings and nature, between societies and natures, and between entangled species and the geological, ecological, and meteorological systems that support them. Marx thought the social dialectic was leading to the purification of the fundamental opposition of human classes. But many believe we are now witnessing a new war of the world as an antagonism between humans and all other classes of existence take center stage. Anthropogenic climate change and toxicity have created revolutionary ethical, political, and conceptual problems and antagonisms. But what if the problem that emerges when left critical theory encounters the Anthropocene, and anthropogenic climate change, is much richer and much stranger? What if one of the conceptual consequences of this intersection is the acceptance that the human did not exist in the past, does not in the present, and will not in the future? What if there is no *human*, or even any *humans*, but merely regionally more or less densely compacted forms and modes of existence, one component of which has been abstracted out and named "the human"? And what if these regions of existence are off-gassing in such a way that they are producing themselves as their own waste products? What does the concept of antagonism afford in such a condition?

Perhaps these questions will seem less strange if we imagine that the science fiction writer and touchstone for many new object ontologies, Philip K. Dick, were taking part in the International Union of Geological Sciences symposia charged with deciding whether the Holocene has ended and, if it has, how to mark the beginning of the Anthropocene (see Dunst and Schlensag 2015; Gibson 2013). And what if, alongside him, we sat representatives of the Italian political movement known generally as autonomism, for instance, Franco "Bifo" Berardi. Dick and the autonomists might raise their voices above the din of scientific measuring and call for new modes of solidarity with all forms of life. But how Dick rather than Berardi would locate *a* life, and thus the potential antagonism between *forms of* life, might differ. Dick might scribble new assemblages on the white board—assemblages that radically distended the human body into its environment, with other still

ghostly envelopes of being emerging, each claiming a different part of the human body as its own internal organs. Over the squeaking of his dry-erase marker, the autonomists might be demanding that the abstract human continually cited within discussions of the Anthropocene be denounced as an illusion of our epoch—that there is no Human but only various forms of human existence trapped in the informational machinery of contemporary capital—semiocapitalism—extracting the desire and pleasure from some for the benefit of others.

Now imagine that at this moment other clusters of existence walk through the symposium door. We can list some of them by their known names: native people within settler liberalism, rock and sand formations, creeks, European and Syrian youth who have never been and will never be employed, and the 41,415 species on the International Union for Conservation of Nature (IUCN) Red List and the 16,306 threatened with extinction. Representatives of these groups may have been issued invitations. But as they enter the commodious hall, they begin to wonder how they fit into the prevailing antagonism. Indigenous Australians, for instance, were for the most part never precarious workers; invasive colonial powers considered them remnants of the Stone Age and did not calculate their labor within labor power. Moreover, settlers appropriated their lands, laying waste to them through the introduction of new species, land morphologies, and toxic chemicals. Other representatives will not come perhaps because they are bored or put off by the form of the meetings or know that they are simply being invited as an alibi for making the same decisions that would have been made anyway. So they stay home and do things that fail to appear as political actions because they are not general, not universalizing, not class-based, not utopian, or maybe even practical, if practical means that their lives will be enhanced by their actions. Still others may not have been issued an invitation, because, after all, what's the postal address of rocks and riverbeds? Can they be addressed as "you," that is, within the demanding structures of (human) language? Can they *refuse* to take up subjectivity in (human) language? Let's anthropomorphize them and imagine them saying to the delegates sent to solicit them: You want us to join your efforts to save the planet you have made? Then you can learn to become unintelligible to yourselves by adapting to our intelligibility. Because they know that it is unlikely the humans will take up this challenge, they remain precariously autonomous, removed from the order to participate in solving the coming catastrophe. Besides, rocks and sand and riverbanks have little reason to care—they are not going anywhere.

In order to probe the unsettling conceptual task facing critical left theory in the increasingly hot politics of anthropogenic climate change and toxicity, this essay begins with the impasses, convergences, and missed encounters between the imaginary of social and natural antagonism in autonomist literature and anthropocenic discourse. As the human recedes into the background of capitalism—the animal-machinic-mineral assemblage of geontopower—how is a spectral humanism still operating the machinery of resistance? How does this spectral human conserve rather than confront older imaginaries of social contradiction and antagonism? Rather than answering this question from within the tense encounter between autonomism and anthropogenic climate change and toxicity, I conclude by resituating it in the unacknowledged connections, historical relations, and difficult inheritances each has to settler late liberalism, especially the concept of autonomy and antagonism itself.

First Premises

In international symposia on the Anthropocene, geologists often set the terms. For geologists, the central problem of the Anthropocene is how to ground the general claim that the human species is now the dominant geological force and thus merits its own geological age in stratigraphic evidence. Some place the emergence of the Anthropocene at the beginning of the Neolithic Revolution, when agriculture was invented and the human population exploded. Others peg it to the detonation of the atomic bomb, an event that left radioactive sediments in the stratigraphy and helped consolidate a notion of *the earth* (Gaia) as something that could be destroyed by human action. Hannah Arendt's ([1963] 2007: 49) reflections on the launching of the Sputnik and the lost contact "between the world of the senses and the appearances and the physical worldview" would be important here, as would be James Lovelock's (1965) Gaia hypothesis published two years later in the wake of the revolutionary Apollo 8 picture of earthrise and earthset broadcast live on Christmas Eve 1968 (see also DeLoughrey 2014). Still others situate the beginning of the Anthropocene in the coal-fueled Industrial Revolution. No matter when they peg its beginning, geologists implicitly or explicitly stage the human actor as an abstraction on the one side opposed and sometimes antagonistic to other biological, meteorological, and geological actors on the other side. And the question becomes, when did *humans* become the dominant force on the *world*? This way of sorting existence makes sense from the disciplinary logic of geology, a disciplinary perspective that relies on natural

types and species logics. The human species is now the self that confronts nature as its other in a battle for a new level of universal recognition. True, we may finally be witnessing "les fins de l'homme," with nature as the other existence necessary for human freedom.[1]

But it is exactly this phrasing that has provoked the strongest response on the left, with many arguing that *the Human* has exerted not a malignant force on the meteorological, geological, and biological dimension of the earth but only a specific formation of human sociality—capitalism or carbon-based capitalism—to the benefit of only specific subjects within this formation (see Moore 2014). Rather than Chakrabarty's worry, we have Marx's return. Leave aside for now the ontological bias that characterizes the species logic of early Marx (the various ways humans "begin to distinguish themselves from animals"; Marx and Engels [1970] 2004: 42). The alienation of humans from their species being (*Gattungswesen*) was increasingly set aside as, if we follow Louis Althusser, a mature scientific Marxism emerged in which the antagonism was between socioeconomic systems rather than humans and their nature. The remnants of Hegelian humanism gave way to the dialectic of capital and its subsumption of all subjects and subjectivity ("Morality, religion, metaphysics, all the rest of ideology and their corresponding forms of consciousness, thus no longer retain the semblance of independence. They have no history, no development; but men, developing their material production and their material intercourse, alter, along with this their real existence, their thinking and the products of their thinking" [Marx and Engels (1970) 2004: 47]). By *The German Ideology*, Marx was foregrounding the discontinuities of human subjectivity, desire, mentality, and consciousness across social formations: "Life is not determined by consciousness, but consciousness by life" (47). In the shadow of Michel Foucault's (1982) critique of modernist historiography it is hard to ignore how *the humans* produced out of a "definite form of expressing their life" are made equivalent to *the human* produced out of another "definite mode of life" (Marx and Engels [1970] 2004: 42).

But it was exactly this subsumption of the subjectivity and life of the worker within the dialectic of capital and labor power that the autonomist movement refused in the 1960s (see Murphy 2010). Building on the work of Mario Tronti, autonomists such as Antonio Negri and Berardi begin with the assumption that working-class struggles precede and prefigure the unfolding formations and strategies of capital. Workers should refuse to consider themselves within this new capital abstraction. Instead, they should protest the "disciplinary regulation imposed by economic power" and foster

the "independence of social time from the temporality of capital" (Berardi 2009: 75). Thus the autonomists refused to work under the organizational and philosophical premises of corporate capitalism and Marxist unions and played with tactics to undermine them—absenteeism, wildcat strikes, bossnapping. These were not merely strategies for obtaining better contractual terms for the labor power of the worker. They were, more profoundly, a refusal to subsume life, desire, and happiness under the rule of labor power (see Hardt 1993). They were an embrace of freedom from both capitalism and economistic Marxism and an embarkation on a flight from class identity within and identification with the dialectics of capital. By refusing to be collapsed into the dialectic of capital and its abstraction of the human through labor power, the worker could explore new modes of being. It could find new antagonisms as it called for a revolt of the soul that refuses "the field of lack" which has "produced dialectical philosophy, on which twentieth century politics built its (mis)fortunes" (Berardi 2009: 176). In short, autonomism advocated poetic practices of the otherwise—a politics that left open the content and destiny of the human by removing the human from the capture of capital.

But to be autonomous from the capture of capital does not mean to be removed from the history of capital, nor does it mean to undermine decisively the category of the human. It is to be related to humanism and capital history differently, even as capitalism and its humanisms unfold. And unfold they have. Capitalists did not sit by passively while their colleagues and relatives were being kidnapped—whether detained in their offices by autonomists or held for ransom by the Red Brigades—or when their assembly lines were being disrupted. They and their union and state allies aggressively and creatively responded to the autonomist challenge. For instance, Berardi (2009: 186) notes that the emergence of a European-wide autonomist refusal to subjugate life to labor power helped accelerate the technological replacement of workers, the rise of deregulation, the reorganization of relations between economy and society, and the disorganization of the coordinates of left critical discourse. And what Berardi, Negri, and others see as emerging in the wake of industrial production is *semiocapitalism* (or *informational capital*)—the predominance of the technological mechanization of immaterial signs as the principal objects of capital production and expropriation (Berardi 2010, 2011; Hardt and Negri 2000). But whatever one calls this new form of capital, it is radically different from the conditions in which autonomism emerged. In *semiocapital*, affective-informational loops are oriented toward the capture of different spheres of human knowledge and the immanent

desires of subjects. And insofar as it is effective in this capture, semiocapital pushes beyond labor power into soul power—not merely a consumption of human labor but a pneumaphagia, a spirit-eater.

If autonomism is to succeed in this new climate, Berardi argues, it must work to rewire the multitude of positions within the working assemblage of cognitive capital and discover the new antagonisms that define contemporary time. For Berardi, the contemporary antagonism pivots on the soul, for it is the human soul semiocapital commodifies. Thus the aim of revolution must be the liberation of the soul from the labor of capital. When that is the aim, the Left's definition of workers also changes. Once autonomism liberates the Left from semiocapital's pneumaphagia, new subjects of work and workers emerge. Workers are not merely the precarious laborers within the Silicon knowledge factories but all the dispersed and fragmented nodes within and across which information-desire is being produced, elaborated, amplified, distributed, and consumed. This vast assemblage includes geologists, geneticists, biochemists, miners, software coders, biocircuitry, computer algorithms, massive data storage facilities, air conditioners, satellites, human fingers and rare-earth-based screens, legislation for appropriating gas and minerals, ships and ship canals and the teaming life and toxicities carried and discharged in their ballast that cross territories, sink into soils, and are ingested in drinking water. All existence is turned into abstract labor and oriented to the accumulation of informational capital (see Rose 2006; Sunder Rajan 2006; Cooper 2008).

Ruling Existence and Existing Ideas

Berardi's call for a politics of solidarity between all life-forms against the pneumaphagia of semiocapital resonates with and is amplified by an allied movement among scholars in the humanities and humanistic social sciences to liberate themselves from humanism. Posthumanist scholars have attacked a series of ontological distinctions between the human animal and other animals (the various ways humans "begin to distinguish themselves from animals"; Marx and Engels [1970] 2004: 42). *Homo sapiens*, the "wise person," may approach existence through a specific interpretive form (intentionality, self-awareness, logos), but nonhuman animals have forms of interpretation and "aboutness" that allow them to adjust behavior, make use of elements in their environment, and in doing so alter the conditions in which they find themselves—and then start the cycle again (see, e.g., Yablo 2014). In Berardi's work the protagonists of contemporary

semiocapital and its role in climate change and toxicity are not humans against other biotic, meteorological, and geological forces but all of life, including human life (the soul), against semiocapitalism's rapacious subjugation of all existence.

But if this new possibility and form of solidarity provides a positive pathway for a new form of revolt against capital, it also opens a new set of political problems. The problems follow from the same critique autonomists and others level against the anthropocenic Human. Life does not exist in general any more than the Human exists in general. More crucially, in the anthropogenic condition of climate change and toxicity, even the phrase "forms of life" mystifies rather than analyzes how the concept of antagonism works when every region of existence is a set of accumulating and dissipating entanglements (see, e.g., Povinelli 2016). In other words, although a multitude of immanent forms of entangled existence exist in any given actual world, this does not mean that all actually exist. Thus, three illusions of contemporary late liberalism surround us: the autonomy of objects, the antagonisms of position, and the pluralism of being.

In the shadow of the coming catastrophe of semiocapital's climate change and toxicity, do we need a parliament of *things*—a *demogenesis* fitting the simultaneity of soil, earth, and science (see Latour 2015)? Let's leave aside the question of whether existence has agreed that its governance is like a human parliament. Are some *things* going to get more ballots, or more weight in the voting? Will we only allow those forms of entanglement that are our companion species to vote, excluding various forms of viruses, bacteria, and algae? Probably—this is the point of an antagonism defining the field of solidarity. And will the parliament of things include all things living and nonliving? Will desert sands get a vote? Or when we pass out the ballots will we predetermine what does and doesn't have a soul, refusing the nonliving, the never-having-lived, a possibility of extending itself? Or do we decide that all things are vital? Do we work with those who say that from the perspective of anthropogenic climate change there is no difference between life and nonlife? From the perspective of the carbon cycle, soil, rock, water, air, microbial, plant, animal: all forms of existence are each other's internal lung. Now not only does the human disappear into the total organism of the earth, *Gaia*, but so do all other forms of entangled existence move into an extimate relation to "each" other. Dick is now wide awake. There is no *human*, or even any *humans*, but merely regionally more or less densely compacted forms and modes of existence, one component of which has been abstracted out and named "the human." One can only get these abstractions—life,

human, earth, workers, mushrooms—by cutting and hacking into and across the rivers, streams, winds, breaths, roots, wires, chemical migrations in the attempt to embaginate a region of existence only to find oneself creating new rivers, streams, winds, breaths, roots, wires, chemical migrations (for example). One cannot make a body with organs. Nothing is autonomous, including the autonomist soul currently under attack.

Jean Baudrillard's (1994: 153) prediction for the coming era of simulacra has come true:

> We will live in this world, which for us has all the disquieting strangeness of the desert and of the simulacrum, with all the veracity of living phantoms, of wandering and simulating animals that capital, that *the death of capital* has made of us—because the desert of cities is equal to the desert of sand—the jungle of signs is equal to that of the forests—the vertigo of simulacra is equal to that of nature—only the vertiginous seduction of a dying system remains, in which work buries work, in which value buries value—leaving a virgin, sacred space without pathways, continuous as Bataille wished it, where only the wind lifts the sand, where only the wind watches over the sand.

In these deserts not only is the human liberated from dialectics, but it is also distended from itself. What human? Where is the human when flesh is inside neurons encased in metal, cooled by vast arrays, whose power is generated by vaster networks of energy production? All is multiply distended, attuned, and embodied. And this "where is it / am I" is then disembodied in the image of the Digital Cloud, which runs a good race with the anthropocenic Human as the primary illusion of our epoch (see Carruth 2014; Starosielski 2012; Günel, forthcoming). The human in semiocapital is not within this assemblage but in the leakage among various forms of corpo-reality. How does one "build forms of social solidarity that are capable of re-activating the social body" in the context of this competitive aggressive subjugation of all forms of existence in the "competitive aggressiveness" of contemporary capital? (Berardi quoted in Hugill and Thorburn 2012: 213). Who are the antagonists? How does one have an antagonism when all is extimate to all, when nothing is autonomous?

The Autonomy of the Wastelands

The autonomous soul that Berardi and others seek to defend from semiocapitalism's assault is, in other settler colonial spaces, not merely an illusionary construct but a weapon of the enlightened liberal state in its constant

maneuvering against indigenous people. And where *autonomy from* late liberal settler governance does emerge it is nothing like the autonomy that some within the autonomist movement imagine. Let's start with autonomy as weaponry of settler colonialism, namely, the *autological subject*. The imaginary of the autological subject pivots on a miraculous enclosure of a human self defined by nothing but his or her historical unfolding of desire. Autological subjects make their history. The sense and drama of this imaginary form of subjectivity is always contrasted to the *genealogical society*—societies in which matters of the heart and labors of life are defined by preexisting collectively constraining restrictions on individual risk and exploration. We can think of these two imaginary forms of sociality as companion species defined by their different social tense—on the one side we find any account of the actual freedoms and justices of the autological subject endlessly deferred to an unreachable future, and on the other we find the genealogical society relegated to the frozen landscapes of past perfect. The normative orientation of the autological subject is said to be the open future—its desire is to endlessly unfold in myriad and unimpeded creative gestures and explorations. Its sovereignty rests in the more or less self-determining individual. But to make this unfolding a universal historical form of subjectivity and governance, this subject must make other forms and arrangements of existence radically different from itself and historically retrograde. The autological subject demands that the genealogical society be its opposite; namely, the genealogical society is past perfect, and its sovereignty must rest in its ability to determine the truth of the individual.

The imaginary dialectic of the autological subject and genealogical society coevolved in the vicious landscapes of liberal imperialism and became an invasive species in settler colonialism. Everywhere liberalism went this fantasy went with it, such that sovereignty likewise came to be bifurcated—the colonizer claiming that its form of sovereignty was based on the subject's autonomy (within limits) and that the sovereignty of the colonized was based on genealogy (various forms of a dominated social order). For many critical race and indigenous theorists such as Denise Ferreira da Silva (2007) and Aileen Moreton-Robinson (2015), the struggle is to find a mode of belonging outside these Western imaginaries (see also Simpson 2014). What would we know differently if we read the history of autonomy from the perspective of settler liberal colonialism? For Moreton-Robinson, indigenous relations to land are not defined by autonomy as signified by a settler notion of sovereign possession of or over oneself, another, or a place. Instead, they are forms of "ontological belonging" (Moreton-Robinson 2015: 4).

Likewise, Glenn Coulthard (2014) has more accurately described the shuttle between violent settler dispossession and a subtler, quieter form of subjective and spatial dislocation, a form of ongoing and relentless appropriation of indigenous lands (see also Alfred 2005; Wolfe 2016). For Coulthard (2010: 79), "it is a profound misunderstanding to think of land or place as simply some material object of profound importance to Indigenous cultures (although it is this too); instead it ought to be understood as a field of relationships of things to each other."

In the first stage of the invasion of Australia, Europeans attempted to subsume the myriad indigenous forms of human and land co-belonging into, first, a colonial and, second, a national identity. As the settler invasion proceeded, the invasive species consumed whatever fueled its ongoing expansion, uprooting, burning, and killing whatever did not. Some indigenous people and their lands resisted the genocide as the invasive species built camps to function as "the pillow of a dying race."[2] Many within the invasive species argued that massive exterminations of indigenous forms of life were a tragic but natural process by which the old withered in the face of the new. It was not murder but history. After all, how can one murder what is already in the past? The invasive species was simply bringing a retarded space into its proper time. Autological sovereignty was the natural future of genealogical sovereignty. Settler genocide was simply a means of speeding up the process.

But indigenous forms of existence refused to be yet another fantastical version of the settler projection of the genealogical society. They refused to go away, to die, or to let (their) history (have) happen(ed). From the 1950s through the 1970s, radical Red Power, Black Power, anticolonial, and new social movements refused paternalistic liberal imperialism and settler colonialism. In other words, anticolonial movements were turning back imperial Europe just as workerist strategies were refusing the left unionist/capital convergence. Berardi's insight that working-class struggles precede and prefigure the unfolding formations and strategies of capital is useful here. Just as capital was forced to *respond* to the tactics of the radical Left, so the settler state was forced to respond to the demands of an indigenous uprising. Thus a new settler tactic emerged in the 1970s. The settler state would not kill indigenous people or let them die comfortably, if they agreed to a toxic form of sovereignty. The first mode is primarily known under the name of self-determination and cultural recognition. In Australia, from the mid-1970s through the mid-2000s, the federal Aboriginal Lands Rights Act exemplified this new state tactic. The Lands Rights Act granted indigenous groups

in the Northern Territory the right to lay claim over their own lands provided (a) that these lands had not already been alienated over the long course of settler colonization and (b) that the claimants fit a narrow anthropological and legal definition of the "traditional." A series of legislative documents was written that offered land and recognition to indigenous people if they agreed to be "traditional." In other words a form of past-oriented being-in-the-present was carved into settler governance—the state-backed indigene would be past perfect, and its sovereignty must rest in its ability to determine the truth of the individual. Every action of the indigenous person and group would be assessed and valued relative to these temporal and sovereign disciplines (see Nesper 2002). Each failure to conform to these sovereign temporal regimes would shift more land to the side of the invading species, narrowing the range of Indigenous maneuver. If indigenous people accepted these terms, they would be given back the lands that capital and the state never wanted in the first place. There in state and capital wastelands, history could be autonomous because the freehold was over the wastelands of settler history. The form of property invented to justify as a gift the giving of what had not yet been taken was called "Aboriginal freehold tenure."

The rights that indigenous groups received from the state were never intended to make indigenous worlds the norm. Neither the invasive state nor capital suddenly or fundamentally altered how they related to lands and peoples on the basis of what indigenous people told them. Extractive capital, for instance, did not suddenly become obligated to an indigenous analysis of the unalterable coconstitution of various forms of existence. Instead, the rights the state gave indigenous people were meant to provide a means of cleansing the national history of its shameful past and providing authorized indigenous groups a means of attaching a small spigot to the larger pipeline of settler late liberal capital. It should not be surprising then that by the 2000s, mining on Aboriginal land in the Northern Territory of Australia alone contributed more than $1 billion a year to the territory's economy and accounted for 80 percent of its income (see Central Land Council 2016). Four hundred and thirty-two indigenous land agreements stretched across two hundred mining operations. This détente held until the mid-2000s. But by the 2000s, in the long shadow of the global financial crisis and China's great hunger for raw minerals, indigenous people were not willing to hand over even more land. The state and capital realized that they had made a mistake. All those machines and clouds, all that desire captured and manipulated by the attunement of the positive and negative atomic charges that allow fingertips to communicate to copper or indium tin oxide wires on large and small screens, then stored and manipulated across ever-larger arrays of big data, all the ways

that all institutions of intelligence shift to accommodate their dominion (universities shifting from the arts and humanities to the quantitative informational sciences): all this depended on commoditized minerals and gases found in what were thought to be the great wastelands of the nation.

But strong binaries can always be flipped. In 2007, the conservative federal government fanned the flames of panic about the sexual assault of Indigenous children on remote communities in order to pass the Northern Territory National Emergency Response (NTNER), claiming that a set of unsubstantiated assaults were caused by Indigenous sexual traditions (Altman 2013). Among other measures, NTNER allowed the federal government to seize Indigenous lands and open them to mining. Whereas traditions had once been good for the nation, now they were bad. The conservative state, their allies in extractive capital and indigenous social politics, did not dispute that indigenous sovereignty existed. Instead, they agreed that it existed as a past perfect, individually constraining power. This is why indigenous people had to be liberated from their own sovereign form. Indigenous individuals had to become autonomous to indigenous sovereignty. So much for the autonomy of Aboriginal freehold—and the hundreds of indigenous land agreements with various mining operations. What was made visible for those for whom it had not been visible before was that the sovereign autonomy of indigenous rights had always had a temporal asterisk attached to it. It was always a toxic asset. What had not already been despoiled became so. And I mean what had not been *already* despoiled—the lands reserved for the state-sanctioned autonomy of history were not necessarily pristine deserts but asbestos dumping grounds, nuclear test lands, medical experiments, and chemical contaminations (see, e.g., Donnison 2014; Anderson 2006).

Toxic Autonomy

If we examine semiocapital and anthropogenic climate change from within the many indigenous worlds under assault by the anthropogenic effects of mining and climate, a new form of indigenous autonomy emerges. But, as I noted above, this new form of autonomy challenges the romance of the autonomous soul, replacing it with a more literal form of toxic sovereignty. Take, for example, the second Karrabing Film Collective project, *Windjarrameru, The Stealing C*nt$*. *Windjarrameru* tells the story of a group of young indigenous men hiding in a chemically contaminated swamp after being falsely accused of stealing two cartons of beer, while all around them miners are wrecking and polluting their land.[3] It is not a documentary film, and it cuts across fiction and nonfiction to produce, what Martina Angelotti (2015) has called, a

factional dimension of truth. For instance, throughout the film are numerous background signs to the main action of the film—two large, dry branches with "Stop poison" painted on them; an old, large corrugated water tank with a placard attached stating, "Warning radiation"; and, at the turnoff to the swamp, a large sign on which is written, "Danger, asbestos, cancers and lung disease hazard, authorized personnel only, respirators and protective clothing are required at all times." We created the first two signs ("Stop poison" and "Radiation area") and placed them on or near already-existing historical infrastructures. The large corrugated water tank on which we affixed the sign "Warning radiation" is, we believe, a leftover part of an illegal nonindigenous squatter dwelling. It sits alongside a group of large concrete and metal structures from the Wagait Battery built in 1944 to defend Darwin from Japanese air assaults in World War II (see Owen and James 2013). The sign "Danger, asbestos . . ." has a real, factual existence. It refers to the antenna field and compound, located on the far northwestern side of the Cox Peninsula. The antenna field and compound were built in 1942 after the Royal Australian Air Force commandeered American equipment. The antenna field was placed next to Charles Lighthouse, built in the late 1800s and the location of forced indigenous labor throughout the early twentieth century.

Which parts of this world are fact or fiction emerges, however, in the practice of making these films. In the film narrative, three police chase the young indigenous men up to a barbed wire fence, where they capture one of them, while the others escape into a contaminated area. The police asked the young man they've grabbed who placed the sign "Stop poison" at the edge of the fence. The clear implication is that this is an act of illegal signage. After shooting the scene, the Karrabing emerged from the scrub to find two nonfictional police, who confronted them and asked if they had entered illegally or altered signage in the area. To defuse the situation they introduced the real police to the fictional police and joked about which of them seemed more authentic. But curious why the real police were interested in where the film crew was filming, some of the Karrabing went online. There they found a Federal Department of Finance document ("Cox Peninsula Remediation Project," December 2014) submitted to the Parliamentary Standing Committee on Public Works. When studying the maps within this report, the members realized that the toxic field was much bigger than they had known. And, indeed, they had been shooting within it. But they and other members of their family had also hunted, collected fruit, and camped within this same toxic area. They learned that water wells in a primarily European community that hugs the coast north of the Radio Australia receiver are periodically tested, but no testing is done of the broader aquifer system regularly used by

Karrabing and other indigenous residents on the peninsula. Suddenly, fictional signs became real signs of what many knew but systematically hid from those for whom not knowing had the greatest impact.

But it is not only indigenous worlds that are analyzing anthropogenic toxicity and its effects on a new form of immanent being. Black, brown, and indigenous lands, cities, and neighborhoods have long struggled to analyze being in the space of extractive capital as it came, took, and left a differentially distributed toxosphere of refuse (Nixon 2011). We have a rich aesthetics of these sites. From *Killer of Sheep* to *Darwin's Nightmare* to *Beasts of the Southern Wild*, filmic imaginaries of specific worlds have borne the brunt of casual abandonment to vicious and total extraction to massive displacements. These have been met with new local and state urgencies and intellectual interventions. Ghassan Hage (2016: 45) notes "the increasing inability of industry and government to control, manage, and recycle the by-products of the exploitation and transformation of natural resources. This has given rise to an ungoverned overflow of unrecyclable waste that is increasingly polluting—visually, chemically, and in many other ways—our lands and waters as well as the atmosphere. As with the flow of unwanted refugees across national borders, waste of all kinds appears to be beyond our control: ungovernable." Thus not humans and nature, but some humans and the crap they have consumed and produced in the processes of consumption (mega trash heaps of Lebanon, Rio, Mumbai, the Pacific Ocean) as massive fires, sand storms, and tornadoes keep time—what Tim Morton (2013) might call hyperobjects of human consumptive informational capitalism. This ungovernable flow is coming home to roost.

But what they learn from all of these fictional and nonfictional endeavors is that anthropogenic toxins do not obey the settler colonial spatial technology of a barbed wire fence or the concept of a border. They seep through and corrode. They make use of, but do not oppose. They extinguish, but are not antagonistic in the sense of creating two actively opposing forces. They are inside and outside. They are poisonous according to degree or strength, wiring and unwiring bodies and regions rather than simply silencing them. *They* are not because they are everywhere. Like Moreton-Robinson and Coulthard, Karrabing members do not simply divorce their being from their lands even as their lands, the ancestral beings within them, and they themselves are being recomposed by these toxicities. Instead, in these spaces of utter settler despoilment a new form of sovereignty emerges, a new form of pure autonomy from the capture of capital and state—a toxic autonomy. Throughout their films the Karrabing explore how to be with themselves and other existences within a place as the state and capital flee the areas they have

plundered—the areas they, as invasive species, now fear to enter. But the Karrabing are also not naive about what forms of entangled existence this toxic autonomy produces. This is because filmmaking is an activity that allows the Karrabing to analyze their world and in this sense is an act of "survivance." Gerald Vizenor (1999: 11) notes that "survivance is an active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name" and that "native survivance stories are renunciations of dominance, tragedy and victimry" even as they reject the fabulous imaginaries of the settler's romantic Aboriginal. For Karrabing, survivance does not mean the survival of the world as it is, or as the settler invasion has conceived it.

I am not sure how Dick, various autonomists, or members of the International Union of Geological Sciences might respond to a world without the thick autonomous nature of things that affords allies and antagonists. But politics after anthropogenic climate change and toxicity will need to grapple with a world without autonomy or antagonists yet extraordinarily hostile to some regions of existence. The illusions of our epoch are the autonomous and antagonistic. Other illusions may be better suited. Viruses, gassings, toxins—these are the names we give to manners of appearing and spreading; tactics of diverting the energies of arrangements of existence in order to extend themselves; strategies of copying, duplicating, and lying dormant even as they continually adjust to, experiment with, and test their circumstances; maneuvers to confuse and level every difference that emerges between regions while carefully taking advantage of the minutest aspects of their differentiation.

Notes

1 Here I am referring to the name of Jean-Luc Nancy's seminal conference. See also *The Sense of the World* (*Le sens du monde*) (Nancy 2006).

2 Unlike in the Jim Crow American South, the one-drop rule pertained to white blood, such that "one drop" of white blood was justification for removing children from their parents. See Bolton 1982.

3 For more information about the Karrabing Film Collective, see Angelotti 2015.

References

Alfred, Taiaiake. 2005. *Wasáse: Indigenous Pathways of Activism and Freedom*. Toronto: University of Toronto Press.

Altman, Jon. 2013. "Arguing the Intervention." *Journal of Indigenous Policy* 14: 1–146.

Anderson, Warwick. 2006. *The Cultivation of Whiteness: Science, Health, and Racial Destiny in Australia*. Durham, NC: Duke University Press.

Angelotti, Martina. 2015. "Karrabing Film Collective: An Interview." *Domus*, December 18. www.domusweb.it/en/interviews/2015/12/18/visible_award_2015_the_karrabing_film_collective.html.

Arendt, Hannah. (1963) 2007. "The Conquest of Space and the Stature of Man." *New Atlantis* 18: 43–55.

Baudrillard, Jean. 1994. *Simulacra and Simulation*. Translated by Sheila Faria Glaser. Ann Arbor: University of Michigan Press.

Berardi, Franco. 2009. *Precarious Rhapsody: Semiocapitalism and the Pathologies of the Post-Alpha Generation*. Translated by Arianna Bove et al. London: Minor Compositions.

Berardi, Franco. 2010. "Cognitarian Subjectivation." *e-flux*, no. 20. www.e-flux.com/journal/cognitarian-subjectivation.

Berardi, Franco. 2011. *After the Future*. Translated by Arianna Bove et al. Oakland, CA: AK Press.

Bolton, G. C. 1982. "Aborigines in Social History: An Overview." In *Aboriginal Sites, Rights, and Resource Development*, edited by Ronald M. Berndt, 59–81. Perth: University of Western Australia Press.

Carruth, Allison. 2014. "The Digital Cloud and the Micropolitics of Energy." *Public Culture* 26, no. 2: 339–64.

Central Land Council. 2016. "Making Agreements on Aboriginal Land: Mining and Development." www.clc.org.au/articles/info/mining-and-development (accessed July 13, 2016).

Chakrabarty, Dipesh. 2009. "The Climate of History: Four Theses." *Critical Inquiry* 35, no. 2: 197–222.

Cooper, Melinda. 2008. *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era*. Seattle: University of Washington Press.

Coulthard, Glen. 2010. "Place against Empire: Understanding Indigenous Anti-Colonialism." *Affinities* 4, no. 2 : 79–83.

Coulthard, Glen. 2014. *Red Skin, White Masks: Rejecting the Colonial Politics of Recognition*. Minneapolis: University of Minnesota Press.

DeLoughrey, Elizabeth. 2014. "Satellite Planetarity and the Ends of the Earth." *Public Culture*, 26, no. 2: 257–80.

Donnison, Jon. 2014. "Lingering Impact of British Nuclear Tests in the Australian Outback." BBC News, December 31. www.bbc.com/news/world-australia-30640338.

Dunst, Alexander, and Stefan Schlensag. 2015. *The World According to Philip K. Dick*. New York: Palgrave Macmillan.

Ferreira da Silva, Denise. 2007. *Toward a Global Idea of Race*. Minneapolis: University of Minnesota Press.

Foucault, Michel. 1982. *The Archaeology of Knowledge and the Discourse on Language*. Translated by A. M. Sheridan Smith. New York: Pantheon Books.

Gibson, Prue. 2013. "Machinic Interagency and Co-evolution." *M/C Journal* 16, no. 6. http://journal.media-culture.org.au/index.php/mcjournal/article/view/719.

Günel, Gökçe. Forthcoming. *Spaceship in the Desert: Energy, Climate Change, and Green Business in Abu Dhabi*. Durham, NC: Duke University Press.

Hage, Ghassan. 2016. "État de siège: A Dying Domesticating Colonialism?" *American Ethnologist* 43, no. 1: 40–49.

Hardt, Michael. 1993. *Gilles Deleuze: An Apprenticeship in Philosophy*. Minneapolis: University of Minnesota Press.

Hardt, Michael, and Antonio Negri. 2000. *Empire*. Cambridge, MA: Harvard University Press.
Hugill, David, and Elise Thorburn. 2012. "Interview with 'Bifo': Reactivating the Body in Insurrectionary Times." *Berkeley Planning Journal* 25: 210–22. escholarship.org/uc/item/7z748198#page-1.
Latour, Bruno. 2015. *Face à Gaïa* (*Facing Gaia*). Paris: Découverte.
Lovelock, James. 1965. "A Physical Basis for Life Detection Experiments." *Nature* 207, no. 4997: 568–70.
Marx, Karl, and Friedrich Engels. (1970) 2004. *The German Ideology, Part One*. Edited and with introduction by C. J. Arthur. New York: International Publishers.
Moore, Jason W. 2014. "The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis." www.jasonwmoore.com/uploads/The_Capitalocene__Part_I__June_2014.pdf.
Moreton-Robinson, Aileen. 2015. *The White Possessive: Property, Power, and Indigenous Sovereignty*. Minneapolis: University of Minnesota Press.
Morton, Timothy. 2013. *Hyperobjects: Philosophy and Ecology after the End of the World*. Minneapolis: University of Minnesota Press.
Murphy, Timothy S. 2010. "The Workerist Matrix: Introduction to Mario Tronti's *Workers and Capital* and Massimo Cacciari's 'Confrontation with Heidegger.'" *Genre* 43, nos. 3–4: 327–36.
Nancy, Jean-Luc. 2008. *The Sense of the World*. Minneapolis: University of Minnesota Press.
Nesper, Larry. 2002. *The Walleye War: The Struggle for Ojibwe Spearfishing and Treaty Rights*. Lincoln: University of Nebraska Press.
Nixon, Rob. 2011. *Slow Violence and the Environmentalism of the Poor*. Cambridge, MA: Harvard University Press.
Owen, Tim, and Shelley James. 2013. "The History, Archaeology, and Material Cultural of 105 Radar Station, Cox Peninsula, Northern Territory." *Australasian Historical Archaeology* 31: 92–98.
Povinelli, Elizabeth A. 2016. *Geontologies: A Requiem to Late Liberalism*. Durham, NC: Duke University Press.
Rose, Nikolas. 2006. *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century*. Princeton, NJ: Princeton University Press.
Simpson, Audra. 2014. *Mohawk Interruptus: Political Life across the Borders of Settler States*. Durham, NC: Duke University Press.
Starosielski, Nicole. 2012. "'Warning: Do Not Dig': Negotiating the Visibility of Critical Infrastructures." *Journal of Visual Culture* 11, no. 1: 38–57.
Sunder Rajan, Kaushik. 2006. *Biocapital: The Constitution of Postgenomic Life*. Durham, NC: Duke University Press.
Vizenor, Gerald. 1999. *Manifest Manners: Narratives on Postindian Survivance*. Lincoln: University of Nebraska Press.
Wolfe, Patrick. 2016. *Traces of History: Elementary Structures of Race*. London: Verso.
Yablo, Stephen. 2014. *Aboutness*. Princeton, NJ: Princeton University Press.

Matteo Pasquinelli

The Automaton of the Anthropocene: On Carbosilicon Machines and Cyberfossil Capital

> Natural equilibriums will be increasingly reliant upon human intervention, and a time will come when vast programmes will need to be set up in order to regulate the relationship between oxygen, ozone and carbon dioxide in the Earth's atmosphere. We might just as well rename environmental ecology *machinic ecology*, because Cosmic and human praxis has only ever been a question of machines, even, dare I say it, of war machines. From time immemorial "nature" has been at war with life! The pursuit of mastery over the mechanosphere will have to begin immediately if the acceleration of techno-scientific progress and the pressure of huge population increases are to be dealt with.
> —Félix Guattari, *The Three Ecologies*

> As social life becomes mature, the social unemployment of machines will become as marked as the present technological unemployment of men.
> —Louis Mumford, *Technics and Civilization*

The Bicephalous Machine

The history of industrial civilization can be depicted as a bicephalous chimera whose heads grew out of the same machine, innervated each other, and, after further metamorphoses, still

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attempt to hegemonize each other. The two heads are Energy and Information, and they bifurcated out of the industrial machine of the nineteenth century, although at different tempos. They initiated and extended two technological lineages: the civilizations of Carbon and Silicon, respectively, the one of energy as a medium of motion and the one of energy as a medium of control and communication. The two regimes carried different *entropic costs* and also quite different *colonial costs*, having been developed at different historical stages and latitudes of the planet. Although, for instance, Charles Babbage's (1832: 153) Analytical Engine was potentially ready to replace "the mental division of labor" in the industrial factory, only the microchips and labor composition of the twentieth century would be able to trigger the corresponding information revolution. And although Karl Marx registered the "metabolic rift" (Foster 1999) caused by the pollution of "carboniferous capitalism" (Mumford [1934] 2010: 156) on the English landscape, the input and output of the industrial apparatus set in motion a gigantic web of economic relations and supply chains that enslaved populations beyond the borders of the British Empire.

The thermodynamic engine is correctly identified as the central axis of the Industrial Revolution, but the flows of primitive accumulation that prepared its terrain are today finally recognized: the significant contribution of agricultural enclosures, resources expropriation, colonial invasions, unpaid domestic labor, and slavery. Since Marx's formulation, the industrial machine is perceived specifically as the diagram of surplus value, in which machinery is *dead labor* that dialectically absorbs workers' *living labor*. After cybernetics (Wiener 1948) and Gilles Deleuze and Félix Guattari's philosophy of the assemblage (DeLanda 2016), the machine is described in a less dialectical way as a conurbation of flows of money, energy, matter, and information. The unruly technosphere responsible for the Anthropocene should be analyzed with both approaches in mind: the one that sees the machine as a diagram of surplus, accumulation, and crisis and the one that sees it as a network of flows that responds to a larger social ecology.

Rather than engaging in metaphysical debates on the opposition between Nature and Society, this essay looks for an *empirical assemblage* where the connection between the two, through the paradigms of energy and information, can be studied. The essay illustrates the industrial machine as the forgotten bifurcation of energy and information and follows such a bifurcation along three stages: the industrial factory, the cybernetic society, and planetary computation. Labor is made of energy and information, and so also is capital. By defining labor as the composition of energy and informa-

tion, labor can be woven back into the fabric of the Anthropocene paradigm, which itself emerged as a complex architecture of energy and information. Within this picture, labor remains the collective agency that is socially and politically separated by technology and that appears, then, to be "encrypted" (or, more interestingly, *outcrypted*) in all subsequent regimes of production.[1] In this respect, the Anthropocene paradigm seems complicit with a mode of governance that attempts to dissolve labor conflicts into the fabric of information and energy, thus mystifying labor into technological forms so as to render it invisible (as argued in the case of automation by Giedion 1948).

The intimate relation between labor and the energy economy has been investigated since the energy crisis of the 1970s that George Caffentzis ([1980] 1992) rightly renames a "work/energy crisis." Caffentzis notices that information is required by capital to allocate resources and workers in the most efficient way against entropy: *information is the economic intelligence of energy*. But more importantly, both information revolution and energy crisis are responses to the social movements of the 1960s and their refusal of labor. Similarly, this essay tries to weave together the *energy theory of labor* (labor as manual activity) with the *information theory of labor*, that is, labor as a source of information that gives form to energy and matter.

A genealogical study of information that goes back to the industrial age is worthwhile. The global technosphere responsible for the Anthropocene still resembles, in its form and function, the automaton of the industrial age, which was described also by Marx ([1867] 1981: 544) as a central axis of production running nonstop and orchestrating the overall division of mental and manual labor in the factory. Sadly, the *automaton* of the technosphere and its comfort narratives (such as the myth of technological singularity) appears to mirror and capture today the *autonomy* of social movements theorized and practiced in the previous decades.

Confronting the Anthropocene paradigm with Guattari's *machinic ecology* (that includes the inorganic, organic, technological, economic, and psychic spheres within the same *Umwelt*), this essay attempts to recompose the *epistemic rift* between energy and information that was provoked by industrial capitalism and then amplified by cybernetics and the digital revolution. The recombination of *labor's intelligence* (Schaffer 1994), that is, a novel assemblage of energy and information at a higher scale of labor, will be proposed as a necessary passage toward the *machinic ecology* that Guattari envisioned also as a political ecology of the mind.

As much as political economy has discovered the substrate of energy and labor in the diagram of information capitalism too late (for focusing on

frictionless paradigms such as knowledge economy and network society for too long), ecology has overlooked the role of information in the *Bildung* of its own cognitive map. If the critique of industrialism helped to recognize the metabolism of energy and matter also in the regime of information machines (see the idea of media geology in Parikka 2015), likewise a new critique of cybernetics should help to remind us of the role of information in the growth crisis of the old industrial apparatus. The two regimes of industrialism and informationalism will be hopefully described, one day, according to a paradigm that is capable of comprehending their continuum, intersections, and bifurcations, that is, their coevolution.

If labor is reframed according to the composition of the flows of energy and information, a new theory of machine is also necessary. At the end of the essay, the sketch of the *carbosilicon machine* (the infoenergetic assemblage that emerged with the coupling of the Turing machine and the thermodynamic engine) will hopefully cast a different light on the politics of the Anthropocene and the division of labor engendered by the age of planetary computation and logistics. In the last part of the essay, the two paradigms of "fossil capital" (Malm 2016) and "control revolution" (Beniger 1986) will be united into the exploratory idea of *cyberfossil capital*, the ultimate assemblage of the perennial flows of energy and information.

Coal, or the Fuel of Abstract Labor

It was Gilbert Simondon (2009: 20) who noticed that the industrial machine was already an *infomechanical relay*, as it was separating, for the first time, the traditional form of labor in a source of *energy* (propelled by natural resources such as water or coal) and a source of *information* (the conscious movements and instructions of workers supervising the machine). In this view, the traditional *tool* is a design in which energy and information are still united: with the hammer, for example, the preindustrial artisan was providing both energy and form in the same gesture. It was thanks to their separation (bifurcation) that the flows of energy and information could be governed and exponentially multiplied by capital.

The Industrial Revolution was the reorganization of the labor power of the manufacturing age around the gigantic master axis of the factory—of which workers and flows of natural resources became mere prostheses. The Scottish business theorist Andrew Ure (whom Marx humorously called "the Pindar of the automatic factory" for his extravagant prose) described the

industrial apparatus as "a vast automaton, composed of various mechanical and intellectual organs, acting in uninterrupted concert for the production of a common object, all of them being subordinate to a self-regulated moving force" (Ure 1835; quoted in Marx [1867] 1981: 544). In a similar way, Babbage (1832) recognized a division of manual and mental labor within the management of the factory and imagined two different forms for their mechanization: whereas thermodynamic machines were replacing manual labor, his Analytical Engines, prototypes of modern calculators (yet never finalized during his life), were supposed to automate, for instance, the intellectual labor of the factory's accountants. The automation of mental labor (information) takes hold through a more profound relation with the metabolism of energy.

Andreas Malm (2013) has illustrated how the motion of the rising industrial automaton had to be propelled by a stable and versatile form of energy, which happened to be found in coal. The physical properties of coal (lightness, homogeneity, measurability, calorific potential) crucially contributed to the acceleration of industrial capitalism. Steam engines replaced water mills not because coal was cheaper and more abundant than water, but because it provided a more stable flow of power than rainfalls and allowed factories to move close to urban areas, where most of the workers were living at the time. Malm registers in this way the energetic reason for the slow emergence of the industrial mode of production out of the manufacturing age: indeed, it took roughly forty years for the steam engine to be adopted in the place of the water mill. Coal came to be used across the full spectrum of production since it was the most adequate source of *abstract energy*—where *abstract* means easily computable in terms of cost, transport, stock, and performance. Coal could be transformed into a systemic component of capital only via a technological innovation, that is, the thermodynamic engine.

> For coal to be universalised as a fuel for all sorts of commodity production, it had to be turned into a source of mechanical energy—and, more precisely, of rotary motion. Only by coupling the combustion of coal to the rotation of a wheel could fossil fuels be made to fire the general process of growth: increased production—and transportation—of all kinds of commodities. This is why James Watt's steam engine is widely identified as the fatal breakthrough into a warmer world. (Malm 2013: 18)

What is recognized in the gears of such an industrial artifact is also the coupling of *abstract energy* and *abstract labor.*[2] Malm spotlights, in particular, the

subtle relation between the energetic versatility of coal and the consolidation of the new spatiotemporal abstractions of capital, namely, urban factories and their clock-based labor discipline. Coal provided the energetic continuum that was necessary for the disciplinary abstractions of industrial time and industrial space to emerge.[3]

Extending Malm's genealogy, it may be added that the abstract properties of information emerged thanks to the nature of fossil energy, to its homogeneous carbon chains, that made coal easier to quantify and compute than traditional sources, such as water or animal power. If coal could be turned into *abstract energy* and labor into *abstract labor*, this happened specifically thanks to two new technologies of control at the center of the industrial apparatus: "closed-loop feedback devices like James Watt's steam governor (1788) and preprogrammed open-loop controllers like those of the Jacquard loom (1801)" (as noted by Beniger 1986: 17). The steam governor was a device to maintain the constant output of an engine by regulating its fuel input in real time (retrospectively, it is considered the first cybernetic device). The punched card was a data device to store instructions of textile patterns for the Jacquard loom (its data format would be adopted by IBM, almost unchanged, throughout the twentieth century). To be more precise, Watt's governor was turning the engine impulses into *abstract movement*, that is, constant rotary motion, and Jacquard's punched cards were turning manual instructions into *abstract form*, that is, information. Watt's governor and the Jacquard loom's punched cards—that is, control of motion and control of information—can be considered, in embryo, the first two anatomical components of the upcoming cybernetic system.[4] Throughout the Industrial Revolution, the bifurcating lineages of energy and information were already affecting one another and composing novel assemblages.

One may say that somehow both Marxism and environmentalism address the energetic component of capitalism: the former identifies it in the exploitation of human labor, the latter in the exploitation of natural resources. The "autonomy" of both labor and nature is used sometimes to unify the ground of "red" and "green" politics, but this *energy theory of labor* overlooks the role of information in the definition of both labor and nature. Whereas this section attempted to uncover the role of information within the industrial apparatus and the traditional definition of labor, the following section will show the hidden function of information in the constitution of the paradigm of ecology. Interestingly, both ecology and cybernetics will appear like the interweaving of the very same flows of energy and information—yet outside the factory.

Information, or the Government of Surplus

Conceptually, both ecology and cybernetics share roots in the notion of organism that is found in the German *Naturphilosophie* of the nineteenth century, where any "form of life" (from the animal to the nation-state) was understood as self-centered and in antagonism with the surrounding world (*Umwelt*). It was the zoologist and popular illustrator Ernst Haeckel (1866) who introduced the term *ecology* (*Ökologie*) as the study of the relation between organism and environment. The biologist Jakob von Uexküll (1920) described the relation between the animal's nervous system (*Innenwelt*) and the outside world (*Außenwelt*) as a "functional circle" (*Funktionskreis*)—a scheme that would later be repeated in the feedback loop of cybernetics. Similar to the *Funktionskreis*, the feedback loop of cybernetic systems was conceived as a circulation of information and response to an external stimulus. Uexküll viewed the organism as an information processing system struggling to adapt to the environment, similar to the adaptive model that influenced the early design of the "cybernetic brain" (Pickering 2010). Yet one should remember that Uexküll (as much as Marx) did not possess a notion of information: the mathematical definition of information would be formulated only by Claude Shannon (1948).

Another family trait common to ecology and cybernetics is the idea of conservative equilibrium and self-regulation (later on, this would be further consolidated in the notion of *homeostasis*).[5] There is a distinction to be made though: in ecology the medium of self-regulation appears to be the energy metabolism itself, whereas in cybernetics the medium of self-regulation is strictly assigned to information. The two paradigms converged from time to time and formed what is called *cybernetic ecology*. *The Whole Earth Catalog* published in California between 1968 and 1972 was a culminating example of this coevolution and, interestingly, a cultural pioneer of the following regime of production, the *network society* (see Bryant 2006; Turner 2010). For stressing the role of the infosphere in the control of the technosphere, the Anthropocene paradigm can also be considered part of the history of cybernetic ecology.

Historically, cybernetics originated from a mix of information theory and cognitive sciences that was heavily sponsored by military research (including the Manhattan Project in the construction of the first nuclear bomb). This essay illustrates cybernetics only in its coupling with the industrial apparatus: the *information flow* bifurcating out of the industrial machine encountered cybernetics and mainframe computers just after World War II.

As James Beniger (1986) shows in his book *The Control Revolution*, the paradigm of informationalism emerged through the continuous pressure of industrial production, in fact, out of a "crisis of control" of Western capitalism. A more and more *abstract* definition of information (i.e., measurable, computable, and transmissible knowledge) had to be introduced to manage the economic and commodity boom of the United States after World War II.

The cybernetic lineage that germinated out of the *information terminal* of the industrial machine aspired to control factories, national economies, and even the whole planet as its new self-reflexive organ, or *world brain*. Douglas Engelbart (1962) advanced the idea of machine-aided *augmented intellect* for problem solving even at the geopolitical scale. Stafford Beer (1972) would apply cybernetics to factory management with utopian enthusiasm: Salvador Allende's socialist government would invite him to develop the project Cybersyn with the purpose to regulate Chile's economy (which was, by the way, heavily based on copper extraction).[6] There is a lineage of cybernetics that was progressive: sometimes called social cybernetics, it influenced antipsychiatry movements and French philosophy too. Deleuze and Guattari (1987: 21) took the idea of *plateaus*, for instance, from the work of the English cybernetician Gregory Bateson on Balinese culture.[7]

With the original nucleus of ecology, cybernetics shared the idea of a self-regulating system based on information loops but applied this scheme to the design of intelligent machines. After World War II, during the so-called Great Acceleration (Steffen et al. 2015), industrial cybernetics was supposed to contain the overgrowth of production flows as a control apparatus. With the microchip revolution, the technologies of communication and control grew and transformed into a new vast nervous system, a *sentient technosphere* that today is escalating to the size of global data centers and the sophistication of machine learning algorithms. Cybernetics was also supposed to transform the economy into an ecology of feedback loops in order to control social unrest and potential revolutions. But homeostasis is a troublesome category when transplanted from biological to economic and institutional systems: in fact, capitalism keeps on expanding the use of fossil fuels and crunches ever-growing databases, feeding on metabolic surplus. As Beniger (1986) noted, the information revolution grew up (and keeps on growing) by feeding itself on the industrial and energetic surplus that it was supposed to measure and control. Equilibrium is rarely seen.

Cybernetics was thus the first *technopolitics*, that is, the first time a technological protocol was claimed as a protocol of political government (see Deutsch 1963). More exactly, cybernetics was the normative project of power

in the age of information machines—a shift that Michel Foucault, but not Deleuze and Guattari, failed to record in his epistemology of power, although French philosophy (since the work of Simondon) was among the few early critical voices of the control paradigm of cybernetics. Marxism developed a critique of cybernetics too late, and Italian *operaismo* (workerism) started its inquiry on cognitive labor, not by chance, only after 1989. The only exemption may be the pioneering and forgotten work of Romano Alquati, who studied the division of labor at the Italian computer factory Olivetti as early as 1961 (!) and attempted to merge the notion of Marx's surplus value and cybernetic information under the concept of *valorizing information*. Alquati was probably the first to sketch an information theory of labor.

> The *productive labour* is defined by the quality of *information* elaborated and transmitted by the worker to the means of production via the mediation of constant capital, in a way that is tendentially indirect, but completely socialized. . . . Cybernetics recomposes globally and organically the functions of the general worker that are pulverized into individual microdecisions: the 'bit' links up the atomized worker to the figures of the Plan. (Alquati 1963; translated in Pasquinelli 2015: 55)

Autonomist Marxists like Alquati often stressed how social struggles and the refusal of labor accelerated industrial automation and the dissemination of information technologies. Labor resistance pushed the information revolution in the passage from Fordism to post-Fordism. But post-Fordism is not only the regime of the "hegemony of immaterial production";[8] it rose as a massive concentration of information, that is, knowledge and intelligence, on the side of capital, in fact, as a "control revolution" over industrial production (Beniger 1986). Post-Fordism is Fordism plus the databases of labor.

Computation, or the Encryption of Labor

Paul Edwards (2010) has illustrated how climate science and the computation of global warming are possible only thanks to a planetary network of sensors, data centers, and institutions that conceived and implemented mathematical models for data mining and forecasting. Surprisingly (or maybe not), the first picture of the "vast machine" of meteorological computation by John Ruskin (1839) resembled closely the "vast automaton" of the industrial factory described by Ure (1835). Ruskin's Meteorological Society appeared to be designed to mirror and second the central technological axis of the time, that is, the giant *automaton* that was orchestrating the division of manual and mental labor in the industrial factory.

> The Meteorological Society, therefore, has been formed not for a city, nor for a kingdom, but for the world. It wishes to be the central point, the moving power, of a vast machine, and it feels that unless it can be this, it must be powerless; if it cannot do all it can do nothing. It desires to have at its command, at stated periods, perfect systems of methodical and simultaneous observations; it wishes its influence and its power to be omnipresent over the globe so that it may be able to know, at any given instant, the state of the atmosphere on every point on its surface. (Ruskin 1839: 59)

The perception of the whole earth as ecosystem (as in the Gaia hypothesis) and the measurement of the Anthropocene are possible only through the most sophisticated information technologies. As much as the British Meteorological Society imitated the automaton of industrial capitalism qua control apparatus, today climate science institutions mirror the data centers of computational capitalism. With almost identical techniques, global data centers accumulate information and intelligence, not just about the world's climate but also about financial markets, logistical chains, international terrorism, and, more importantly, social networks of billions of individuals. Is the similarity of climate science and control apparatuses just a coincidence, or does it point to a more general form of governance?

The vast network of climate science appears like an extended cybernetic loop with big institutions taking the role of the nervous system of a pretty large organism—planet earth. The "vast machine" of the early climate science should be considered as the prototype of the *governance machine* of the Anthropocene, in which more and more metabolic flows and infrastructures are integrated and computed.[9] Climate science infrastructure and the Anthropocene technosphere emerge like the late twin of computational capitalism, in which computation appears to be oriented to the calculus of the planet's *surplus energy* rather than the calculus of *surplus labor*. Computation comes to give form to surplus, but one wonders if such a computation of surplus energy is just a way to mystify surplus labor. Since the "work/energy crisis" of the 1970s (Caffentzis [1980] 1992), we know that any definition and measure of energy affects the governance of labor. More generally, it looks as if we have surrendered the antagonism between labor, energy, and information to the Cybernetic Hypothesis (Tiqqun 2001), on one side, and the Anthropocene Hypothesis, on the other. The former postulates that life on the planet *is already* under the control of a totalitarian cybernetic apparatus, the latter that life on the planet *should be* under the control of a benevolent cybernetic apparatus. In both scenarios, computation is the adequate form

of the paradoxical disappearance of labor, that is, *the ideological encryption of labor* within technology. It is necessary, then, to reveal labor again in the diagram of technology and, conversely, technology in the diagram of labor. The limit of current Marxism is the inability to recognize the new forms of *technified labor* and *technified subjectivities* that have lost any resemblance to the labor struggles of the past. In the mesh of global logistics and the algorithmic division of labor, new assemblages of labor must be recognized.

Carbosilicon Assemblages and Cyberfossil Capital

Any bifurcation is the birth of a new assemblage. And, in turn, any new assemblage expands previous bifurcations. In 1989, the same year the Berlin Wall fell and a decade before the much-celebrated rise of the network society, Guattari ([1989] 2013: 11) pictured "the age of planetary computerization" in his book *Schizoanalytic Cartographies*. This age was prophetically marked by a polyphony of technologies including new chemical compounds and even nuclear fusion energy but, more importantly, also artificial intelligence and large databases. According to Guattari, new subjectivities would be based on the computation of "enormous quantities of data" and biological engineering would remodel traditional living forms. In the same year, Guattari also published *The Three Ecologies* and recognized, in parallel, the ecological catastrophe driven by the hubris of technoscience. He writes: "The Earth is undergoing a period of intense techno-scientific transformations. If no remedy is found, the ecological disequilibrium this has generated will ultimately threaten the continuation of life on the planet's surface" (Guattari [1989] 2000: 27).

The contrast between the potentiality of computation and the damages of the technosphere has become manifest today, with global data centers accelerating networks of logistics, the extraction of natural resources (often in the global South), and fossil fuel emissions worldwide. The incestuous relation between planetary control and planetary disequilibrium is the riddle at stake in the hiatus between the Cybernetic Hypothesis and the Anthropocene Hypothesis, the civilizations of Silicon and Carbon, the lineages of Information and Energy, as illustrated throughout this essay. The relation between the chimera's two heads of Energy and Information happened to be a turbulent double bind: of mutual amplification (in the game of capital) but also of containment (in the game of politics). Rather than reiterating the opposition of monotonic paradigms, it may be better to try and consolidate the assemblage of energy and information into new systemic notions.

The idea of the *carbosilicon machine* is proposed to describe the historical assemblage of the industrial and information apparatuses, the grafting of the Turing machine onto the governor of the thermodynamic engine. The carbosilicon machine is but the cypher of the technosphere, which seals the molecular imbrication of manual and mental labor that is often overlooked. If Babbage's Analytical Engine, now acknowledged as the first stored-program computer, was "a projection of a more perfect factory" (Mirowski 2002: 34), any Turing machine should be considered an overall *dispositif* for the logistics of mental and manual labor as well as that of matter and energy. At a planetary scale, the coupling of energy and information is obvious in the colonial relation between the data centers of the logistics companies of the global North and the extractive industries in the global South. The "Technosphere of the Anthropocene" is therefore the name given to the globalization of the old colonial factory, still waiting to find the present-day Babbage and Marx.

The notion of the *carbosilicon machine* may help to decouple and repurpose technology from its colonial and monopolistic destiny and, more importantly, to illuminate new forms of struggle and resistance. Such a clarification is especially hard nowadays due to the double crisis of the Carbon and Silicon regimes: the environmental and energetic crisis, on the one hand, and the crisis of valorization triggered by digital technologies, on the other, have galvanized political fronts that strive to merge. Critical thought, and specifically Marxism, has never tried, in this respect, to unite the lineages of energy and information into a synthetic definition of labor. Everything can be easily described under the hegemony of *financial capitalism*, but *fossil capitalism* and *cognitive capitalism* are still waiting to be integrated. Such a theoretical weakness is mirrored by a sort of "bifurcation" that happens to social struggles too. The disconnect between information-related struggles (from the hacker movement to the digital precariat, from Anonymous to media activism in the post–Edward Snowden age) and energy-related struggles (from antinuclear movements to climate justice, from urban ecology to indigenous struggles on land and sovereignty) is evident. To use an old topos of the autonomist thought: a new *political composition* of energy and information must be thought against the *technical composition* that bifurcated them since the industrial age.

How might we address social autonomy in the age of the planetary automaton? Ironically, the *automaton* of the technosphere (as in Haff 2014) appears to absorb and reverse the *autonomy* of social movements and workers' struggles of the 1960s and 1970s as much as the network cultures of the 1990s to 2010s (themselves easily captured by the new social monopolies of the Internet). The technological form absorbs features that once belonged to

the social form. It may be wise to clarify here that *automaton* means "capable of independent motion," whereas *autonomy* means "self-governing and able to invent new laws, rules, and habits." Automation is the imitation of old rules; autonomy is the invention of new ones. This is why Langdon Winner (1977: 16) says that the expression "autonomous technology" is ironic, because technical objects seem to supplant the freewill of subjects. To rethink social autonomy today one has to see what the autonomy of energy and the autonomy of information mean together in an expanded (and technified) notion of labor.

Eventually the designation of carbosilicon machine summons the demons of its historical proliferation and logically bespeaks the birth of the regime of *cyberfossil capitalism*—a regime that has implemented energy and information qua abstract equivalents as much as labor and money. The imbrication of energy and information flows is not new to philosophy. In their reading of the "Fragment on Machines" in *Grundrisse* (Marx [1939] 1993: 690–712), Deleuze and Guattari (1983: 232) recognized a *machinic surplus value* that was distinguished into a *surplus value of flow* (labor, energy) and a *surplus value of code* (information, knowledge). Accordingly, late computational capitalism should be defined as an abstract machine that divides labor in flows of energy and information and manages their synthesis qua real abstractions. Cyberfossil capitalism is the metabolism of the most archaic biosphere and the most abstract technosphere united by capital.

Notes

1 The term *outcryption* refers to something that is invisible and inaccessible for being encoded, paradoxically, in public procedures, common habits, and social techniques: it is historically the nonconscious yet very empirical power of any ideology.

2 Orthodox Marxists will pardon, for once, the ambivalent use of the notion of abstract labor in this passage. In Marx, abstract labor refers to human activity that is calculated and valorized by capital as the universal equivalent. Here it points also to the cognitive and informational component of labor in general. Alfred Sohn-Rethel (1978) would find that the two dimensions are genealogically related.

3 The fossil fuel economy will be further "abstractified" by capital with the introduction of carbon credit trading. See Leonardi 2014.

4 Norbert Wiener (1948: 11) coined the term *cybernetics* from the Greek *kybernetes* (governor/steersman), also drawing on Clerk Maxwell's 1868 article "On Governors."

5 It is worth noting that Haeckel and Uexküll embraced reactionary political positions, as did a good part of the German *Lebensphilosophie*, not to mention Martin Heidegger. See Harrington 1999.

6 On the Cybersyn project, see Medina 2011. It must be noted that Cybersyn was contemporary to the Advanced Research Projects Agency Network, or ARPANET (progenitor of the Internet), which was developed by the US Department of Defense. ARPANET

was conceptually far more advanced than Cybersyn for implementing a decentralized architecture based on packet-switching communication.

7 In general, Deleuze and Guattari's notion of *machinic* is indebted to the open framework inaugurated by cybernetics that aimed to dissolve the border between organic systems and technical systems (and between vitalism and mechanicism).

8 On the hegemony of immaterial production, see Hardt and Negri 2004: 103–15.

9 In fact, the metabolism of the global technosphere is incredibly complex: it comprises the cycles of chemical compounds such as agricultural nitrogen and rare earth, for instance, and not just fossil carbon. Peter Haff (2014) describes the technosphere as a humungous automaton and proposes six rules to frame the fatal destiny of the human outclassed by the metabolism of technology: inaccessibility, impotence, control, scale, performance, and provision (curiously grounding in this way the principles of *anticybernetics*, as this looks like a theory of noncontrol).

References

Alquati, Romano. 1963. "Composizione organica del capitale e forza-lavoro alla Olivetti" ("Organic Composition of Capital and Labor-Power at Olivetti"). *Quaderni Rossi* (*Red Noteooks*), no. 2: 63–98.

Babbage, Charles. 1832. *On the Economy of Machinery and Manufactures*. London: Charles Knight.

Beer, Stafford. 1972. *Brain of the Firm: The Managerial Cybernetics of Organization*. London: Allen Lane.

Beniger, James. 1986. *The Control Revolution: Technological and Economic Origins of the Information Society*. Cambridge, MA: Harvard University Press.

Bryant, William. 2006. "Whole System, Whole Earth: The Convergence of Ecology and Technology in Twentieth-Century American Culture." PhD diss., University of Iowa.

Caffentzis, George. (1980) 1992. "The Work/Energy Crisis and the Apocalypse." In *Midnight Oil: Work, Energy, War, 1973–1992*, edited by Midnight Notes Collective, 215–72. New York: Autonomedia.

DeLanda, Manuel. 2016. *Assemblage Theory*. Edinburgh: Edinburgh University Press.

Deleuze, Gilles, and Félix Guattari. 1983. *Anti-Oedipus: Capitalism and Schizophrenia*. Translated by Robert Hurley, Mark Seem, and Helen R. Lane. Minneapolis: University of Minnesota Press.

Deleuze, Gilles, and Félix Guattari. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Translated by Brian Massumi. Minneapolis: University of Minnesota Press.

Deutsch, Karl Wolfgang. 1963. *The Nerves of Government: Models of Political Communication and Control*. New York: Free Press of Glencoe.

Edwards, Paul. 2010. *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, MA: MIT Press.

Engelbart, Douglas. 1962. "Augmenting Human Intellect: A Conceptual Framework." Summary Report AFOSR-3233. Menlo Park, CA: Stanford Research Institute.

Foster, John Bellamy. 1999. "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology." *American Journal of Sociology* 105, no. 2: 366–405.

Giedion, Sigfried. 1948. *Mechanization Takes Command: A Contribution to Anonymous History*. New York: Oxford University Press.

Guattari, Félix. (1989) 2000. *The Three Ecologies*. Translated by Ian Pindar and Paul Sutton. London: Athlone.

Guattari, Félix. (1989) 2013. *Schizoanalytic Cartographies*. Translated by Andrew Goffey. London: Bloomsbury.

Haeckel, Ernst. 1866. *Generelle Morphologie der Organismen* (*General Morphology of Organisms*). Berlin: Georg Reimer.

Haff, Peter. 2014. "Humans and Technology in the Anthropocene: Six Rules." *Anthropocene Review* 1, no. 2: 126–36.

Hardt, Michael, and Antonio Negri. 2004. *Multitude: War and Democracy in the Age of Empire*. New York: Penguin.

Harrington, Anne. 1999. *Reenchanted Science: Holism in German Culture from Wilhelm II to Hitler*. Princeton, NJ: Princeton University Press.

Leonardi, Emanuele. 2014. "Carbon Trading Dogma: Theoretical Assumptions and Practical Implications of Global Carbon Markets." Paper presented at Historical Materialism, the School of Oriental and African Studies, London, UK, November 6–9.

Malm, Andreas. 2013. "The Origins of Fossil Capital: From Water to Steam in the British Cotton Industry." *Historical Materialism* 21, no. 1: 15–68.

Malm, Andreas. 2016. *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming*. London: Verso.

Marx, Karl. (1867) 1981. *Capital: A Critique of Political Economy*. Vol. 1. Translated by Ben Fowkes. London: Penguin.

Marx, Karl. (1939) 1993. *Grundrisse: Foundations of the Critique of Political Economy*. Translated by Martin Nicolaus. London: Penguin.

Medina, Eden. 2011. *Cybernetic Revolutionaries: Technology and Politics in Allende's Chile*. Cambridge, MA: MIT Press.

Mirowski, Philip. 2002. *Machine Dreams: Economics Becomes a Cyborg Science*. New York: Cambridge University Press.

Mumford, Lewis. (1934) 2010. *Technics and Civilization*. Chicago: University of Chicago Press.

Parikka, Jussi. 2015. *A Geology of Media*. Minneapolis: University of Minnesota Press.

Pasquinelli, Matteo. 2015. "Italian *Operaismo* and the Information Machine." *Theory, Culture and Society* 32, no. 3: 49–68.

Pickering, Andrew. 2010. *The Cybernetic Brain: Sketches of Another Future*. Chicago: University of Chicago Press.

Ruskin, John. 1839. "Remarks on the Present State of Meteorological Science." *Transactions of the Meteorological Society* 1: 56–59.

Schaffer, Simon. 1994. "Babbage's Intelligence: Calculating Engines and the Factory System." *Critical Inquiry* 21, no. 1: 203–27.

Shannon, Claude. 1948. "A Mathematical Theory of Communication." *Bell System Technical Journal* 27, no. 3: 379–423.

Simondon, Gilbert. 2009. "Technical Mentality." Translated by Arne De Boever. *Parrhesia*, no. 7: 17–27.

Sohn-Rethel, Alfred. 1978. *Intellectual and Manual Labour: A Critique of Epistemology*. Atlantic Highlands, NJ: Humanities Press.

Steffen, Will, et al. 2015. "The Trajectory of the Anthropocene: The Great Acceleration." *Anthropocene Review* 2, no. 1: 81–98.

Tiqqun. 2001. "L'hypothèse cybernétique" ("Cybernetic Hypothesis"). *Tiqqun* 2: 40–83.

Turner, Fred. 2010. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: University of Chicago Press.

Uexküll, Jakob von. 1920. *Theoretische Biologie* (*Theoretical Biology*). Berlin: Gebrüder Paetel.

Ure, Andrew. 1835. *The Philosophy of Manufactures; or, An Exposition of the Scientific, Moral, and Commercial Economy of the Factory System*. London: Charles Knight.

Wiener, Norbert. 1948. *Cybernetics; or, Control and Communication in the Animal and the Machine*. Cambridge, MA: MIT Press.

Winner, Langdon. 1977. *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*. Cambridge, MA: MIT Press.

Karen Pinkus

Intermittent Grids

Introduction

The grid must be protected at all costs!" Or "I am going off the grid, running on my own power!" In different ways, both of these alternatives end up reinforcing the grid as it stands: a fully functioning 24–7 basic human right in the West, an aspiration in the developing world. Paradoxically, both positions are predicated on a certain invisibility of the grid: it's a massive infrastructure that comprises fuels (clean or dirty, transition, or fossil-based), power stations, storage tanks, computers, transformers, wires, poles, meters, and end users of different sorts, often under the protection of military defenses that we only notice if there is a glitch or disaster. There can be no growth without electricity, or so we are led to believe. Any undoing of its power can only mean a catastrophic, *Mad Max*–like reversion to anarchy or despair. For the carbon-polluting developed world, at least, intermittent power is quite simply unthinkable.

Senator Ted Cruz's opposition to the Iran nuclear deal in the spring of 2015 has been widely cited. Responding to a question concerning the greatest risk in the accord, he noted that a thermonuclear pulse sent by Iran might target the grid:

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"It could take down our stock market, our financial systems, but even more importantly, could take down food delivery, water delivery, heat, air conditioning, transportation. The projections are that one nuclear warhead in the atmosphere over the Eastern Seaboard could result in tens of millions Americans dying" (quoted in Everett 2015). The grid is life itself, by this logic.[1] Significantly, even the most committed entities working toward decarbonization take it for granted that "we" cannot tolerate any disruption in the smooth flow of electricity on demand.[2] Now, in this "transitional" period, withdrawal, as an "alternative" or "green" consumer choice or a quasi-libertarian expression of anger against a public utility, assumes the continued functioning of a/the normative grid.

At the same time, climate justice or emissions equity actors deploy a rhetorics of technology transfer to the developing world where the (invisible and ever powerful) grid will grow and spread, only with non-fossil-based inputs. *This* dream is predicated on the hope that technology will finally overcome the inherent intermittency of water and wind already placed into the category of historical artifacts by Karl Marx (who does not conceive of capturing solar energy, or at least not directly). *This* dream invokes capacity building and technological leapfrogging: those who have not (yet) enjoyed growth will not have to pass through a carbon economy. They just need the green light of some capital investments, so to speak, to be on their way. But where are they going? Do we truly believe that replacing "carbon" with another "material" (economic theorist Jeremy Rifkin, only a few decades ago, called for a *hydrogen* economy with distribution networks as broad as the World Wide Web) will lead to the end of environmental externalizations, to a more beneficent capitalism, or, God forbid, to socialism with some benefits of capitalism, an energo-systemicity that "we" "rational" citizens of the developed world will embrace instantly because it is cheap, clean, and fair(er)? I call this nothing short of a rhetorics of bad faith since it fails to approach the complexity of keeping below 2 (or, as some in the intermittent world demand, below 1.5) degrees.

In this essay, I summon some of the language, strategies, and tactics that developed in Italy of the 1960s, the period that gave rise to the political movements known as workerism (*operaismo*) and later Autonomia. I do so for two essential purposes: first, as a critique of energy conservation and, second, as a way to think about the grid as a structure and about intermittency as a potentially productive concept. The following provides a starting point for this investigation: "For Operaismo, and for a number of Italian movements or groups that formed around the same time, the possibility of autonomy was not a generic claim of autonomy *from*, but rather a more auda-

cious and radical claim of autonomy *for*. This *autonomy for* consisted of a bid by the workers to construct a source of power alternative to the one established and maintained by capitalism" (Aureli 2008: 12).

For one critic, at least, *autonomia* is about generating power (in multiple senses of this word), not conserving it. In this regard, especially through the crucial work of Allan Stoekl, a Bataillean excess of expenditure might be brought into the discussion alongside the workers of 1960s Italy, with the caveat that such a move is post factum and possibly perverse. Georges Bataille's thought is deeply imbricated with energy as "inseparable from that which powers cars and elevators," but also as useless force that "leads to nothing beyond death or pointless erotic expenditure that defies quantification in measure; elapsed moments, dollars per hour, indulgences saved up for quicker entry into heaven" (Stoekl 2007: xvi). Rather than conserving energy (and then, for whom?), Bataille (1991: 11) reminds us that "energy finally can only be wasted." Simply put, Bataille is the thinker who most effectively affirms that energy/power exceeds the space of the factory or labor under capitalism.

To be sure, the aftermath of Italy's boom (usually identified as 1958–62) was a context of great experimentation and creativity in cybernetics and electronics. We might also characterize it as a period of transition from analogue to digital, a distinction of particular importance for Franco "Bifo" Berardi in his critique of the present as an age of depression, finance, and disproportionate speed. As transitional, 1960s Italy provides an interesting model for thinking about the grid now, in the time of climate change. Of course, for those struggling against wages and capital, the immediate structure of oppression was the Fordist factory and not the greenhouse effect. More broadly, neither "ecology" nor "environment" was central to the movements in their most experimental and powerful phases. What *autonomia* can contribute to the present discussion is not a direct translation of demands to the sphere of power—in multiple valences—but rather some of its strategies.[3] Precisely through an openness to different futures and revolutionary aspirations, *autonomia* of the 1970s can offer some perspective on both adaptation to and mitigation of climate change (which can sometimes drift together or stand in stark contrast), as they interact with "power" in the very complex web that is the carbon present.

The Grid

A brief examination of "the grid" is in order. What is it and what are its limits? Let's say it all starts with a lightbulb. In fact, Thomas Edison apparently

understood very early on that the single and singular filament bulb would become part of a complex system. The power grid works in various ways, some horizontal (interconnecting components of the same magnitude), others vertical (different components in a functional chain):

> For example, an electrical system of the horizontal kind combines power plants under central control, while a production system of the vertical kind might link a coal mine to an electric power plant through a central control facility coordinating the supply of coal and the output of electricity. Systems are also arranged hierarchically, with small systems yielding to the overriding control of a large encompassing system. Systems also interact with one another through the coordination of semiautonomous controls, but without yielding to an overriding control. Although it is customary to define systems as technical, economic, political, or social, the centralization of at least a loose control over systems of these different kinds makes possible the conceptualization of sociotechnical systems and the like. (Hughes 1983: 6)

The electrical grid (or, in common speech, "power") is normally regulated by either a state-sponsored utility or a hybrid public-private utility. And for the visible future at least, in the United States, a regional electrical grid, even if powered primarily by renewables, does not mean the end of coal. Early on in the development of the grid, industrialists developed mixed systems (public and private ownership, regulation and markets), which are difficult to untangle. Moreover, the physical infrastructures of the grid are multiple. A system might include "an urban power plant using hard or bituminous coal, a lignite-fired plant at an open-pit site, a high-head hydroelectric plant drawing from a natural lake at high elevation, and a low-head plant using the running water of a river" (Hughes 1983: 367). This type of system required increasingly sophisticated networks of communication and control for load forecasting. Since plants were at some distance, telephonic technology (including utility poles but also other forms of infrastructure and cultural components) grew parallel to electricity. Because many utilities are part of holding companies, their growth is tied up with complex systems of finance and networks of power that far exceed the image or "good intentions" of a local service provider.

The fuel/energy knot is difficult to unravel, and "electricity," while it tends to be associated with the latter term, is also subject to mystification. In "The Charge against Electricity," Mike Anusas and Tim Ingold hold a mock trial of electricity with the prosecution accusing it of locking up energy flows. Electricity, they claim, protects itself through four key characteristics: remoteness, conduction, insulation, and sensorial subtlety. The defense

argues that if electricity were to be freed from the corporations that have channeled and colonized it, it would be a vital and creative force. They note: "Where the prosecution links safety and security to insulation, for the defense it is the continuity of lines that affords the possibility for life to carry on. The prosecution charges electricity with deceit; the defense counters that electricity has the capacity to reveal the true extent of our energetic entanglements, even as they launch an alternative charge, against infrastructure, for having kept these revelations under wraps" (Anusas and Ingold 2015: 551).

Dominic Boyer's work on infrastructure and what he calls "energopolitics" is suggestive here. Boyer, following German politician Hermann Scheer, confirms that solar technology is well advanced. It has already "caught up" with the demand, to use everyday speech. But Boyer (forthcoming) cautions:

> The problem is that grids and pipeline systems—products of early 20th century political and industrial concentration enabled in turn by the burning of fossil fuels—have become a chief instrument in the monopolization of political authority, an "energopolitical" (my term, not Scheer's) apparatus mutually reinforcing the inertia of a particular organization of fuel and a particular organization of political power. Their convergence constitutes an energo-material path dependency while also casting a dark shadow of improbability over any imagined alternative to the long-chained fossil status quo.

From a different perspective, Jane Bennett in her influential *Vibrant Matter* identifies the grid as an example of a heterogeneous assemblage (a term she borrows from Gilles Deleuze and Félix Guattari) of agencies, human and nonhuman. It is

> a material cluster of charged parts that have indeed affiliated, remaining in sufficient proximity and coordination to produce distinctive effects. The elements of the assemblage work together, although their coordination does not rise to the level of an organism. Rather, its jelling endures alongside energies and factions that fly out from it and disturb it from within. And, most important for [Bennett's] purposes, the elements of this assemblage, while they include humans and their (social, legal, linguistic) constructions, also include some very active and powerful nonhumans: electrons, trees, wind, fire, electromagnetic fields. (Bennett 2010: 24)

Here, then, the assemblage that is the grid comprises various actants that cooperate under normal circumstances but may fail to do so under an emergency scenario. That such emergencies might be more frequent due to anthropogenic climate change in general and rising sea levels in particular

does not concern Bennett directly.[4] On the contrary, she might have chosen any number of complex systems to illustrate her point, but we should keep the assemblage model in mind, since it is far too easy to not see the technological elements that make up the grid (we blot them from our memories, we Photoshop them from our landscapes, we turn away when we pass a power plant, and we cover up wires with switch plates). The arrival of power to the end user is tinged with green, whereas the generation—the flue stack—is the site of "dirt." "Electric" signals "clean" precisely because the grid allows us to displace the very combustion of fuels to a remote location. No smoke, no fire, so no guilt or anxiety. Or thought.

In fact, electricity (for use in home and business) is currently the largest sector of greenhouse gas emissions in the United States.[5] Most electricity is generated through steam (so nineteenth century!) that activates a turbine. The fuels used in electrical generation might be fossil-based—coal, natural gas, or oil (in limited cases)—or "uranium" (as the fuel of nuclear power). Or, increasingly, they might be renewable (hydropower from water, either flowing "naturally" or dammed, or wind or solar power). Electricity is generally converted and then transferred over high-voltage lines (three hundred miles is a typical distance in the United States) to transformers (located at junctures of wires and set high up, atop poles that line our streets), where it has to be stepped down to 240 volts for domestic use.

At the point it enters a structure, electricity is normally channeled through a meter that keeps track of watts per hour of usage. Older meters either turned (using a rotor) or ticked off usage (with counters composed of flip numbers). These meters themselves run off electricity (they are one of the agents in the assemblage). In some areas, a meter reader comes to the home from time to time, and after he or she records the actual usage, the customer's bill may be adjusted. Recently, however, there has been a movement to smart grids, with meters directly connected to the power company. The smart meter also allows consumers to keep track of their use: to be more conscious of it for conservation purposes or to keep track of what they might sell to the utility. They may literally "turn back the meter." The smart grid (along with "big data" and "smart cities") makes measurement—but not actually generation—possible. In other words, ideally, at least, it functions regardless of the type of fuel input into the system, and it is not necessarily less carbon intensive than the traditional grid. In fact, the carbon footprint of big data is enormous, and we should be cautious about any discourse that pretends to make the grid more efficient through generating and processing information as if "smart" were somehow disengaged from or objective with relation to the subject "grid."

Access

A draft of the Twenty-First Conference of the Parties (COP21) United Nations Framework Convention on Climate Change (UNFCCC) agreement included text "*acknowledging* the need to promote access to electricity in countries in Africa through the enhanced deployment of renewable energy." Yet by the time the gavel fell in Paris, the final text had been changed to "*acknowledging* the need to promote universal access to sustainable energy in developing countries, in particular in Africa, through the enhanced deployment of renewable energy" (UNFCCC 2015: 2). The excision of "electricity," and the vague ("sustainable") and tautological ("energy . . . through . . . energy") language of the agreement are symptomatic of the difficulty of consensus. On a global scale it is generally agreed that regularized power for longer periods of the day leads to greater opportunities for small businesses or artisanal enterprises as well as for education. It goes without saying that the links between education, lower birthrates, and better resiliency to climate change are also important. Think of the manipulation of the grid in the Gaza Strip, which relies on the Israeli power authority, but where infrastructures have been damaged and power cut off, fuel supplies curtailed, and high taxes imposed by the Palestinian Authority, weakening power distribution. So sure, go ahead and dream of a more democratic spread of power, of giant wind and solar arrays (or should we call them farms?) throughout the global South, or of distributed energy hubs sending cheap and clean power to cookstoves and long-lasting bulbs by which diligent children study at night. These are pleasant images, but they don't really seem commensurate with the enormity of the crisis, with the timescales of carbon, with the Anthropocene, let alone with technology or carbon lock-in.

Currently, the world's largest solar/wind/hydro array is under construction in Ouarzazate, Morocco. When finished, it should produce enough energy for export to Europe if proper interconnections can be developed. The Ouarzazate plant echoes Atlantropa, German scientist Herman Sörgel's dream beginning in the 1920s for a mega construction, a hydroelectric dam over the Strait of Gibraltar, bringing light from the "dark continent," linking two continents in peace. Like Atlantropa (as a utopian design idea) Ouarzazate operates on a large scale, with significant potential as a model for other "deserts" of the world. But also like the unrealized geoengineering project (which would have lowered water levels in the Mediterranean, among other significant collateral effects), the array operates under familiar principles ("unused land"—the desert as the classic *terra nullius* of Western imperialism; reach into every home; constant on-demand electricity; contingency

plans for sandstorms, etc.) without disrupting familiar temporal, economic, or social models. On the contrary: the idea that "they" can mirror back "our" own ways of life appears to cancel out—in its blinding light—the real waves of refugees (climate-related or not) that are currently transferring from "their" shores to "ours." Lines of mirrors or wind turbines, depopulated technological spaces may signify a kind of hope precisely to those political and business leaders who recognize the threat of climate change but list it as simply another challenge among others. These are the same actors who are currently calculating (and perhaps monetizing) terrible "external" effects on the grid from increasing storms and sea level rise, the ripple effects on crucial economic entities such as insurance and reinsurance not to mention the fossil fuel industry itself, but also possible "internal" shifts that could come from intermittent power, or scarcity, or self-imposed brownouts, or conflict, or a generalized breakdown.[6]

Reforming the Grid

Meanwhile, Cornell University, where I teach, has made strides toward carbon neutrality by retrofitting a former coal-burning power plant (coal came to the campus primarily from Virginia because local coal was too fine for the boilers) into a more efficient cogeneration and lake-source cooling plant running on natural gas. The plant provides electricity generated from steam (which also heats), and for heavy-use days or emergencies it is also hooked into the grid (the plant can sell and buy). It also has a reserve of diesel oil in a large tank just in case there is an interruption in the natural gas. That the grid might go down is unthinkable—not only because (to be cynical) students are consumers, but also because laboratories and other facilities require consistency. An infrastructure links the university, the Dominion pipeline (gas enters the plant through a very small—eight-inch diameter—pipe), the glacial lake, a local stream (water taken in is refined to work without jamming up the boilers), the electrical utility, and buildings on the campus.[7] At the plant site one can still find residual and disconnected ruins: a coal chute, a coal conveyor, brick smokestacks. There has been some discussion of moving these artifacts to a nearby museum. Interestingly, this entire circuit is autonomous from the (relatively poor) town of Ithaca itself.

Initiatives such as New York State's Reforming the Energy Vision (REV) are attempting to reform through regulation, to make grids smarter.[8] In the old model (see figure 1), a central plant (presumably coal, although we see no inputs or infrastructures that convey fuel to the site) sends electricity to a home, a commercial building, and two factories (with towers belching steam).

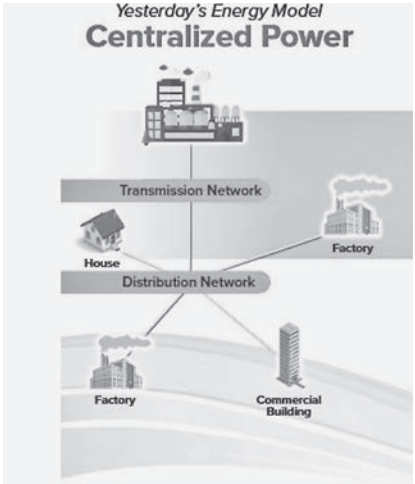

Figure 1. Yesterday's energy model

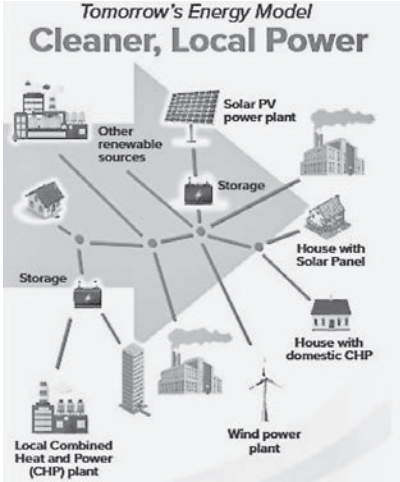

Figure 2. Tomorrow's energy model

The reformed, future model (figure 2) consists of spokes connecting producers with storage facilities and with various users (including the iconic image of the factory), some of which are themselves producers. From a formal point of view we might be tempted to describe this pattern as rhizomatic, but we should also be very careful in assigning to it the kind of truly deterritorializing power that might be associated with Deleuze and Guattari's complex thought around the term.

Tomorrow's model claims to be "cleaner" than the older one. Nevertheless, it could be argued that the reformed model, however much it opens itself to localized differences, is predicated on an assumption of a constant flow. Never mind that there are virtually no factories left in Central New York. Whatever else this model demonstrates, it is precisely not about labor. Bodies are elided in favor of embedded structures and buildings. End users in this model continue to consume and live without disruption, as far as we can see. Even when users "sell back" energy to the grid on a day when their apparatuses are functioning well, they are enabling the structure to function even better. When a time comes that "people are being paid to use energy" from the grid, capital will find other channels to flow into.

Society Is a Factory (on the Grid)

The work of the Italian *autonomisti* develops from a different atmosphere to be sure. The Fordist factory stood as the major opposition for the workers,

and that model is no longer dominant in the West, supplanted by immaterial labor, the proletariat supplanted by the cognitariat, and so on. If the twentieth-century factory, ideally, functioned as smooth flow, a key strategy of various revolutionary actors was to interrupt it, not necessarily by relying on the general strike (a syndicalist tactic) but by rendering flow intermittent. Because the factory owners could more easily intervene at the level of the chronometer (speed of production) and could manipulate paychecks by adding or subtracting piecework (*cottimo*, in Italian) more easily than they could influence salaries or the length of the working day, workers could speed up or slow down, occupy the factory rather than punching out at the end of the workday, caress, break, or fit their bodies to the machines in perverse ways. Workers at Fiat Mirafiori in Turin—a key site of *autonomia*—formed human serpentine chains, disrupted assembly lines by tying themselves to conveyor belts, played card games during work hours, and marched from one building to another, banging on metal, reproducing the noise of the factory. Reverse strikes—productivity in spite of or outside of that demanded by the institutional powers—also disrupted predetermined rates of production. In analogy with the grid, such actions could mean overproductivity, surges.

A certain creativity develops around not just production but also consumption. During the 1960s and early 1970s workers at the Italian electric utility, ENEL, advised their comrades to send in their bills, paying only the (subsidized) per kilowatt-hour price paid by corporations (lower than the domestic usage rate) but not the taxes (which were essentially a supplement paid to the company). Or in the case of the telephone company, workers wanted to pay what they could afford, realizing that they could survive without their phones, but the bosses could not. The "rent strike" followed a similar logic: because they believed that the industrialists in Turin controlled the (apparently "free") real estate market, workers in Turin sometimes withheld rent or protested that they should determine the cost of housing as a means of exercising their power. Rent, they felt, should also be no more than 10 percent of their salary. Autoreduction drifted to public transport, but also to entertainment with demands for free cinema and concerts. "Creative" forms of payment gesture toward authentically new ways of thinking about wages, value, and time that are the potent legacy of Autonomia.[9]

The credits are still rolling in Elio Petri's *The Working Class Goes to Heaven* (1971) as martial music composed by Ennio Morricone is replaced by the ticking of (multiple, analogue) alarm clocks, followed by the opening shot of

Lulù (Gian Maria Volonté), who is jolted awake. Lulù hears the erotic moans of his girlfriend, unsatisfied because Lulù is always too tired.[10]

Then a cut. Time has passed, and an alarm sounds. Another cut and we are at the factory gates. Montage allows the director to alter the flow of time, rendering film itself an important medium for experiencing and theorizing the intermittent. Students hand out flyers, explaining to the workers that they are exploited, entering a dark prison (illuminated by electricity). Petri goes to the factory floor (he filmed in an actual occupied space, using workers as extras) to stage a number of different conflicts.[11] So while this film is in no way sanctioned by branches of the movement(s), it can be read as a kind of documentary laying out different demands. At least that is what Petri sets up, but then various images, flows, and techniques of cinema interrupt what could simply be a taxonomic project.

The work that Lulù does in the beginning of the film—cutting off pieces of metal tubing, coordinating between his foot on a pedal and his hand on a lever—could be done by monkeys, he notes. Lulù himself is productive precisely because he assimilates his body to the machine. It is only the students and party members outside who label Lulù as a victim of inhumane rhythms.

In any case, at the film's beginning some workers see their primary struggle as that between the wages (the lowest per-hour rate possible in the labor market) and *cottimo* (the number of items produced or moved during a set time). This struggle might be worked out through the workers' assemblies and unions. Some want a full strike until they have achieved "less work for more pay," while others feel that "reasoned" strikes lasting two hours will help them achieve better working conditions. Some workers want to destroy the factory and with this revolutionize the time of the working class, and still others have lost their minds and no longer work at all. These are familiar positions.

Lulù cannot stop working (a filmic trope that finds its origin in Charlie Chaplin's *Modern Times*). He is tied to the machine of superproductivity, but it ends up blowing apart because he is no Alexey Stakhanov.[12] He shows a new worker how to save time by seizing a metal piece while the apparatus is still in motion rather than waiting for it to stop. Time saved is money earned, until Lulù loses a finger (the sexual metaphor is on the surface, not deeply buried). Lacking a digit, he can still return to the factory, where he is subjected to absurd psychological testing that Petri parodies with great fervor. Back at his machine, Lulù's "strategy," if that's the right word, is this: Since factory labor is our life, why not work all the time, even Sundays? And while

we're at it, why not bring in children and women as well? In a sense, this is the most logical proposal of all made by the workers.

After being fired for protesting with the students and destroying property, Lulù is once again rehired thanks to the compromises negotiated with management by the factory assembly. Order is restored. This time, however, there is no extra pay for piecework and no chance for "self-determination" on the shop floor. The agitators have now been assigned to the classic assembly line (the place of the least amount of skill). Here they are arranged in a line, side by side, no longer specialized but bound to a collective tempo (as opposed to working at their own stations and thus able to work more slowly by choice). It seems clear that this "demotion" to an ever more alienating situation is a punishment for agitation, and the pessimistic link between the factory and the asylum suggests that the workers are now "dead" (e.g., in heaven . . . or hell).[13]

I linger on this film, again, not because it is a manifesto for the movement, but precisely because it offers an energetic vision into the last days of the Fordist factory. This vision, however, is far from transparent or linear. *The Working Class* posits the rhythm of factory work as a possible subject for a film (i.e., potentially, a merely formalist and experimental one) but then undoes this through the deliberate use of montage and shot selection and through aleatory effects. In other words, as a film it first promises smooth flow and then undoes that flow. Significantly, *The Working Class* reveals the inherent weakness of the liberal critique of the inhumane speed of factory work—a discourse espoused by the students. Nor can we justifiably take away a critique of machines as either displacing humans or dehumanizing humans. The machines and humans are linked in an affective knot, as we learn from the paternalistic recording that greets the workers each morning: "Workers! Treat the machine that has been entrusted to you with love!"

Later, Petri makes what we might call a Foucauldian analogy between the insane asylum and the factory, but then he complicates any facile conflation of the two spaces because in the former—where no work, only "time served," actually is done—piecework prevails (the ex-militant worker obsessively keeps track of his products in a notebook). Finally, the workers are much more unified than under the various regimes of resistance, precisely in the uniformity of their movements, their mutual inability to hear each other, the lines they form, just like the little children marching out of the school, as Lulù notes. Petri gives us a glimpse into a space of generalized production (even the workers don't know what they are making). That this factory is "electrified," that is, it runs on (fossil) fuels, is apparently of no

importance to what goes on inside. And yet we are now compelled to acknowledge this in a way that would not have been the case for viewers at the time of the film's release.

Disruptions

Autonomist practice and theory, rather than leading to a conscious and "ethical" choice to (pay to) go off the grid, might embrace differential temporal and economic modes that are not easily assimilable to the repetitious and exhausting labor of factory work, or to the regular work hours of the office, or the odd hours of the temp, or to the hyperenergized flows of international capital, or to some fantasy combining any of the above. Rather, the notion of refusal to work might lead to an embrace of bursts of energy followed by periods of powering down, surges followed by smooth and invisible flows of power, disruptions followed by uniform and homogeneous moments.

Speculating with *autonomia* could lead us to imagine different kinds of grids, neither purely anticonsumerist nor no-growth. The Fordist factory evolves from or is fatally imbricated with fossil fuels. In this sense, the factory is the "cause" both of a paradigm of labor that has been burst apart by factors normally subsumed under the rubric of neoliberalism and of a series of phenomena of the physical world including greenhouse gas emissions—invisible, undetectable by human sense—whose concentrations have been vastly accelerated according to a graphed curve (Keeling). Whichever beginning point or golden spike for the Anthropocene we embrace, or even if we reject the term altogether, there is no doubt that the mass-producing factory stands squarely in the narrative.

Could it be that in this period of tipping points, thresholds, crisis, and transition, the images and lessons of the *autonomisti* have become more crucial than ever because the planet can't afford to wait for reforms (or collapses) in the big carbon institutions? We can certainly learn from the subversive actions of small groups of workers. If the point of pressure toward greenhouse gas reduction needs to be on the major economies where the grid is—for now—uninterrupted, we cannot hold out that either the developing world has a right to enjoy this same level of consistency or it does not. Rather, that mitigation and adaptation might be terms not dictated as policy from on high but defined piecemeal by small collectives is at least a potential source of hope. Scheer believed that "proliferating decentralized small-scale action is our revolutionary path forward. Urban spaces and municipal politics—blending as they do relatively small spaces with relatively dense humanity—will thus

become especially critical zones of experiment, engagement and transformation" (quoted in Boyer, forthcoming). However, I think it is essential to distinguish between collective experiments and small-scale replications of the grid. Multiple microgrids are not necessarily cleaner than one macrogrid, just as nothing guarantees that alternative forms of production (such as maker culture) will not proliferate into multiple mini-factories contributing to accelerated greenhouse gas emissions (Pasquinelli 2014: 71).

If the Fordist/Taylorist factory that was the laboratory space in 1960s and 1970s Italy is no longer central to the dominant paradigm of production, that does not mean we cannot invoke it more broadly to signal any space where individuals meet as producers (of the product they make or of another), a space where the inhuman rhythms and tensions between piecework and time lead to forms of excess or destruction that could be exploited for various ends.

Returning to Bataille, then, a community might form, not in opposition (i.e., not as labor against capital) but as a sacred and heterogeneous set of rituals. These rituals might involve repetition, as does (or did) factory labor. Kent Brintnall (2015: 8) writes, thinking with Bataille:

> There is a movement of energy on the surface of the planet and there are also discrete points across which that energy moves. We desperately try to tame and manipulate these flows of energy for our own goals, aims and projects. We try to tap into the pulsive force of this energy so that our labor can be more efficient, our work can be more productive. But because this energy is vaster than us, because it always precedes us, because we have had to carve our very selves out of this massive, overwhelming flux, when we are reminded of its presence and its power, it is quite often a source of great anxiety and horror—and we tend to react badly. Even though, as Freud notes with respect to the mystery of sexuality, and Bataille notes with respect to the sacred, we are sometimes drawn to increase forms of stimulation that seek to overwhelm us.

Since the grid is not a "place" like a factory, it cannot genuinely be occupied with the tactics of the Italian workers. Indeed, it is easier to stage a traditional protest against a pipeline or even oil drilling (think of the kayaktivists hanging from a bridge in Portland, Oregon, or occupying a river) than against "electricity." "Delivered through decentralized electrical grids, electrical power is arguably even more difficult to disrupt than oil's liquid gush. The multiplicity of potential circuits, the sheer number of ways that current can be rapidly rerouted, and the near-instantaneous speed with which it travels make it hard to effectively contain" (Bellamy and Thomas 2015: 6). If an intermittent grid only translates for us as sacrifice or loss, this is because, for

now and for us, the grid generally works. But what if in the near-term future the Western grid starts to crumble, for instance, because of "external forces"—those massive and "natural" disruptions that the scientists are loathe to attribute specifically to climate change, but whose increased frequency they do acknowledge? It is likely that we will continue to shore up resistance to what we perceive as a threat from the outside. We insulate, privatize, build walls and dams all in the name of common sense and efficiency, as the "basis of a rational economy" (Bataille 1991: 22). We hear a lot of talk about decarbonizing the grid but never about degridding power. It's a process. Sure, yes, but time is up. So now what?

Autonomia—defined by Berardi as a kind of therapy without end—might open to us another way of being in relation to power: not based on freedom to choose (recall the promise of the REV initiative that "these changes, in turn, will empower customers by allowing them more choice in how they manage and consume electric energy"), not only a renunciation or withdrawal from its use (the "dark sky" movement seems to reify energy privilege, for instance), but a movement toward power—perhaps disruptive, violent, effervescent (Bataille), generous, or altruistic—not dictated by the assumption that intermittency equals death.

Notes

1 Residents of South Africa refer to load-shedding blackouts as "like death." See Onishi 2015.

2 My speculative dictionary, *Fuel* (Pinkus 2016), treats the question of the input and works to undo the fantasy of accessing power/energy without having to think about fuel.

3 While there exist multiple histories of the period, in my current work I focus on cinema, to see where certain cracks or contradictions or flashes of images might point us to different narratives than those offered by standard accounts of the social laboratory/factory that was Italy in the 1960s and 1970s. For a similar approach, see Williams 2016.

4 Although one apparent cause of the East Coast blackout of 2003 was a large brushfire (expected to be more common in a time of prolonged drought), there were others, including a lack of "reactive power," tied to market conditions. So, to cite Bennett (2010: 28), the grid broke down in various ways in 2003 "from a quirky electron flow and a spontaneous fire to members of Congress who have a neoliberal faith in market regulation."

5 Electricity is still—worldwide—produced primarily by burning coal (although the percentage is down in the United States due to the increase in natural gas production). In 2015, electricity accounted for 37 percent of the United States' energy-related emissions (Schlossberg 2016; US Environmental Protection Agency 2016).

6 Recent disturbances in Venezuela are blamed on the country's mono-energy culture (extreme drought is responsible for an "electricity crisis," precisely because the grid is hydro-powered—for reasons that are not immediately "environmental"). If only they

had diversified their energy portfolio like a good investment portfolio, they would be more like "us" and enjoy a grid shored up against singular vulnerabilities, as a short piece in the *New Yorker* implies (Bakke 2016).

7 Dominion Transport, with headquarters in West Virginia, is one of the largest natural gas pipelines in the United States.

8 According to its website, the REV (2016) initiative "will also promote markets to achieve greater use of advanced energy management products to enhance demand elasticity and efficiencies. These changes, in turn, will empower customers by allowing them more choice in how they manage and consume electric energy." As I have suggested, the last two words together add up to a strange mystification that could distract us from pressing issues such as greenhouse gas emissions or inequality.

9 For more on autoreduction, see Comitati Autonomi Operai 1976; Laganà, Pianta, and Segre 1982; and Smith 2010.

10 Indeed, sectors of the Left in Italy were very critical of *The Working Class*, but I maintain that it is crucial for thinking about factory labor during this period because of a kind of visual access it gives us, as well as the various ways narratives are posited and then withdrawn, set up, and dismantled.

11 Petri and his producers consulted with the Federazione Impiegati Operai Metallurgici, or FIOM (the leftist metalworkers union), which suggested the occupied Falconi elevator factory in the city of Novara, near Turin and Milan. Workers from that factory and other locals played extras in the film. Today the company has moved operations to Switzerland, and in place of the structure we see in the film is a yoga and beauty center.

12 In 1935 Stakhanov, a Soviet coal miner, became a celebrity when he set a record for mining fourteen times his quota in a single shift.

13 The forced interconnectedness of the human body and the machine is, I think, the one false note in the film. We don't need Lulù's monologue on the analogy at the start of the film. We know that the body is a factory to metabolize food / living labor and produce shit. And we don't need to hear about the connection between the erection and Lulù's missing finger. More interesting are the aleatory moments when the machines break down or when, through editing, Petri interrupts what might otherwise be smooth analogous flows or familiar narratives of the working day.

References

Anusas, Mike, and Tim Ingold. 2015. "The Charge against Electricity." *Cultural Anthropology* 30, no. 4: 540–54. doi:10.14506/ca30.4.03.

Aureli, Pier Vittorio. 2008. *The Project of Autonomy: Politics and Architecture within and against Capitalism*. New York: Buell Center / Princeton Architectural Press.

Bakke, Gretchen. 2016. "The Electricity Crisis in Venezuela: A Cautionary Tale." *New Yorker*, May 17. www.newyorker.com/tech/elements/the-electricity-crisis-in-venezuela-a-cautionary-tale.

Bataille, Georges. 1991. *The Accursed Share*. Translated by Robert Hurley. New York: Zone Books.

Bellamy, Brent Ryan, and David Thomas. 2015. "The Green Struggle." *Jacobin*, October 27. www.jacobinmag.com/2015/10/fossil-fuels-renewables-capitalism.

Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Durham, NC: Duke University Press.

Boyer, Dominic. Forthcoming. "Revolutionary Infrastructure." In *Infrastructures and Social Complexity*, edited by Penelope Harvey, Casper Bruun Jensen, and Atsuro Morita. New York: Routledge.

Brintnall, Kent. 2015. "Movement Politics: Acephalic, Apocalyptic, Apophatic." Paper presented at the annual meeting of the American Comparative Literature Association, Seattle, March 26–29.

Comitati Autonomi Operai. 1976. *Autonomia operaia*. Rome: Savelli.

Everett, Burgess. 2015. "Cruz's Iran Doomsday: 'Murder' of Millions of Israelis, Americans." *Politico*, July 21. www.politico.com/story/2015/07/ted-cruz-iran-deal-doomsday-120415.

Hughes, Thomas. 1983. *Networks of Power: Electrification in Western Society*. Baltimore: Johns Hopkins University Press.

Laganà, Guido, Mario Pianta, and Anna Segre. 1982. "Urban Social Movements and Urban Restructuring in Turin, 1969–1976." *International Journal of Urban and Regional Research* 6: 223–45.

Onishi, Norimitsu. 2015. "Weak Power Grids in Africa Stunt Economies and Fire Up Tempers." *New York Times*, July 2. www.nytimes.com/2015/07/03/world/africa/weak-power-grids-in-africa-stunt-economies-and-fire-up-tempers.html.

Pasquinelli, Matteo, ed. 2014. *Gli algoritmi del capitale* (*The Algorithms of Capital*). Verona: Ombre Corte.

Pinkus, Karen. 2016. *Fuel: A Speculative Dictionary*. Minneapolis: University of Minnesota Press.

REV (Reforming the Energy Vision). 2016. "About the Initiative." New York Department of Public Service. www3.dps.ny.gov/W/PSCWeb.nsf/All/CC4F2EFA3A23551585257DEA007DCFE2?OpenDocument (accessed October 2, 2016).

Schlossberg, Tatiana. 2016. "Just How Much Power Do Your Electronics Use When They Are 'Off'?" *New York Times*, May 7. www.nytimes.com/2016/05/08/science/just-how-much-power-do-your-electronics-use-when-they-are-off.html.

Smith, Jason. 2010. "The Politics of Incivility: Autonomia and Tiqqun." Special issue on Franco-Italian Political Thought. *Minnesota Review* 75: 119–32.

Stoekl, Allan. 2007. *Bataille's Peak: Energy, Religion, and Postsustainability*. Minneapolis: University of Minnesota Press.

UNFCCC (United Nations Framework Convention on Climate Change). 2015. "Adoption of the Paris Agreement." FCCC/CP/2015/L.9/Rev.1. December 12. unfccc.int/resource/docs/2015/cop21/eng/l09.pdf.

US Environmental Protection Agency. 2016. www3.epa.gov/. Energy Information Administration. https://www.eia.gov/tools/faqs/faq.cfm?id=77&t=3 (accessed October 2, 2016).

Williams, Evan Calder. 2016. "Seven Gestures of Revolt." Europa, Futuro Anterior. http://europafuturoanterior.com/en/interventions/.

The Working Class Goes to Heaven (*La classe operaia va in paradiso*). 1971. Directed by Elio Petri. Euro International Film. Rome, Italy.

Marco Armiero and Massimo De Angelis

Anthropocene: Victims, Narrators, and Revolutionaries

The Return of Grand Narratives and Their Ghosts

The grand narratives are back. After a long emphasis on multiple and partial stories, global metanarratives are again gaining ground.[1] Nonetheless, it is not historians but scientists who have created the most powerful historical narrative of the previous decades. This narrative does not speak anymore of structural injustices, economic progress, or inevitable revolutions. In fact, it relies not at all on ideologies but on the brute facts of science—or at least this is how the story goes. The Anthropocene is literally based on geological strata accumulating the traces of humans in the texture of the planet (Crutzen and Stoermer 2000). But the Anthropocene is also a historical tale that goes far beyond the specific issues studied by geologists. Planetary boundaries are not inscribed into the soil; nevertheless, they delimit the contours of the Anthropocene, setting the possibilities for survival of humans on earth (Rockström et al. 2009; Steffen et al. 2015a, 2015b). While the geological strata will tell us whether—or even when—the Anthropocene began, planetary boundaries instead reveal whether—or even when—the Anthropocene will end, crashing

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against the biophysical limits of the planet. As Ben Dibley (2012) has argued, the geologic Anthropocene and planetary boundaries are part of the same global narrative; in both cases scientists have taken the lead in proposing an all-inclusive explanation of the present crisis and even of its possible outcomes.

The Anthropocene is a grand narrative because it proposes universal truths, or laws, and considers universal agents, working rather poorly with the nuisances of the specific, which is, instead, the daily bread of social scientists and humanities scholars. There is no room for differences in the geological strata or in planetary boundaries. The Anthropocene is the age of one planet and all humans as a whole; never has the "We" been more powerful in a historical narrative than now (Chakrabarty 2009).

Critical scholars have argued that such universalism erases hierarchies, power relations, and historical inequalities. Rightly, Jason W. Moore (2014) has proposed calling the new age the Capitalocene, remarking that capitalism, not a biological and indefinite human species, has actually shaped the planet. For example, according to a recent study by Oxfam (2015), the richest 10 percent of people in the world are responsible for 50 percent of lifestyle emissions. Also, it is through capitalist development—measured in gross domestic product growth—that greenhouse gases have accumulated in the atmosphere, fish stocks have been depleted, biodiversity halved, and so on, one horrifying statistic after another. Capital as a social force appropriates nature for its own use, not the anthropos. All the same, the repressive, military, financial, and ideological/marketing apparatuses through which global capitalism orients social forces continue to disregard the many barriers necessary to maintain the earth's delicate Holocene equilibrium. Meanwhile, other social forces orient themselves to do just the opposite, to heal, to value outside the criteria of capital, to struggle to stay within ecological limits, to create new ways to socially cooperate within those limits, to establish resilient livelihoods providing commons that are also ecologically sustainable.

Thus the question comes naturally, once we rescale the notion of social conflict and put it at the heart of our contemporary moment: If capitalism as a system is the agent of the Anthropocene, what revolutionary subject can overthrow it (Barca 2016)? The mainstream idea seems to suggest that scientists can be the revolutionary subject in the Anthropocene. Since the contradictions of this new era are not as apparent as those of capitalism, one needs special skills or even tools to recognize its challenges. But the recipes of the scientists are turned into energy-efficient new technologies that, used in a regime of capitalist growth, cannot reverse the wheel of the Anthropocene.

Efficiency is, after all, only a ratio (Piercen 2005), the reduction of which does not bring about absolute cuts of carbon dioxide (CO_2) gases or agents of ocean acidification. Capital's systemic *conatus*[2] of self-preservation is accumulation, which translates into endless striving for economic growth. Thus far, decoupling growth from emissions has been only a dream.

The absence of reflection on revolutionary practices and subjects is the main weakness of the radical critique of the Anthropocene. The risk is to envision the Anthropocene as a space for villains and victims but not for revolutionaries. Several scholars have uncovered the depoliticizing effect of the Anthropocene (see, e.g., Swyngedouw 2011, 2013; Houston 2013); nonetheless, revealing the unequal distribution of responsibilities in the making of the current ecological crisis does not automatically imply a quest for revolutionary alternatives embedded in practices of subjectification, commoning, and sabotage. In this respect, we believe that it is crucial to challenge the (in)visibility and (un)knowability of the Anthropocene beyond geological strata and planetary boundaries. We argue that, as the Capitalocene, the Anthropocene has left its traces in the bodies of people upon which the new epoch has been created. The traces of the Capitalocene are not only in geological strata but also in the biological and genetic strata of human bodies (Alaimo 2010); exploitation, subordination, and inequalities are inscribed into the human body and experienced, visible and knowable, by subalterns without the mediation of—many times actually in opposition to—mainstream scientific knowledge. The Capitalocene also forces the bodily boundaries of the subaltern toward thresholds, the crossing of which will radically change their lives, if not place in question their very survival. Placing the bodily experience of subalterns at the center of our analysis does not question the existence of a global threat for the planet, but instead aims to individuate the revolutionary practices and unearth the alternative processes of knowledge production that not only question the capitalistic system rather than try to fix it but also defend or build alternatives.

To enhance our arguments, we rely on a few empirical cases of contamination and resistance. More specifically, we build on the findings of the global Environmental Justice Organisations, Liabilities and Trade (EJOLT) atlas of environmental conflicts and on our own research on struggles against toxic contamination in Campania, Italy. Looking at the Anthropocene from place-based struggles over contamination illuminates the stratification, or the embodying, of the Anthropocene's violence in the organosphere[3]—what we call the Wasteocene—and how this may create revolutionary subjects through the experience of resistance and commoning. Against the abstract "we" of

the Anthropocene and its governmentalization of the self, a revolutionary project encompasses the making of collective identities out of struggles, building on the embodied experience of capitalist violence. We inflect the concept of Capitalocene with our own concept of Wasteocene, which stresses the contaminating nature of capitalism and its perdurance within the sociobiological fabric, its accumulation of externalities inside both the human and the earth's body. We envision the Wasteocene as a feature of the Capitalocene, especially adapted to demystify the mainstream narratives of the Anthropocene. As we illustrate below, while clearly imposing the violence of capitalism on humans and nonhumans, the Wasteocene as the Anthropocene can easily deliver the "we" message, thereby blaming all, fostering technological fixes, and relying on the experts for diagnosis and solutions. However, a revolutionary subject cannot be created simply by naming. While using *Capitalocene* or *Wasteocene* may reveal actual injustices inscribed in the Anthropocene, these terms on their own do not transform victims and affected individuals into revolutionary subjects. As we illustrate through our second example, the constitution of revolutionary subjects occurs in the making and experience of the Wasteocene, in an antagonistic relationship with the forces that create it.

Resisting the Anthropocene: Evidence from the EJOLT Atlas

In short, neither a species nor a gas but a particular mode of production has affected different realms of ecological systems to a degree of starting a new geological era (Malm and Hornborg 2014). This is correct, only to the extent that we understand *capital* as the class relations of struggle (Cleaver 1979) plus something else, an outside that is constituted in this struggle (De Angelis 2007). In this sense, the *anthropos* in the Anthropocene is actually a misplaced subject. To the extent that we are talking about the Capitalocene, we need to replace the universalistic "we" of the human species—the "We" of the Anthropocene—with a different "we," one that is constituted through two interrelated moments of the same subjectivity, two different modulations. The first is the "we" of the working class that struggles to overcome its own condition as disciplined waged and unwaged workers and also strives to overcome deep divisions in power and access to wealth within the planetary working class broadly defined: essentially, an anti-neoliberal stance. The second is a corresponding "we" made of a multitude of subjects whose practices are outside the value practices of capital, often in the shape of commons systems (Hardt and Negri 2000, 2005; De Angelis 2017). We have thus social movements and commons, struggling subjects and commoners.

The Capitalocene thus is constituted not only by capitalists and disciplined workers but also by other value worlds and practices that create alternatives to it. Take, for example, the superb ecological justice atlas project produced by the EJOLT (2015) team. Here are described only a small fraction of contested sites of environmental struggles in the world, in which, on one side, are the forces of capital and, on the other, is localized opposition to it, often associated with a different way for people to relate to nature and to one another. The variety of cases included in the EJOLT atlas is extraordinary: 436 land acquisition conflicts, 308 cases of mineral ore exploration, 280 struggles over water access rights and entitlements, 208 cases of deforestation, and 141 cases regarding waste facilities, just to mention the largest categories. While illustrating what environmental injustice is, each of these cases in turn makes visible some of the victims/revolutionaries (depending on what moment of the cycle of struggle is selected) and some of the villains.

Take, for example, carbon offsetting, the "strategy" sanctioned by the Kyoto Protocol as a way for governments and private companies to earn carbon credits to be exchanged on dedicated markets as part and parcel of the "financialization of nature" (Bond 2015). This is not the place to review the absurdity of using the logic of market metrics to deal with the greatest of all environmental issues, climate change, or the speculative enrichment of the few in a fluctuating "carbon price," within a mechanism criticized even by Pope Francis (2015).[4] For our purpose, carbon offsetting implies the clashing between two types of "anthropos," two types of human social and value practices: on the one hand, those who are willing to substitute existing local forests with eucalyptus plantations to gain the right to sell carbon credits on the market to heavy polluters elsewhere in the world and, on the other, the displaced communities that would have taken care of those forests for their own livelihoods. The discourse of the Anthropocene hides this huge cleavage within humanity, this endless struggle between the logic of the reproduction of commoners and the profiting of capitalists. Just as the term *capitalists* corresponds to the subject position of those who control and direct capitalist processes, *commoners* designates social subjects who collectively control, direct, and engage in the reproduction of commons and for which the relation to capital may be often necessary but does not exhaust their social being and activity (see De Angelis 2017).

In Bukaleba, Uganda, for instance, one type of *anthropos*, instituted as the Norwegian company Green Resources, acquired in 1996 a fifty-year license to 9,165 hectares of land from the government in the Bukaleba Central Forest Reserve. Green Resources also has plantations in Tanzania and Mozambique, and it is the largest plantation in Africa outside the Republic of

South Africa. The project in Bukaleba has produced approximately one hundred thousand tons of CO_2 equivalent in offsets. More is expected due to the establishment of a new charcoal plant. The economic value of that project depends on the price of carbon, which is today relatively low, at around €8 a ton in the European market. Let us say that €1 million is the price for the violent displacement of thirteen communities that have lost their rights to use the forest commons, the abuses of remaining community members arrested for trespassing in what is now a no-grazing zone, the environmental degradation of rivers and lakes due to the plantation's use of agrochemicals, and also the damage being done to biodiversity by clearing indigenous trees to make space for nonnative pine and eucalyptus trees. Biodiversity is a key indicator of the Anthropocene, and in this case it is obviously reduced not because the local *anthropos* wanted it to be so. Carbon offsetting operations like these do not necessarily reduce carbon, since they have replaced local species of trees, and there are great doubts that carbon credit mechanisms will result in lower CO_2 emissions.[5] Clearly, the victims here are also agents; violence used on resisting subjects is always the means to reduce subjects to victims.

The case of the state of Orissa in eastern India reveals the same kind of clash of interests and values. Here the Indian company J R Power Gen Private Limited signed a memorandum of understanding with the Orissa government to develop a power plant at Kishore Nagar and build a 1,980 megawatt thermal plant. In 2009 the state government issued notes for the acquisition of the land, highly fertile ground for rice paddies and other crops. Clearly, clashing value practices are evident in this case, with the company wanting to profit and the locals wanting to reproduce their livelihoods and protect the local environment (a means for their own livelihood reproduction). A movement of local farmers and communities has developed, occupying railroads and stopping trains, demanding that the project be scrapped and that the government instead keep its promises for a local irrigation project (Samal 2012).

In the network of conflicts represented in the EJOLT atlas, one finds in each of them not "humans" but *anthropos* socially constituted along opposing positionalities and giving rise to different social forces pursuing conflicting goals, moved by clashing values. Clearly, there are always ambiguities in struggles; activists can be co-opted, commoners can receive compensation and leave (paying later the price for squalid forms of urbanizations that never matched what was promised), but the point remains: *to the extent that the Anthropocene is the Capitalocene, the anthropos is constituted through struggle.*

It goes without saying that there are counterexamples; in many instances alternative ways of doing and valuing are co-opted within capital's initiatives. One example is the development of Aboriginal-controlled carbon markets in Australia. In other cases, the livelihoods of the poor are pitted against conservation agendas, such that what used to be a common forest is now a state- or private-managed site, with corresponding prohibitions on local (often) indigenous groups grazing, hunting, fishing, and gathering food, wood, and fodder, thus leaving them destitute. These and many other cases would seem to show that we should abandon old political categories assuming binary contestants. The world is more complex; there are multitudes after all, not masses of revolutionary subjects. And, we would add, fortunately so, because complexity, and its varieties of measure, is the stuff of commons and their resilience, if mechanisms of self-regulation of this complexity are to be found. Sometimes capital co-opts the specific variety of particular commons. For example, the Fish River carbon credit is one of the projects in Australia to valorize Aboriginals and their knowledge of low carbon bush burning, in view of producing carbon credits that are then sold and reinvested in indigenous jobs and maintenance of the land. The Fish River Fire Project (2015) has managed to reduce the area burned in the late dry season from about 36 percent in the period between 2000 and 2009 to approximately 1 percent in 2012. Greenhouse gases are reduced, indigenous knowledge is put to work, and good jobs are created for indigenous people.

Carbon credits and cap-and-trade mechanisms are anathema to many environmentalist movements, not only because they are rife with corruption, but also because they cannot achieve the needed drastic reduction of greenhouse emissions. On average, we think this is true. But it is also clear that if a way for the commons exists to tap into this clearly capitalist mechanism, the alternative being destitution, then so be it: people need to eat, hence interaction between the commons and the capitalist system is necessary until local commons find alternative ways to integrate among themselves. Thus, in a complex world, there exist both value binaries and accommodation, that is, a temporary suspension of those binaries in order for each system to use the complexity of the other, or, in Niklas Luhmann's (1995) terms, *structural coupling*. In the Australian case, an absolutely ineffective global system for reducing greenhouse cases—the carbon market—uses the complexity of Aboriginal knowledge to gain legitimacy and expand into new, more "corporate responsible" areas. Nonetheless, indigenous knowledge is preserved and used, indigenous people and their communities access income, and—in this case—carbon is potentially sequestered, since every

year bush fires are controlled through indigenous techniques that have proved successful for this task. Binaries can exist within complex systems, as long as we understand that complexity is also made of structural coupling among otherwise opposed systems and temporary accommodations, or *deals*. But the fate of the deal, its own resilience, depends in this case on the destiny of a mechanism being heavily contested, in which what is clearly at stake is a binary that is in tension, and also on the site of struggle. But we should ask ourselves the question: What will become of these examples of good practices if the sham of carbon markets were to collapse under the weight of its own ineffectiveness?

Out of the Wasteocene

While the EJOLT atlas is a crucial tool to visualize the spatial dimensions of the Anthropocene, to project it almost literally onto the land, one might ask what the Anthropocene would look like if we were to focus our attention on the body. Strata of toxins have sedimented into the human body, to the point of being inscribed into the genetic memory of humans, according to the most recent studies in epigenetics (Guthman and Mansfield 2013). Exploring the Anthropocene through the human body might offer more insights about social inequalities than the geological obsession with the precise starting point of the new era can. It also may allow us to better understand how revolutionary subjects are *produced*, something a case study is better set up to do. As we demonstrate, the embodiment of inequalities in the human body produces not only victims but also rebellious subjects who do not comply with the neoliberal narrative of the Anthropocene.

Nobody speaks of the Anthropocene in the "Land of Fires," the area in the Neapolitan hinterland where illegal dumping of toxic waste is affecting the lives of thousands of people.[6] Evidently, people living and dying there use other words and have other worries. It is not that they are unaware victims; rather, decades of mobilization have created expert communities (D'Alisa et al. 2010) well informed on the complex matter of body/environment relationships (Armiero 2014). It was thanks to the work of grassroots activists that the attention of public opinion and the authorities shifted from the trash in the Neapolitan streets to the invisible threat of toxic waste, affecting mainly the subaltern communities living at the fringe of the metropolis (D'Alisa and Armiero 2013).

Looking at what has been called the Anthropocene from the Land of Fires or other underclass neighborhoods overlooking more or less legal

dumps might be an interesting experiment. From several points of view, waste can be considered the essence of the Anthropocene; both symbolically and materially, it embodies humans' ability to affect the environment to the point of transforming it into a gigantic dump. Archeologists know very well that a dumpsite is the mirror of a society; cultures—and their relationships with the environment—are inscribed into the strata of garbage (Rathje and Murphy 2001). Precisely as in the Anthropocene discourse, as also with waste, history is mixed with the earth in a material sense, becoming legible through the stratification upon which our world is built. Waste also represents the ironic conundrum of humans' relationships with the environment: the wealthier the society becomes, the more waste it produces, jeopardizing its very existence. That garbage is a luxury for rich societies has been said many times. This does not mean that the poor do not have waste; rather, it says something about who produces garbage and who gets it. Isn't this the perfect metaphor for the Anthropocene? The metaphor becomes even more effective because waste is the typical trope of an Anthropocene kind of environmentalist discourse. While complaining about waste, everybody concurs in its production, and thereby any protest over waste becomes questionable. With waste, as with the Anthropocene, it is a matter not of antagonist politics but of self-reflexivity or expertise. In short, what is needed is the governmentalization of both the self and society. "Do you recycle?" The neoliberal project brings back everything to the individual, who is asked to face the consequences of his or her actions and make the changes needed, following the instructions of the experts. We argue that both the Anthropocene discourse and the waste discourse conflate the individual and the society at large—or, using the Anthropocene vocabulary, the species. If people live in this mess—either the local wasteland of the Land of Fires or the global dump of climate change—they should only blame themselves as members of the universal human species or, in the optimistic version, act as a member of the same universal human species to improve the situation.

In the case of the Land of Fires, and more broadly of the Neapolitan waste crisis, the governmentalization project has been effective, imposing a sense of guilt and shame on the affected people. Employing the evergreen rhetoric of southern Italians as uncivilized subjects, the mainstream public discourse has blamed local people for their alleged unwillingness to recycle, their complicity with illegal disposal of toxics, and, in general, their style of life. The uncivilized Neapolitans smoke, drink, and eat too much, while, obviously, they do not exercise at all. Indeed, the Land of Fires is the perfect Anthropocene laboratory; capitalism infiltrates every living and nonliving

thing, imposing its logic over socioecological relationships. Making profit out of contamination—what Federico Demaria and Giacomo D'Alisa (2013) have called accumulation through contamination—capitalism enters into the body of subaltern people in two ways: on the one hand, it occupies cells with cancer and other diseases related to its organization of labor and space; on the other hand, it imposes an ideology of the cure of the self that is based on individual choices, establishing what a healthy lifestyle should be. Precisely as in the optimistic Anthropocene, in this Wasteocene story humans can make the "right" choices and solve the problems they have created if only they listen to the experts and follow their advice; no mention is made of structural injustices or power asymmetries.

In the Wasteocene as in the Anthropocene, instead of speaking of capitalism and injustice, the mainstream narrative focuses on consumerism—"everybody is responsible"—and technology—"experts can fix this." But revolutionary subjects rise neither from guilt nor from a blind trust in the experts. Victimization leads not to a collective sense of agency but more likely to an appeal for justice to some superior authorities. In the waste crisis of Campania all these different feelings and paths have been mobilized. People have felt ashamed to be identified with garbage; they have been victimized, crying for help from the authorities or experts. Nonetheless, that experience has also created resisting communities, recalcitrant to the governmentalizing project.

In an interview, M. (2012), a middle-aged woman who has participated in the struggles against a landfill in her community, stated clearly what was at stake in that mobilization. When we asked her how she became interested in waste, she testily replied: "I am interested not in waste but in commons." Later she explained that opposing the construction of a waste facility was only part of a wider struggle to defend the commons; among those commons she also included public health. For M., fighting against a poorly planned landfill and the cutting of public funds to the health system were two sides of the same battle. Strange as it may seem, the mobilization over waste in Campania has been accompanied by a wider experimentation of commoning; not by chance, a coalition of grassroots groups has chosen as its name Rete Commons (Commons Network). The staple mobilization practice has been the presidio, that is, the permanent public assembly of all citizens who wish to be involved in the decisions regarding their communities (Armiero and Sgueglia 2016). During the years of mobilization—more or less from 2004 to 2009—the presidio was both a practice and a place; it generally started as an extemporary picket in the street to block some construc-

tion project and it evolved toward a more permanent setting. In this sense it embodies a commoning practice, claiming a space and filling it with a new institution, the permanent assembly. In several cases, the presidios became the alter egos of the official sites where decisions have to be made, mainly the municipal councils. In the memories of activists, the presidio was not only a space where the protest was organized; it was also a social space, where a new community was shaped.[7] In underclass neighborhoods squeezed between cheap housing and shopping malls, the presidio was much more than a picket against a landfill. It was literally the experimentation of new collective practices that aimed to stop not only the next waste dump but also the reproduction of the social dump made of isolation, the commodification of free time, and the annihilation of public spaces. In most of the cases, the presidios had rather short lives, like temporary autonomous zones (Bey 1991), even if the research is still to be done on what they have left in the communities and among the people (De Rosa and Caggiano 2015). We argue that the current vitality of the political landscape in Naples is largely connected to that season of commoning. As examples, we should mention here the flourishing of several *centri sociali* (social centers) at the forefront in the struggles to reclaim urban spaces; some of them, such as Insurgencia, are strongly connected to the waste struggles;[8] the experience of Critical Mass, in the construction of a common platform among all kinds of grassroots groups toward the 2016 municipal election; and the city's current government, probably the most leftist among the local administrations in the entire country, and its support of these commoning experiences. On March 9, 2015, the Neapolitan municipal government formalized the existence of what legal scholar and activist Nicola Capone (2015) has defined as an urban common use, granting the right to manage squatter buildings "for the advantage of the local community," following a logic that goes beyond private as well as public property. However, we believe that the most relevant legacy of the presidios is the present practice of citizens' assemblies: during 2016, in almost every district of Naples, citizens have gathered periodically in public assemblies to decide about the future of their communities. Under the slogan "The city decides" and with an explicit Zapatista platform (Insurgencia 2016), a radical leftist coalition has won the 2016 municipal election, forcing the mainstream opinion makers and politicians to talk of a "Neapolitan anomaly."

Although deeply Neapolitan, those grassroots groups have been global in their ambitions, building a wide network of political connections. Since 2014, activists from Insurgencia have traveled to the Syrian city of Kobane, establishing an organic cooperation with Kurdish militants. The revolution

in Rojava (Northern Syria) has become a source of inspiration for the Neapolitan activists thanks to its blend of autonomy, social ecology, and socialism. Other groups have built a significant relationship with the municipal experience of Barcelona, prefiguring a coalition of what they define as the European rebel cities.

In the Wasteocene as in the Anthropocene, the revolutionary subject is not a preconstituted entity, ready to be mobilized when needed. Not even geographical marginality, or being marginal to a national or regional metropolis, is enough to determine the revolutionary subject. Nor is some archetypical local community the depository of the new revolution. As we have illustrated, in the case of the Campania waste struggles it is an embodied experience that has generated a resisting community. Basically, the community does not preexist the mobilization but is produced through commoning, that is, through shared practices and shared narratives.

Our interpretation goes against the naturalization/celebration of community. The arrival of an exploitative corporation does not necessarily produce revolutionary subjects. In the case of Naples, the presence of a diffuse radical counterculture—the *centri sociali*—and the mobilization of a cohort of radical scholars have met with the bodily experience of injustice. In the places where there was nothing to mobilize, the evolution of the waste struggles toward the creation of commons and commoning institutions did not materialize. However, we are not envisioning the usual hegemonic and vanguard relationship between the masses and some sort of organized Marxist groups (*centri sociali* instead of the "glorious party"). In the hodgepodge of the waste crisis, radical activists, citizens, and militant scholars have developed a new vocabulary, creative practices, and hybrid identities, reinventing themselves rather than only guiding the masses.

Whereas the Anthropocene narrative ignores capitalism, choosing instead to speak of human species, in the Wasteocene, speaking of capitalism does not hide its effects on bodies; on the contrary, it is the very place where resisting subjects are made. The traces of the Wasteocene are accumulated into the bodies of subaltern subjects, but they are not only clues, inert strata proving that some global process has affected that inner environment. Acting on and through the body, those traces create both sick people and resisting subjects. The experience of the capitalistic making of the body uncovers the power inequalities inscribed into the Wasteocene; in many cases it can create identities from a shared experience of subalternity and cries for justice (Iengo and Armeiero 2017). The case of Campania reveals also that a revolutionary agenda cannot be delegated to the authority of some impartial scientific knowledge; in fact, the causal connections between toxic

waste and toxic bodies are still controversial in the scientific debate—even if nowadays it is recognized more widely than a decade ago, when activists started to make those claims (Armiero 2014; Cantoni 2016). We neither aim to undermine the need for more scientific research nor support some obscurantist campaign against science. Our point is that science is a battlefield rather than a blueprint ready to be applied to save the day. In the 1970s, Italian urban planner Virginio Bettini (1976) wrote about the opposition between an ecology of power and a class ecology. He was writing in the aftermath of the Seveso disaster (an industrial "accident" near Milan) when, once more in recent Italian history, it became manifest that science was not the land where power disappeared. It is only through struggle that the science of capital can serve the revolutionary needs of subalterns.

Conclusion

Naomi Klein (2014) in her book *This Changes Everything* describes the emergence of what she defines as global Blockadia. Everywhere people are getting organized to resist the expansion of capital in their bodies and communities. At the checkpoints of this global Blockadia, the Anthropocene ceases to be an abstract category and becomes an embodied and socially determined reality; in other words, it stops being the Anthropocene and appears for what it really is: the Capitalocene, many times under the guise of what we have defined here as the Wasteocene. What Blockadia does is to clearly undermine the universalism of the Anthropocene narrative, breaking it up through the fault lines of class, race, and gender. Blockades divide the social field: one cannot be on both sides of a checkpoint at the same time. In disrupting the universalism of the Anthropocene, global Blockadia has also another function, that is, making visible what is hidden in the Anthropocene. According to Henrik Ernstson and Erik Swyngedouw (2015), violence stays invisible in the Anthropocene. As in the Greek classical theater, in the Anthropocene violence cannot be represented on-scene; it is obscene, evoked but invisible to the public. The Anthropocene projects violence into the future, the coming apocalypse, or into the past, the debate on the original sin producing it, but stays largely blind on the ongoing violence (Barca 2014). As the Invisible Committee (2009: 73–74) has stated: "You have to admit: this whole 'catastrophe,' which they so noisily inform us about, it doesn't really touch us. At least not until we are hit by one of its foreseeable consequences. It may concern us, but it doesn't touch us. And that is the real catastrophe."

In this sense, revolution in, against, and beyond the Anthropocene is a struggle not only for visibility on the part of invisible subjects (Holloway

2002: 97) but also for visibility of the processes of exploitation and violence producing the Anthropocene.[9] That revolution also raises the urgency to constitute something new through commoning, which implies building connections among existing and new commons, blending protest, and making new circuits of resilient and sustainable production in commons (P. M. 2014).

In this article we have employed a few cases of local resistance against environmental injustice in order to demystify the mainstream narrative of the Anthropocene. In uncovering the violence inherent to the Anthropocene and its fictitious universalistic ethos, we propose a twofold denaturalization. On the one hand, we rebut the "naturalization" of a way of production and its ecological outcomes; it is capitalism and not the human species that is the force behind the current socioecological crisis. On the other hand, while the Anthropocene/Capitalocene narrative aims to organize people through time and space, subtracting from this organization is the basic form of disobedience that makes it possible to build alternatives to it. As Jacques Rancière (2004: 36) has written: "Any subjectification is a disidentification, removal from the naturalness of a place, the opening up of a subject space where anyone can be counted since it is the space where those of no account are counted, where a connection is made between having a part and having no part."

While one can say that in the cases we have presented there is always a deep connection to the places—something along the lines of Raymond Williams's and David Harvey's (1995) militant particularism or what Thomas Nail (2012) has called neoterritorialization—nonetheless, in its progressive versions it actually implies "relocating" the specific places into wider global frames of exploitation and resistance. It is not by chance that the communities living in what we have defined as the Wasteocene of the Neapolitan region have built a connection with the Kurds's struggles that has led to the granting of Neapolitan honorary citizenship to the Kurdish leader Abdullah Öcalan by the leftist municipal government.

The opposition to the universalistic Anthropocene is not the return of the local but the making of new commons and common identities through commoning.

Notes

1 It is not by chance that a few years ago Cambridge University Press released *The History Manifesto* (Guldi and Armitage 2014), an ambitious project, as the title unequivocally reveals, which aims to return history to a global explanation of human society.

2 The term is used by Spinoza with reference to the tendency, or endeavor, of self-preservation. See Damasio 2003: 79.

3 We use the term *organosphere* to refer to the inner socionatural system of the human and more-than-human body. We are in debt to Robert Emmett for suggesting this word to us.

4 In his "Encyclical Letter *Laudato Si*," Pope Francis (2015: 126) states: "The strategy of buying and selling 'carbon credits' can lead to a new form of speculation which would not help reduce the emission of polluting gases worldwide. This system seems to provide a quick and easy solution under the guise of a certain commitment to the environment, but in no way does it allow for the radical change which present circumstances require. Rather, it may simply become a ploy which permits maintaining the excessive consumption of some countries and sectors."

5 For a review of the Bukaleba case, see also Lyons, Richards, and Westoby 2014.

6 The Land of Fires comprises an area between the provinces of Naples and Caserta marked by a continuous presence of toxic fires, generally ignited on purpose to cover the disposal of hazardous waste. This designation, coined by local activists, has been picked up by all major Italian newspapers in their reports on waste crisis in the Campania region.

7 Film festivals, activities for children, exhibitions, conferences, concerts, training courses, and social dinners were some of the events held at the presidio (from our informants and field notes).

8 The *centri sociali* are old, abandoned buildings occupied by young activists and transformed into centers for political, cultural, and recreational activities. On this experience, see Mudu 2004.

9 Precisely for capitalism as also for the Anthropocene, we need to recognize with David Harvey (2014: 5) the possibility that "we are often encountering symptoms rather than underlying causes and that we need to unmask what is truly happening underneath a welter of often mystifying surface appearances."

References

Alaimo, Stacy. 2010. *Bodily Natures: Science, Environment, and the Material Self*. Bloomington: Indiana University Press.

Armiero, Marco. 2014. "Is There an Indigenous Knowledge in the Urban North? Re/inventing Local Knowledge and Communities in the Struggles over Garbage and Incinerators in Campania, Italy." *Estudos de sociologia* 1, no. 20. www.revista.ufpe.br/revsocio/index.php/revista/article/view/339/298.

Armiero, Marco, and Leandro Sgueglia. 2016. "Wasted Spaces, Resisting People: The Politics of Waste in Naples, Italy." Unpublished manuscript.

Barca, Stefania. 2014. "Telling the Right Story: Environmental Violence and Liberation Narratives." *Environment and History* 20, no. 4: 535–46.

Barca, Stefania. 2016. "Labor in the Age of Climate Change." *Jacobin*, March 18. jacobinmag.com/2016/03/climate-labor-just-transition-green-jobs/.

Bettini, Virginio. 1976. "Ecologia di potere, ecologia di classe nel caso ICMESA" ("Ecology of Power, Ecology of Class in the ICMESA's Case"). In *Ecologia e lotte sociali: Ambiente, popolazione, inquinamento* (*Ecology and Social Struggles: Environment, Peoples, Pollution*), edited by Barry Commoner and Virginio Bettini, 5–46. Milan: Feltrinelli.

Bey, Hakim. 1991. *Temporary Autonomous Zones*. New York: Autonomedia.

Bond, Patrick. 2015. "Climate Change Casino: Carbon Trading Reborn in New-Generation Mega Polluters." *CounterPunch*, December 4.

Cantoni, Roberto. 2016. "The Waste Crisis in Campania, South Italy: A Historical Perspective on an Epidemiological Controversy." *Endeavour* 40, no. 2: 102–13.

Capone, Nicola. 2015. "The Concrete Utopia of the Commons: The Right of 'Civic and Collective Use' of Public (and Private) Goods." Paper presented to the "Environmental Utopias and Dystopias as Forms of Resistance, Oppression, and Liberation" Environment Literature Culture workshop, Stockholm, December 11–12.

Chakrabarty, Dipesh. 2009. "The Climate of History: Four Theses." *Critical Inquiry* 35, no. 2: 197–222.

Cleaver, Harry. 1979. *Reading "Capital" Politically*. Austin: University of Texas Press.

Crutzen, Paul J., and Eugene F. Stoermer. 2000. "The 'Anthropocene.'" *Global Change Newsletter*, no. 41: 17–18.

D'Alisa, Giacomo, and Marco Armiero. 2013. "What Happened to the Trash? Political Miracles and Real Statistics in an Emergency Regime." *Capitalism Nature Socialism* 24, no. 4: 29–45.

D'Alisa, Giacomo, et al. 2010. "Conflict in Campania: Waste Emergency or Crisis of Democracy." *Ecological Economics* 70, no. 2: 239–49.

Damasio, Antonio. 2003. *Looking for Spinoza: Joy Sorrow and the Feeling Brain*. London: William Heinemann.

De Angelis, Massimo. 2007. *The Beginning of History: Value Struggles and Global Capital*. London: Pluto.

De Angelis, Massimo. 2017. *Omnia Sunt Communia. Commons and Post-capitalist Transformation*. London: Zed Books.

Demaria, Federico, and Giacomo D'Alisa. 2013. "Dispossession and Contamination: Strategies for Capital Accumulation in the Waste Market." *Lo Squaderno*, no. 29: 37–39.

De Rosa, Salvatore, and Monica Caggiano. 2015. "Social Economy as Antidote to Criminal Economy: How Social Cooperation is Reclaiming Commons in the Context of Campania's Environmental Conflicts." *Partecipazione e Conflicito: The Open Journal of Sociopolitical Studies* 8, no. 2: 531–54.

Dibley, Ben. 2012. "The Shape of Things to Come: Seven Theses on the Anthropocene and Attachment." *Australian Humanities Review*, no. 52. http://australianhumanitiesreview.org/archive/Issue-May-2012/dibley.

EJOLT (Environmental Justice Organisations, Liabilities and Trade). 2015. Environmental Justice Atlas. http://ejatlas.org/ (accessed March 20, 2015).

Ernstson, Henrik, and Erik Swyngedouw. 2015. "Framing the Meeting: Rupturing the Anthro-obscene! The Political Promises of Planetary and Uneven Urban Ecologies." Position paper presented at conference at Teater Reflex, organized by KTH Environmental Humanities Laboratory, Stockholm, September 16–19.

Fish River Fire Project. 2015. www.fishriver.com.au/ (accessed March 20, 2015).

Francis. 2015. "Encyclical Letter *Laudato Si*." Rome, May 24. http://w2.vatican.va/content/dam/francesco/pdf/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si_en.pdf.

Guldi, Jo, and David Armitage. 2014. *The History Manifesto*. Cambridge: Cambridge University Press.

Guthman, Julie, and Becky Mansfield. 2013. "The Implications of Environmental Epigenetics: A New Direction for Geographic Inquiry on Health, Space, and Nature-Society Relations." *Progress in Human Geography* 37, no. 4: 486–504.

Hardt, Michael, and Antonio Negri. 2000. *Empire*. Cambridge, MA: Harvard University Press.

Hardt, Michael, and Antonio Negri. 2005. *Multitude: War and Democracy in the Age of Empire*. New York: Penguin.

Harvey, David. 1995. "Militant Particularism and Global Ambition: The Conceptual Politics of Place, Space, and Environment in the Work of Raymond Williams." *Social Text*, no. 42: 69–98.

Harvey, David. 2014. *Seventeen Contradictions and the End of Capitalism*. New York: Oxford University Press.

Holloway, John. 2002. *Change the World without Taking Power: The Meaning of Revolution Today*. London: Pluto.

Houston, Donna. 2013. "Crisis Is Where We Live: Environmental Justice for the Anthropocene." *Globalizations* 10, no. 3: 439–50.

Iengo, Ilenia, and Marco Armiero. 2017. "The Politicization of Ill Bodies in Campania, Italy." *Journal of Political Ecology* 24:44–58.

Insurgencia. 2016. "ZapatismoPartenopeo." *Global Project*, February 25. www.globalproject.info/it/in_movimento/Zapatismo-partenopeo/19906.

Invisible Committee. 2009. *The Coming Insurrection*. Los Angeles: Semiotext(e).

Klein, Naomi. 2014. *This Changes Everything: Capitalism vs. the Climate*. New York: Simon and Schuster.

Luhmann, Niklas. 1995. *Social Systems*. Stanford: Stanford University Press.

Lyons, Kristen, Carol Richards, and Peter Westoby. 2014. *The Darker Side of Green Plantation Forestry and Carbon Violence in Uganda*. Oakland, CA: Oakland Institute. www.oaklandinstitute.org/sites/oaklandinstitute.org/files/Report_DarkerSideofGreen_hirez.pdf.

M. 2012. Author interview. Naples, Italy. March 27, 2012.

Malm, Andreas, and Alf Hornborg. 2014. "The Geology of Mankind? A Critique of the Anthropocene Narrative." *Anthropocene Review* 1, no. 1: 62–69.

Moore, Jason W. 2014. "The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis." www.jasonwmoore.com/uploads/The_Capitalocene__Part_I__June_2014.pdf.

Mudu, Pierpaolo. 2004. "Resisting and Challenging Neoliberalism: Development of Italian Social Centers." *Antipode* 36, no. 5: 917–41.

Nail, Thomas. 2012. *Returning to Revolution: Deleuze, Guattari, and Zapatismo*. Edinburgh: Edinburgh University Press.

Oxfam. 2015. "Extreme Carbon Inequality." Oxfam Media Briefing, December 2. www.oxfam.org/sites/www.oxfam.org/files/file_attachments/mb-extreme-carbon-inequality-021215-en.pdf.

P. M. 2014. *"The Power of Neighborhood" and the Commons*. New York: Autonomedia.

Piercen, Thomas. 2005. *The Logic of Sufficiency*. Cambridge, MA: MIT Press.

Rancière, Jacques. 2004. *Disagreement: Politics and Philosophy*. Translated by Julie Rose. Minneapolis: University of Minnesota Press.

Rathje, William L., and Cullen Murphy. 2001. *Rubbish! The Archaeology of Garbage*. Tucson: University of Arizona Press.

Rockström, Johan, et al. 2009. "Planetary Boundaries: Exploring the Safe Operating Space for Humanity." *Ecology and Society* 14, no. 2. www.ecologyandsociety.org/vol14/iss2/art32.

Samal, Debranjan. 2012. "Go Back J R Power Plant: Rail and Road Blockade." *Orissa Barta*, January 6. www.orissabarta.com/index.php?option=com_content&view=article&id=9373:go-back-jr-power-plant-rail-and-road-blockade.

Steffen, William, et al. 2015a. "Planetary Boundaries: Guiding Human Development on a Changing Planet." *Science* 347, no. 6223. http://science.sciencemag.org/content/347/6223/1259855.

Steffen, William, et al. 2015b. "The Trajectory of the Anthropocene: The Great Acceleration." *Anthropocene Review* 2, no. 1: 81–98.

Swyngedouw, Erik. 2011. "Depoliticized Environments: The End of Nature, Climate Change, and the Post-Political Condition." *Royal Institute of Philosophy Supplement* 69: 253–74.

Swyngedouw, Erik. 2013. "Apocalypse Now! Fear and Doomsday Pleasures." *Capitalism Nature Socialism* 24, no. 1: 9–18.

Anja Kanngieser and Nicholas Beuret

Refusing the World: Silence, Commoning, and the Anthropocene

Silence can be a plan
rigorously executed
the blueprint to a life
It is a presence
it has a history a form
—Adrienne Rich, "Cartographies of Silence"

Introducing Silence

The meteoric rise of the Anthropocene as a device for thinking through the slow, ongoing ecological disasters that mark the current period speaks to a pervasive catastrophism within political and ecological praxis. The Anthropocene operates as a call to action: it describes a series of complex emergencies that require urgent response on unimaginable scales (Zalasiewicz et al. 2010). From the truncated timelines of climate change to the vastness of the Sixth Great Extinction (Kolbert 2014), the Anthropocene is an epoch of heroic activity.

The calls to ecological heroism—the injunction to recreate humanity as a global steward (Steffen et al. 2011) or the calls to engineer the earth (Lynas 2011)—have not gone uncontested. But

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whereas much of the current debate on the concept of the Anthropocene takes issue with the locus of human capacity for geological agency (Crist 2013; Haraway 2015), we question the call to action itself. If action here designates a project to "save the world," or at the very least sustainably manage it, we contend that radical politics in the Anthropocene needs to turn to silence—what Adrienne Rich reminds us can be "a plan"—as an overlooked component of ethico-political thought. Indeed, we would suggest that the Anthropocene forces us to think silence, to work through the tensions it introduces into political life in the contemporary moment.

Cognizant of the indistinct nature of silence as a concept, we want to explore its constituent role as an element of political praxis. Specifically, if the political challenge of the Anthropocene is how to constitute the world among the ruins of the Holocene, silence suggests a means of breaking with the concept of the global environment as a unitary space of human species action and engendering a series of "other worlds" through the practice of commoning. Taking up a particular articulation of commoning that draws on the autonomist perspective associated with the US collective Midnight Notes and the UK-based journal the *Commoner* (De Angelis 2010; Linebaugh 2008; Midnight Notes Collective 1992), as well as through feminist (Mies 2014; Federici 2004) and postcolonial critiques (Spivak 1988; Tuck and Yang 2012), we contend that various forms of silence, when put to the task of commoning, can offer a useful approach to making other worlds within the Anthropocene.

Taking our cue from accounts of the Anthropocene that posit it as the expression and outcome of specific modes of accumulation—transformations of capitalism (Dyer-Witheford 2015), reorganizations of so-called nature (Moore 2015), and the renewal of modes of colonial violence (Lewis and Maslin 2015)—we propose that silence is a crucial, if overlooked, aspect of commoning. In particular, we argue that staying with the "trouble" of the Anthropocene (Haraway 2015) brings silence to the fore as a means of disrupting the allied processes of accumulation at work across these three sites. This is not because silence is any one thing: silence is not a singular practice to be taken up. Nor is it because all three are intimately bound up in the varied histories of the Anthropocene. Rather, it is through these three sites that silence most clearly troubles the call to heroic action that characterizes Anthropocene discourse. We contend that by troubling the binaries of active/passive and culture/nature, silence produces the grounds for commoning in the present moment.

After setting out accounts of both commoning and silence as operative concepts, we turn to the regime of production referred to as cognitive capital-

ism, employing the writing of Paulo Virno and Franco Berardi to explore the conditions of an age in which mental and social affects and activities are repurposed as labor processes. Here we develop the account of silence as praxis: as a refusal of communicative labor within cognitive capitalism. We argue that the refusal to participate or to speak disrupts existing modes of political and social agency that reproduce cognitive capitalism and its associated regimes of governance.

Turning to the mobilization of silence as a means to overcome human/nonhuman binaries through commoning, we then focus on Anthropocene ecologies. Here silence is understood as a means for becoming attentive to, and making space for, more-than-human forms of life. We are particularly concerned with asking how silence might help to expand commons beyond human interactions and experiences, into building relations across species boundaries. This attention to what is often ignored or made invisible by capital and the Anthropocene is further expanded in our next section, where silence is tied to the politics of representation through the violence of colonialism. We show how silence can be used to push against the dominant regimes of speech as protest, engagement, and response, at the same time as silencing the possibilities of who is heard, under what circumstances, and how. At stake in the capacity to be seen and heard is more than just the capacity to act against the existing world: it is a matter of enduring the Anthropocene within neo/settler colonial regimes and the ruins of global capitalism (Povinelli 2011).

Across these three sites it is the ambivalent nature of silence—as conjunctive absence and presence, excess and lack, activity and passivity—that provides a source of friction that we feel appropriate to the current milieu. In each of these three instances silence is posed as central to a multispecies, intersectional project of commoning. However, silence is not presented as one immutable concept or method: indeed, as much as silence is crucial to resisting the brutalizing effects of global capitalism, so are visibility, speech, and presence. We would suggest that it is precisely within the contested terrains where silence appears as impossible, as an abdication of responsibility, or as a refusal of politics, that it assumes its most significant valence.

Commoning

In this essay we pursue the commons as a specific orientation to re/producing more-than-human relations. This counterposes the reading of the commons as a universalist human condition or shared substance that opposes, underlies, or enables both contemporary capitalism and anticapitalist revolt

(Hardt and Negri 2009; Žižek 2009) and as a mobile concept to be detached from particular ways of laboring in the world (Berlant 2016). Taking up the work of Peter Linebaugh (2008), we contend that commoning is always a situated practice.

To emphasize the situated nature of commoning is not to speak of commons as though they were a natural resource. Following Linebaugh, we can articulate four characteristics of commoning as a practice. First, commoning is always embedded in a particular ecology. The "law of the land" is no sovereign law but more akin to the experimental scientist's obligation to follow the world as set out by Isabelle Stengers (2009). It is a question of asking what working within an ecology requires. Second, commoning involves particular *labor* processes. Common rights are labor rights, not property rights insofar as within a commons one works the land and does not hold it as a possession. Third, commoning is always collective. Here we would add that the laboring collective is never merely human, but always more-than-human, involving animals, plants, resources, objects. Fourth, commoning is defined in opposition not only to both state and capital but also to their temporalities (Linebaugh 2008: 45).

As an oppositional practice, commoning is grounded in refusal. Silvia Federici (2012: 145) argues that "no common is possible unless we refuse to base our life, our reproduction, on the suffering of others." The refusals and withdrawals of commoning are therefore "the first line of resistance to a life of enslavement" (145). However, commons are neither universal nor evenly distributed. The material grounds for commoning in the Anthropocene are shaped by the legacies of capitalism and colonialism, requiring recognition of the heterogeneity and incommensurability of people, experiences, and situations. Commons thus necessitate sustained, experimental engagements with translation and translatability, with "the coloniality of power and the resulting geopolitics of knowledge" (Mezzadra 2015: 217), as well as with the violence inherent to such processes (Solomon and Sakai 2007). The shift to regimes of cognitive capitalism also calls for a critical engagement with commoning insofar as such constituent practices risk producing nonmarket resources to be plundered by capitalist processes. As Massimo De Angelis (2010) argues, "Capital, too, is promoting the commons in its own way." Furthermore, while commoning calls for a working with the more-than-human world, it in no way guarantees an expansion of the political community to include more-than-human agents and lives. Commoning thus requires a deep engagement with the refusals of the more-than-human world, not only in order to make the space to common but also to deepen the process of commoning itself.

In this essay we instigate three propositions on silence as commoning. Rather than ask who should be silent, we establish silence as attentiveness to when one is being forced to speak, as a means for knowing when worlds require listening to, and as a matter of refusing to be recognized. We suggest that all three be considered as variations on the theme at the heart of the commons: namely, how do we make spaces to create other worlds?

Silence as Practice

In a political context, silence has largely designated the evacuation of agency, voice, and power, as ACT UP's Silence = Death declaration in the 1980s powerfully illustrates. It has been associated with repression, a tool to enforce what is heard and what remains inaudible—"to be silenced"—and as a betrayal, a remaining silent or holding secret when it is disingenuous to do so: white silence in the face of police murder of black people, indigenous peoples, and people of color. The connotations of oppression, coercion, and cowardice are entangled in the histories of silence as a political response. As such, silence has most conventionally been framed as passive and neglectful.

The theorizations of refusal and negation within much autonomist Marxist praxis trouble this identification of the political with the active (in action, in speech); this is seen principally in the form of the strike, where labor is interrupted, slowed, or stalled. The autonomist politics of refusal are not bound to the Arendtian politics of action, where politics works to confirm a political identity or human community. Rather, the novelty of the theorization of refusal within autonomist thought is that it constitutes a political practice precisely because it is grounded in the denial to reproduce the worker as an identity (Negri 1991). In refusing to reproduce oneself as a worker, one throws capital into crisis, as the latter requires that a worker both work and be reproduced as a worker (Federici 2012).

Feminist scholars such as Federici (2004, 2012) and Maria Mies (2014) have extended these insights by articulating how reproductive labor forms a key site of struggle against capitalist value production. Political activity not only is constituted as the refusal to maintain or produce a particular public identity but contests the very divisions of the public and private, reproduction and work that make politics possible. Such contestation forms the basis for feminist critiques of the dyadic pairings of male/politics/active versus female/nature/passive (Plumwood 1993). Bringing together the work of Federici, Mies, and Val Plumwood, it could be argued that the very constitution of the political has historically depended on the hierarchical pairing of

active/passive insofar as passivity has laid the grounds for the exploitation of women, those colonized, and the more-than-human worlds.

While refusal and silence are often theorized as the "first step" in a constituent moment (Holloway 2005), we are more interested in exploring what it would mean to stay with silence—to refuse the formation of silence as inaction as opposed to speech as action. This means taking it in its excess and its absence and holding fast to the moment of refusal as a moment of commoning. In doing so we emphasize that silence is not simply one thing or another, but many things, sometimes contradictory, sometimes confusing. At times, the act of speaking is a radical one; speech is necessary to become not only visible but also representable. Because of this, a certain level of analytical care is needed since the particularity of silence means that it does not manifest loudly or clearly but exists in between. To that end we join silence with commoning in order to produce a grammar of silence. Just as commons are always particular commons, silences are always specific silences. How someone, or somebodies, should be silent, when, for what—these are questions resolvable only in the instance when silence is called for. The question of silence within cognitive capitalism, the extinction of the more-than-human world, and resistance to persistent and renewed forms of neo/colonialism all speak to particular spaces where silence can act as a commoning practice in the face of anthropogenic violence.

Cognitive Capitalism

One of the strongest contributions of recent autonomist Marxist thought is the articulation of how language and autonomous activity form part of the basis for capitalist accumulation and neoliberal governance. This is exemplified in the work of Virno (2004, 2008), who contends that many of the qualities "traditionally" associated with political and creative activity have come to be subsumed into capitalist production. For Virno, human capacities such as intellect, language, and emotions now operate as the foundations for capitalist accumulation, with "attitudes of the mind gain[ing] primary status as productive resources" (Virno 2004: 201).

At a time in which "social culture, contrasting imaginaries, expectations, and disappointments, loathing and solitude, all enter to modify the rhythm and pace of the productive process," as Berardi (2007: 58–59) puts it, a refusal to enunciate interrupts the rapid translation, representation, and appropriation of political and social energies and alliances within neoliberal paradigms. When participation is called for at every moment, when subjects

are continually called on to speak, to say what "we" want or how "we" feel, the question of silence presents itself as an act of refusal and sabotage. The key orientating question here is not so much "who should be silent" but "when are 'we' forced to speak." Such a question illuminates those arrangements where silence can be most effective in undermining both capitalist accumulation and the managerial governance of the state.

Silence as an act of sabotage may also apply to radical political calls to action. Writing about the contemporary Left, Berardi (2011) criticizes the attachment of activism to forms of mobilization and activity, which he identifies as locked to past modes of political activism. While for Berardi this provocation to withdrawal is tied to the collapse of modernist systems of organization and collectivity (and thus to the exhaustion of the very possibility of politics), the point he makes folds into a broader argument on how common spaces, publics, and communication designate new terrains of contemporary production and the formation of laboring subjects (De Angelis 2010). Developing the argument further, we would suggest that withdrawal on this terrain is not a sign of failure or defeat but rather marks the limit of Arendtian notions of the political. Whereas Berardi sees activity and speech as seamlessly caught in a web of post-Fordist production and hence silence as the limit of political action, in returning to the early themes of autonomist Marxist praxis we can see such moments of "passivity" as part of a longer genealogy of refusal where acts of passivity (refusals, go-slows, wildcat strikes with no clear demands) function as positive negations by workers (Wright 2002).

A denial of speech outwardly is thus not a denial of agency, power, or self-determination—in fact it may function as reclamation of the parameters of political constitution in a nonfigurative sense. Writing about the 2011 London protests in the wake of the racist police shooting of Mark Duggan, Peter Fleming (2013: 628) commented on the striking power of the protesters' "withdrawal from the machinery of dialogue." This was not an evacuation of sound from those participating, argued Fleming, but rather a strategic dismissal of the pressure for explanation. For Fleming, the protesters' refusals to offer cohesive justifications of their aims, demands, and leaders suspended any kind of engagement with, and legitimation of, official discourse. While narratives of the events proliferated in the media, the refusal to form into easily definable groups, or to testify, was a way for participants to negate categorization by government and "expert" bodies. Refusing to participate in the labor of communication was thus a refusal to participate in the regimes of communication endemic to capital. For Fleming (2013: 629),

the refusal of outward demands indicated a "post-recognition politics." Denial of speech in this sense was not a wholesale refusal of collective composition per se. Rather, it was a means to challenge modes of participation and communication and forge other forms of social composition grounded in silence. It was the absence of participation, the absence of speech, that itself constituted the commons of ungovernability.

As in the protesters' outward silence, where cognitive capitalism transforms the grounds of the polis—language, action—into regimes of work, the autonomist notion of refusal suggests a means for breaking from this conflation, for building different kinds of resistant constellations. It is this difference that, given the role of human exceptionalism in creating the material condition of the Anthropocene (Crist 2013), is fundamental to a reorientation toward the commons as the grounds for another life, one additionally attentive to the more-than-human participants in the construction of social worlds.

Quiet Earth

While much Anthropocene discourse focuses on humanity, one of the key markers of this new epoch is the erasure and silencing of vast numbers of more-than-human beings. The extinction of other-than-human life makes for a quiet earth. Calls to act against the ecocidal violence of humanity are prefaced by injunctions to pay attention: to see, listen, and feel the dyings (Kolbert 2014). However, attentiveness demands silence. Silence, in this way, is one method for tracing encounters across human and nonhuman life-forms.

Silence in Anthropocene ecologies does not denote an absence of humanity—it is not a call to return to the wild or some prehistorical state. We recognize that such a state is only ever the product of violent "clearings" or works of enclosure that drive people out of the territories they inhabit. Rather, it works as a mode of active listening, one designed to draw the more-than-human "background" (Plumwood 1993) into the foreground of thought. That is, it is a means of partially undoing the modernist labor of producing "nature" as a passive object. As such, this approach applies as much to the edgelands that weave through and around urban centers as it does to unfelled forests or unpopulated coastlines. The use of silence to foreground these more-than-human processes that are often taken for granted can play an active role in commoning with the more-than-human world.

Commons are made—they are particular regimes of production that require the activity of a range of actors as well as earth processes. The role of silence is to push to the front the more-than-human and inhuman processes

with which one will common. To work a field of crops, to graze, to forage: all of these processes call for attention in order to see and hear ecologies unfold and move. Silence as a foundation of observation of the more-than-human and inhuman worlds has been often codified in a range of horticultural and craft practices (Papadopoulos 2014), where care rather than appropriation forms the basis of a working-with the world (Puig de la Bellacasa 2012). Exemplary here is the practice of permaculture, a system of agriculture utilizing a philosophy of "working with rather than against nature; of protracted and thoughtful observation rather than protracted and thoughtless labor; and of looking at plants and animals in all their functions" (Mollison 1991: 8). Permaculture starts with an extended period of observation—of silence—in order to see the relationships and patterns at work within a particular ecological environment.

Yet while silence is necessary to common, the Anthropocene as a silencing of the more-than-human world compels us to ask another set of questions. What would it mean to take the extinction of more-than-human forms of life seriously in themselves? What would it look like to consider within political thought how current rising sea levels affect the erosion of sand and mangrove populations, which in turn diminish and move the habitats of sea life on which island economies are reliant? How does silence enable a decentering of modernist notions of "humanity" and a troubling of the heroic narrative of the Anthropocene?

The work of Bernie Krause (2013) illustrates the role human silence can play in enabling the reconstitution of more-than-human ecologies. Krause's work as an acoustic ecologist maps how human activity—logging, highways, pesticides, and aircraft traffic—drowns out the sounds of the more-than-human world. Krause emphasizes these sounds, naming the specific chorus of calls, songs, and noises of a particular ecology as its biophony. The biophony of any given ecology is a central aspect of how an ecology organizes and reproduces itself. As a space of more-than-human communication, it forms the basis for complex communities, knitting together series of relationships and distinct acoustic niches. When this soundscape is disrupted, the ecology degrades, leading to an unraveling of more-than-human forms of life. The breakdown in the biophony contributes to the long dyings of extinction. Krause documents not only the unravelings of life that take place through the disruptions of biophonies but also how they can recover when humanity absents itself from an environment. His recordings suggest that our silence can operate as a means of making space for other forms of life to flourish.

In this context, the struggle to exist stretches the concept of what Angela Davis (2014) calls an "intersectionality of struggles," insofar as it challenges the implied sense that intersectional struggles converge around common concerns. Commoning at the edge of the extinction of the more-than-human world does not necessarily produce singular or coherent communities that include us. Rather, in considering how to build relations across otherness, without assimilating difference or demanding equivalence, commoning at the borderlines of extinction suggests the need to vacate space as a means to allow other worlds to flourish.

In other words, silence not only works to create the space to pay attention, to be attentive to what the world obliges subjects and bodies to do in order to common, but also crucially enables the more-than-human world to flourish on its own terms. The risk of positing silence solely within the framework of human commoning starting from within the ruins of modernity (and its attendant notions of "humanity") is that the instrumentalist logics of Anthropocene discourse that celebrate breeding zoos and wildlife preserves is reproduced. This is a logic, it need be noted here, that also functions to reinforce the dyadic parings of male/politics/active versus female/nature/passive (Plumwood 1993) and as such reinforce the patriarchal and colonial ordering of the Anthropocene through a specific production of nature. In contrast, then, the question of silence here is: How is the world being drowned out, and how can we make the space for the world to speak without us?

Commoning as a situated practice reminds us that there is no guaranteed common ground to resistance. An ethical comportment within the commons must leave space for nonaffirmation, for changing temporalities, for disagreeable desires, and still find some means of discovering collective stakes and being alongside one another. This includes inventing ways of attending to the "shadows of that which does not have, cannot have or does not want to have a political voice" (Stengers 2005: 996).

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Defining the commons as materially situated suggests the need to be attentive to the uneven grounds of commoning: who can common, under what circumstances, and to what extent. There is a growing body of literature exploring the intersection between cognitive capitalism and neo/colonial violence, particularly as it relates to the technosphere's production and maintenance (Dyer-Witheford 2015). Beyond the violence it imposes on bodies, ecologies, and forms of life, however, the Anthropocene can itself be seen as an

outcome of European colonialism, inscribing colonial violence in the planet's geochemistry and atmospheric dynamics (Lewis and Maslin 2015; Todd 2015). Dating the "golden spike" of the Anthropocene to 1610, Simon Lewis and Mark Maslin make the deliberate absence of colonized peoples the marker of the current geological epoch. When faced with such a forced silencing, how can silence as a necessary mode of commoning in the Anthropocene be maintained, especially when, in the context of neo/colonial violence, it often denotes not only the destruction of whole peoples and cultural legacies but also complicity with colonial forces? Moreover, how do we engage with commoning as a practice when the ability to common is itself an uneven product of five hundred years of colonial violence, dispossession, and genocide?

The complex ways in which silence has operated within neo/colonial spaces require us to pay attention to the activity of empowering speech as the articulation of agency within politics (Spivak 1988). Yet while the subaltern attainment of "voice" can be seen as critical for political equality, the acquirement of political recognition is not without its dangers. Aimee Carrillo Rowe and Sheena Malhotra (2013: 2) argue that "the figure of the subaltern gaining voice captures the political imaginary, shifting the focus away from the labor that might be demanded of those in positions of power to learn to listen to subaltern inscriptions—those modes of expression that are often interpreted as 'silence.'" No less problematic is the production of modes of representation and communication that serve to reinforce neo/colonial governance (Coulthard 2014). As Frantz Fanon (2005: 73) argues, in times of anticolonial revolt the emergence of people willing to speak "in the name of the silenced nation" is welcomed by the ruling bureaucracy "with open arms" as a means of reestablishing control over an ungovernable populace. Silence is thus ambivalent in this context, suggesting the need to ask not only who forces one to be quiet and to disappear but also who would speak on one's behalf.

Alongside the clear role for speech (and listening) in post/colonial contexts, there is much de/colonial work that considers silence as an active and self-determined stance against neo- and settler colonial regimes (Coulthard 2014); Simpson 2007; Tuck and Yang 2014). Silence considered as anticolonial resistance manifests in a similar way as it does within the circuits of cognitive capitalism—as a refusal to reproduce neo- and settler colonial social relations, a refusal to be governable, or a refusal to participate in "development."

The ability to be "heard" via representatives and to be governable often hinges on how colonized peoples come to be counted. As such, it is the refusal to be counted—via representatives, through direct participation in

government programs or quite literally by refusing to be counted through government census—that constitutes the basis for the active silence of colonized peoples. This is evidenced in the ongoing debates among the First Nation peoples in the occupied territory of Canada over whether or not indigenous peoples should vote in federal elections, with some contending that participation in these elections undermines indigenous sovereignty and others proposing it as a useful tactic to secure better grounds for future negotiations (Coulthard 2014). As Judith Sayers (2015), former chief of the Hupacasath First Nation, argues, "Why would you want to vote for a government that continually imposes legislation and policies that do not provide for the advancement of First Nations?" This suggests that to participate in choosing a political representative as a First Nations person is in effect to choose an "un-representative" to enact legislation and policies that actively undermine not only the capacity of First Nations peoples to survive as indigenous but also the very notion of autonomy inscribed in First Nations treaties itself.

The imposition of citizenship as well as destructive or assimilationist policies often rests on synoptic mechanisms of measurement. In Canada the collection of census data has had profound impacts on First Nations peoples, and as such First Nations peoples have frequently resisted and refused to cooperate with census takers. Such refusal has taken a variety of forms, from physically absenting oneself during census counts (going "missing"), to refusing to answer census questions and remaining silent, to driving census takers out of indigenous territories (Hubner 2007). The refusal to be representable in this latter instance joins indigenous struggles against governability to both peasant insurrections against census takers (e.g., Taylor 1979: 127) and broader revolts that posit a general ungovernability as found in recent urban riots (Clover 2016).

It is here that the clearest link between the strategies of refusal within the circuits of cognitive capitalism and anti- and decolonial struggles exists. Participation, in both instances, risks incorporation. As such, commoning, in the neo/colonial context, can appear as a potential site both of resistance *and* of incorporation. Commons situated in the margins of urban peripheries can function as nonmarket institutions that work to sustain involvement in informal or formal waged labor, effectively enabling the reproduction of capitalist social relations where capital is unable or unwilling to meet the cost of reproducing labor power. As Federici (2015: 208) has pointed out, resistant commoning and (particularly indigenous women's) subsistence practices developed to maintain relations of commons and evade the logics of commodification have increasingly been monetized by nongovernmental organizations (NGOs) and the World Bank under the rubrics of sustainability and

greenwashing. Similarly, analyses of the black radical tradition in Europe and the United States emphasize how practices of commoning and cooperative organizing among black communities have been exposed to expropriation and marketization by racialized capitalism (Robinson 1983; Nembhard 2014). Commoning, in these instances, can work to reinforce regimes of accumulation and governance rather than facilitate a break from such neo/colonial orders.

The question then is how to common against such incorporations. Or, perhaps more pointedly, the question might be: Are silence as refusal and commoning as autonomy counterposed in this instance? Silence, in a colonial context, reminds us that de/colonization is not a metaphor; it is a question of territory (Tuck and Yang 2012). Silence here can denote a space of action, a silent withdrawal through commoning as a means of retaking hold of occupied land. There is a crucial element of commoning as reterritorialization, where reterritorialization is an antagonistic claim to land that fractures the conception of the earth as a globe. The heterogeneous temporalities of anti- and decolonial commoning contest the "sense of planet" (Heise 2008) produced through the vast machines that catalog and chart the earth. The object produced through these machines—the "global environment"—is a means of pursuing modes of capitalist and neo/colonial governance that seek to overcome the varied "frictions" of anti- and decolonial action (Tsing 2005). As commoning is always bound to the specific legacies and capacities of the territories in which it is embedded, it is opposed to managerial notions of the global commons, just as it is opposed to the representative politics of NGOs and institutional political forms.

Perhaps one of the most manifest sites of conflict around the construction of the global environment as an object of management is that of the national park—often a site of "world heritage value" or of global importance. Such places play a crucial role in conservation praxis as the mechanisms of international biodiversity governance and hold a key discursive and symbolic role in the production of the idea that there is a singular environment that spans the globe. The creation of national parks—and with them the very notion of wilderness that underpins much global environmental thinking—is achieved through the dispossession of millions of indigenous and marginal peoples, creating a reported 130 million "conservation" refugees (Survival International 2014). Such projects of ecological cleansing do not go uncontested: revolts in India have halted evictions of tribal peoples from a number of wildlife reserves, and members of the Waorani tribe have violently resisted eviction from Ecuador's Yasuni National Park (Survival International 2014).

In this latter instance, commoning stands as a means of maintaining a hold over a territory, as something that is destroyed through conservation enclosures in order to make room for the kinds of picturesque "environments" that populate narrations of the Anthropocene. From the Amazon to coastal parks, it is the future visions of these spaces disappearing that form the affective underpinning to Anthropocene tales of catastrophe. Commoning against these conservation spaces joins with other modes of refusal to be governed as a means of resisting the production of forms of global stewardship as championed by supporters of the Anthropocene project (Steffen et al. 2011).

The refusal to be counted, to speak, joins with the refusal to make way for national (and global) projects in a process of ungovernability. To withdraw territory from the nation-state, or to contest the capacity of the nation-state to govern territory via commoning, is a means of making silence into a de/colonizing device, one that works through the refusal of representation and incorporation. By making territory and peoples unincorporable through silence, de/colonial struggles are able to frustrate projects of neo/colonial governance, opening the way for a reoccupation of their territories via commoning.

Conclusion

Faced with mass extinctions, runaway climate change, disappearing ice sheets, and rising sea levels, silence at first glance manifests as a denial of the Anthropocene, a refusal to respond decisively to the global environmental crisis. Yet the call to action, to heroically remake the earth through geoengineering or to institute a form of global environmental governance, itself confuses the substance of the Anthropocene with its resolution. The Anthropocene is the expression and outcome of specific modes of accumulation—transformations of capitalism, which are connected to the transfiguration of so-called nature, and ongoing forms of colonial violence. It not only names a historical event but signals an ongoing process that produces nature-as-object, on the one hand, and an intrepid global agent—humanity—on the other.

Silence as a commoning practice refuses the heroic narrative that underpins Anthropocene discourse and its logic of global stewardship. In an epoch in which opinion, voice, and communication reach their velocity as political response, silence assumes its most significant valence. The Anthropocene is the outcome of five hundred years of dispossession, capitalist accumulation, and neo/colonial globalization. The fabrication of the biosphere as a global environment continues this project of incorporation to better manage the earth. In this context, silence marks a refusal to reproduce existing

Anthropocene social relations and becomes productive of the absence required in order to make other worlds possible.

Commoning is the means here of both resisting and constituting otherwise against this global ordering. Silence enables commoning as it opens space to produce other forms of life. The refusal to participate or speak works to disrupt existing modes of governance, processes of capitalist accumulation, and the ordering of national territories. The refusal to be incorporable and governable produces an absence of governance enabling commoning to take place. At the same time, the silence produced through refusal challenges human exceptionalism and holds space for the more-than-human. As such, it creates the grounds for *particular* expanded notions of community or alliance, bound to specific ecological processes and more-than-human agents. Silence as a refusal to reproduce oneself as a worker, as a subject, and as, ultimately, *human* allows for other autonomous forms of life and processes of social reproduction unhinged from the exhaustive governmental projects of late liberalism (Povinelli 2011) to occur.

The practices of silence and commoning are not universally applicable, nor are they grounded in a shared social condition. The material foundations on which commoning takes place and the political logics into which silence enters necessitate a situated application. There are times when commoning reinforces accumulation, when silence equates with complicity and violence. As liminal and precarious practices that engender the movement from one social regime to another, there are times when commoning reinforces accumulation, when silence equates with complicity and violence. Thus, it is not a matter of universal application. Rather, silence and commoning enter into political calculus through the question of how to make space for other forms of life or, perhaps finally, how to make the current regimes of life ungovernable.

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References

Berardi, Franco. 2007. "Technology and Knowledge in a Universe of Indetermination." Translated by Giuseppina Mecchia. *SubStance* 36, no. 1: 57–74.

Berardi, Franco. 2011. *After the Future*. Translated by Arianna Bove et al. Oakland, CA: AK Press.

Berlant, Lauren. 2016. "The Commons: Infrastructures for Troubling Times." *Environment and Planning D: Society and Space* 34, no. 3: 393–419.

Clover, Joshua. 2016. *Riot. Strike. Riot: The New Era of Uprisings*. London: Verso.
Coulthard, Glen Sean. 2014. *Red Skin, White Masks*. Minneapolis: Universty of Minnesota Press.
Crist, Eileen. 2013. "On the Poverty of Our Nomenclature." *Environmental Humanities* 3: 129–47.
Davis, Angela. 2014. "Transnational Solidarities: Resisting Racism, Genocide, and Settler Colonialism." Paper presented in the Hrant Dink Memorial Lecture series, Bosphorous University, Istanbul, January 9.
De Angelis, Massimo. 2010. "On the Commons: A Public Interview with Massimo De Angelis and Stavros Stavrides." *e-flux*, no. 17. www.e-flux.com/journal/on-the-commons-apublic-interview-with-massimo-de-angelis-and-stavros-stavrides.
Dyer-Witheford, Nick. 2015. *Cyber-Proletariat: Global Labour in the Digital Vortex*. Chicago: University of Chicago Press.
Fanon, Frantz. 2005. *The Wretched of the Earth*. Translated by Richard Philcox. New York: Grove.
Federici, Silvia. 2004. *Caliban and the Witch: Women, the Body, and Primitive Accumulation*. New York: Autonomedia.
Federici, Silvia. 2012. *Revolution at Point Zero: Housework, Reproduction, and Feminist Struggle*. Oakland, CA: PM Press.
Federici, Silvia. 2015. "Reenchanting the World: Technology, the Body, and the Construction of the Commons." In *The Anomie of the Earth: Philosophy, Politics, and Autonomy in Europe and the Americas*, edited by Federico Luisetti, John Pickles, and Wilson Kaiser, 202–15. Durham, NC: Duke University Press.
Fleming, Peter. 2013. "Common as Silence." *Ephemera* 13, no. 3: 627–40.
Haraway, Donna. 2015. "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6: 159–65.
Hardt, Michael, and Antonio Negri. 2009. *Commonwealth*. New York: Belknap Press of Harvard University Press.
Heise, Ursula K. 2008. *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*. Oxford: Oxford University Press.
Holloway, John. 2005. *Change the World without Taking Power: The Meaning of Revolution Today*. London: Pluto.
Hubner, Brian Edward. 2007. "'This Is the Whiteman's Law': Aboriginal Resistance, Bureaucratic Change, and the Census of Canada, 1830–2006." *Archival Science* 7, no. 3: 195–206.
Kolbert, Elizabeth. 2014. *The Sixth Extinction: An Unnatural History*. London: Bloomsbury.
Krause, Bernie. 2013. *The Great Animal Orchestra: Finding the Origins of Music in the World's Wild Places*. London: Profile Books.
Lewis, Simon, and Mark Maslin. 2015. "Defining the Anthropocene." *Nature* 519, no. 7542: 171–80.
Linebaugh, Peter. 2008. *The Magna Carta Manifesto: Liberties and Commons for All*. Berkeley: University of California Press.
Lynas, Mark. 2011. *The God Species: Saving the Planet in the Age of Humans*. Washington, DC: National Geographic.
Mezzadra, Sandro. 2015. "Afterword: Resonance of the Common." In Luisetti, Pickles, and Kaiser, *Anomie of the Earth*, 215–27.

Midnight Notes Collective. 1992. "The New Enclosures." In *Midnight Oil: Work, Energy, War, 1973–1992*, edited by Midnight Notes Collective, 317–33. New York: Autonomedia.

Mies, Maria. 2014. *Patriarchy and Accumulation on a World Scale: Women in the International Division of Labour*. 3rd ed. London: Zed Books.

Mollison, Bill. 1991. *Introduction to Permaculture*. Tasmania, Australia: Tagari.

Moore, Jason W. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso.

Negri, Antonio. 1991. *Marx beyond Marx: Lessons on the "Grundrisse."* Edited by Jim Fleming. Translated by Harry Cleaver, Michael Ryan, and Maurizio Viano. New York: Autonomedia.

Nembhard, Jessica Gordon. 2014. *Collective Courage: A History of African American Cooperative Economic Thought and Practice*. University Park: Pennsylvania State University Press.

Papadopoulos, Dimitris. 2014. "Politics of Matter: Justice and Organisation in Technoscience." *Social Epistemology* 28, no. 1: 70–85.

Plumwood, Val. 1993. *Feminism and the Mastery of Nature*. London: Routledge.

Povinelli, Elizabeth A. 2011. *Economies of Abandonment: Social Belonging and Endurance in Late Liberalism*. Durham, NC: Duke University Press.

Puig de la Bellacasa, Maria. 2012. "'Nothing Comes without Its World': Thinking with Care." *Sociological Review* 60, no. 2: 197–216.

Robinson, Cedric J. 1983. *Black Marxism: The Making of the Black Radical Tradition*. London: Zed Books.

Rowe, Aimee Carrillo, and Sheena Malhotra. 2013. "Still the Silence: Feminist Reflections at the Edges of Sound." In *Silence, Feminism, Power: Reflections at the Edges of Sound*, edited by Sheena Malhotra and Aimee Carrillo Rowe, 1–22. New York: Palgrave Macmillan.

Sayers, Judith. 2015. "To Vote or Not to Vote? Chief's Dilemma Shared by Many First Nations." The Tyee, September 5. http://thetyee.ca/Opinion/2015/09/05/Vote-Dilemma-First-Nations.

Simpson, Audra. 2007. "On Ethnographic Refusal: Indigeneity, 'Voice,' and Colonial Citizenship." *Junctures*, no. 9: 67–80.

Solomon, Jon, and Naoki Sakai. 2007. "Translation, Violence, and the Heterolingual Intimacy." European Institute for Progressive Cultural Policies (EIPCP), September. http://eipcp.net/transversal/1107/solomon/en.

Spivak, Gayatri Chakrabarty. 1988. "Can the Subaltern Speak?" In *Marxism and the Interpretation of Culture*, edited by Cary Nelson and Lawrence Grossberg, 271–313. Urbana: University of Illinois Press.

Steffen, Will, et al. 2011. "The Anthropocene: From Global Change to Planetary Stewardship." *Ambio* 40, no. 7: 739–61.

Stengers, Isabelle. 2005. "The Cosmopolitical Proposal." In *Making Things Public: Atmospheres of Democracy*, edited by Bruno Latour and Peter Weibel, 994–1003. Cambridge, MA: MIT Press.

Stengers, Isabelle. 2009. *The Invention of Modern Science*. Minneapolis: University of Minnesota Press.

Survival International. 2014. *Parks Need Peoples*. London: Survival International.

Taylor, William B. 1979. *Drinking, Homicide, and Rebellion in Colonial Mexican Villages*. Stanford, CA: Stanford University Press.

Todd, Zoe. 2015. "Indigenizing the Anthropocene." In *Art in the Anthropocene: Encounters among Aesthetics, Politics, Environments, and Epistemologies*, edited by Heather Davis and Etienne Turpin, 241–55. London: Open Humanities Press.

Tsing, Anna Lowenhaupt. 2005. *Friction: An Ethnography of Global Connection*. Princeton, NJ: Princeton University Press.

Tuck, Eve, and K. Wayne Yang. 2012. "Decolonization Is Not a Metaphor." *Decolonization: Indigeneity, Education and Society* 1, no. 1: 1–40.

Tuck, Eve, and K. Wayne Yang. 2014. "R-Words: Refusing Research." In *Humanizing Research: Decolonizing Qualitative Inquiry with Youth and Communities*, edited by Django Paris and Maisha T. Winn, 223–48. Thousand Oaks, CA: Sage.

Virno, Paolo. 2004. *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Virno, Paolo. 2008. *Multitude: Between Innovation and Negation*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Los Angeles: Semiotext(e).

Wright, Steve. 2002. *Storming Heaven: Class Composition and Structure in Italian Autonomist Marxism*. London: Pluto.

Zalasiewicz, Jan, et al. 2010. "The New World of the Anthropocene." *Environmental Science and Technology* 44, no. 7: 2228–31.

Žižek, Slavoj. 2009. *First as Tragedy, Then as Farce*. London: Verso.

Isabelle Stengers

Autonomy and the Intrusion of Gaia

Autonomy is a delicate word to use; that is, it is a word easy to misuse. Its meaning and scope were clear, however, when it became central to the *operaist* movement, since it sounded like a cry, echoing and feeding back on the seemingly indomitable recalcitrance of workers against the Fordist organization of work. Rational management was, as it is more than ever today, separating those whom it took hold of from their collective capacity to think, imagine, and self-organize. Correlatively, it would be this very capacity that struggle was to enact, either outside of the established organizations or from the inside, forcing them to learn from the movement as the *operaist* theorists themselves learned from the workplace.

It should be clear from the beginning that I fully accept Mario Tronti's (2013: 121) harsh statement that the defeat of the workers has been a tragedy for human civilization. Had this defeat not happened, the practical meaning of autonomy, together with the way it situates theory, might have been a constitutive part of our common history, a matter of collective, even if conflictual, learning. However, this meaning, just as that of social classes, is not to be defined *in abstract*. It needs to be enacted in effective situations of struggle.

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To be able to meaningfully refer to autonomy implies being able to discern the precursor signs of such a struggle.

I take my stand here with the way Daniel Bensaïd (2002) understood the originality of Marx's concepts, forcefully defending class and class struggle against any socioeconomic characterization. That, however, led him to finally adopt a quasi-messianic position, never renouncing the watch, untiringly looking for the signs of what, he trusted, was to come. I do not share such a messianic trust in the finality of human history or the conviction that the struggles to come will follow some version of the Marxist script. Indeed, I am convinced that Marx himself would have been terrified that some theorists today look to his writing for conceptual warrant or guideline.

The dark irony of the present-day situation is rather that, on one point at least, *The Communist Manifesto* has been fully confirmed. So-called neoliberal capitalism has itself taken on the task of systematically fulfilling the Marxist diagnosis about the revolutionary character of the bourgeois epoch: "All fixed, fast-frozen relations, with their train of ancient and venerable prejudices and opinions, are swept away, all new-formed ones become antiquated before they can ossify. All that is solid melts into air, all that is holy is profaned, and man is at last compelled to face with sober senses his real conditions of life, and his relations with his kind" (Marx and Engels 1967: 234). What women and men are now compelled to face with sober senses is that they should all accept that they are "entrepreneurs," competing with one another to conquer and maintain a market value and that, in the case of failure, they should not complain about being eliminated as redundant. Workers' solidarity, attachment, and loyalty have been systematically dismembered. As for ourselves, academics, we are compelled to accept that what we had deemed holy is now profaned by benchmarking, rational management, and the knowledge economy.

Writing about autonomism today, my mind is deeply divided. On the one hand, I am thinking of those, more or less close to the Invisible Committee, whom I know in France or Belgium as the irreconcilable ones, akin to the partisans during the Nazi occupation—a position I honor even if some of them suspect me of collaboration. But I am not sure that they would accept the qualification as autonomists—they mostly refuse any qualification. On the other hand, I must admit my distance from the philosophico-anthropological theorization by authors like Antonio Negri, Paolo Virno, or Giorgio Agamben. I would rather claim proximity with Félix Guattari's particular brand of activism, but again with a divided mind. Guattari (2008), in his *Three Ecologies*, characterized the triple devastation of our world but was

hypersensitive to the danger of reterritorialization in an imaginary past. Not denying this danger, I am more concerned by the correlative demand that theorization should keep true to the great adventure of deterritorialization heralded by the *Manifesto*. This is, it seems to me, the path Negri followed when celebrating the multitude as free from what still territorialized the old, defeated proletariat, turning the destruction into a promise, or the one Virno followed when he defined the common as a generalized human communicative potential, immune to devastation, ready to finally unfold. In contrast, I am trying to think "with" the devastation, and my position is non-Marxist in the sense that I will bless no gift from Capitalism, even unwilling ones, because all amount, one way or another, to a justification of destruction as the necessary price for going forward.

The Age of Man?

Today all Marxist or post-Marxist scripts must confront a perspective of destruction that Marx could not anticipate, whatever his "pre-ecological" work concerning what he saw as the growing "rift in the universal metabolism of nature" (Foster 2013). Indeed, the soil has been robbed of its generative power, nature has been spoiled, polluted, depleted. But this metabolism is now under another, distinct menace, which deeply perturbs any theory indifferent to the new, dramatic restriction of our historical horizon. The climate, far from being self-stabilizing, has been discovered to be a ticklish, ominous, and fearfully complex reality, which is now threatening us. In other words, capitalist deterritorialization is in the process of irreversibly launching a very material chaotic change resulting in the destruction of what civilization, be it ours or the one that the Marxist socialized man would create, depends on.

The name "Anthropocene" is now associated with this discovery. It was coined in 2000 by the chemist-climatologist Paul J. Crutzen, who, along with his International Panel on Climate Change (IPCC) colleagues, was horrified by the tepid, dithering way that states and the public were answering the alarm they were sounding. Crutzen's and his colleagues' working life and probably nightmarish nights were permeated by threatening data and models. They had taken for granted the official scenario: we, scientists, bring the facts and "society" decides. The IPCC was created in order to obtain facts and predictions that even the most recalcitrant states would have to accept, and the accusation of meddling with politics—which climate negationists nevertheless dumped on them—was thus to be strictly avoided. Climatologists

were anticipating general mobilization, as when the United States entered World War II, a heroic decision to reorganize industrial production and citizens' way of life. Yet nobody moved—they were met with only words and empty commitments.

Crutzen and others concluded that guilt and renunciation were not making a good mobilizing story. People would consent to sacrifices only if they were the price for a possible victory. But there is no victory against the climate; what has been triggered will not fade away. The Anthropocene story downplays this "inconvenient truth" and spins a new invigorating message: the epic story of the "Age of Man," of Man having "attained" the status of a geological force and now being required to shoulder the corresponding responsibility, learning to rationally govern the earth. This, by the way, is not so very different from Marx's idea, but for the small detail that it would have to be accomplished through the laws of the market, not by the associated producers.

Today the Anthropocene has become a success in academic, artistic, and media worlds, with a flow of colloquiums, publications, and research financing. The idea of a "good Anthropocene" is insidiously making its way forward, unleashing engineering dreams of control and command and making geoengineering the logical scenario despite the deep uncertainty of climate manipulation and the political, social, and ecological dangers with which any attempt at this is replete. If it ever were to succeed, it would be the achievement not only of the Marxist notion of real subsumption but also of an irreversible existential subsumption. Indeed, whatever the geoengineering method, it would require that we keep on extracting and mobilizing the massive necessary resources, to keep on feeding the climate manipulating "machine" as a matter of life and death: there would be no question of "changing our minds" because if the manipulation were to stop, the warming it would have avoided would be produced in one brutal shot. In other words, the doctrine that "there is no alternative" (TINA) would become effectively and irreversibly true. Anthropos would actually come to existence under the guise of humanity mobilized by the holy task to serve the climate-taming machine.

Now that climate negationism is running out of steam, it can be anticipated that capitalism will intone the "welcome to the Anthropocene" refrain and parade the golden opportunities that the "stewardship of the earth" will bring. I will not, however, add to the huge literature about this prospect. My point is a more situated one. As an academic, what I have to take seriously is the excited academic answer, as if the Anthropocene had loosened tongues, even set them wagging.

It may well be that critical thinkers are so used to debunking the pretenses of neutral rationality on the part of the general process of objectification—this monotonous, all-conquering wave turning into an object everything it touches—that they did not know how to slow down and think with the "objective" prospect of global climate change. It is clear that the purely symbolic naming of a geological epoch offers more comfort than the "objective" claims of climate models, all the more so as "Man" can thereby recover its central place under the guise of a now self-conscious geological force. And it may be that Marxist and post-Marxist thinkers are, for their own distinct reasons, in the same situation.

Here I would invoke Tronti's (2013: 146–47) claim that autonomist thought is and has to be partial, and I readily admit that the climatologists' claim for neutrality evokes legitimate suspicion. They may well endorse the slogan that we are all "equally" concerned by the coming climate disorder or even that this is a "state of exception" justifying an imposed unanimity transcending political conflictuality. But the fear of falling into such a trap may turn partiality into the identification of anything that troubles the categories of the struggle with a trick of the enemy. Escaping the trap as an end in itself, then, verges on idealism, demanding that whatever complicates the struggle be ignored as still another seductive operation. Is this what explains the remarkable silence of autonomist thinkers facing the question of climate change?

Rather than escaping, it might be better to unravel the trap. We may begin by emphasizing that the definition of an "objective," "global" climate change does not signal some encompassing triumph of scientific rationality. It is simply the only scale at which the climatologists' models have a meaning. Those models, like all tools for the definition of any scientific object, are never neutral but actively partial, privileging, and discarding. But the distinction between the objectivity that they obtain and a world-conquering pseudo-objectivity matters. What those models discard is not disqualified as illusory or "only subjective" but remains a matter of ongoing concern: the climatologists' results must demonstrate that the models do not crucially depend on their partiality, on what they keep and what they ignore. The leading and very specific questions of climatologists are thus about the reliability of their working abstractions, given all that these abstractions abstract from. They ceaselessly rework and complicate their modeled scenarios to test the stability of the outcome when the role of this or that intervening process is taken into account and incorporated.

Such a specification matters because it leaves the ground quite free for critical and political questioning. Climatologists may well sound the alarm,

but their models do not provide the answer to be given to this alarm. And that may be another explanation of the autonomist thinkers' silence. It may well reflect the disarray that makes us all spectators with no grip on what is happening, with just maybe, in their case, the dark satisfaction of having been right in claiming that there is only one solution, to put an end to capitalism. Anyway, the silence of those who are needed to think with the consequences of the climate question was my concern when, in 2006, I began writing the book now translated as *In Catastrophic Times* (Stengers 2015).

The Intrusion of Gaia

In 2008, just before sending the manuscript to the publisher, I felt obliged to rewrite the first pages, explaining why I felt my admittedly partial grasp had kept its relevance in spite of the global financial crisis that had just happened and that was attracting so much attention. The dissymmetry was striking between two stories that were indeed intersecting: one purely human, with its conflicts, speculative crises, ongoing capitalist predation and exploitation blessed by the states in the sacred name of growth; the other silently, obstinately imposing its own stakes, with the earth no longer being just an object of destructive predation but turning also into an awesome protagonist that would not be returned to the background, that is, would not regain its previous "Holocene" stability in any predictable future.

In contrast with the Anthropocene naming strategy, of which I was not aware, the name "Gaia," which I chose, does not promote any figure of Man or Mankind. It refers to James Lovelock's understanding of the radical historicity and exceptionality of the atmosphere, soils, and oceans of the earth, both sustaining and sustained by life. In other words, it names the global scientific being that today's climatologists are discovering as prone to global mutations, whereas Lovelock first characterized it as self-stabilizing (Lovelock and Margulis 1974).

Gaia—as the one who is "intruding"—is not, however, meant to express scientific knowlege. Climate disorder may well concern all inhabitants of the earth, but the term *intrusion* specifically designates "us," and "our" stories, of which we humans are the only true protagonists, as the ones who are intruded on. We who have also unleashed capitalism on the whole earth and its inhabitants, and we who have developed the technoscientific means to decipher the threatening climate mutation that has been triggered by capital's so-called development.

In Catastrophic Times is meant to ring the alarm not about the climate disorder as such but rather about the temptation to claim that the "problem"

has to be left to those who are responsible for it, meaning the state and capitalist powers. On the one hand, national states have renounced any capacity to address a threat such as that of climate disorder in any way that would thwart the laws of the market. On the other hand, capitalism is perfectly able to turn this new situation into a source of new opportunities with the radical irresponsibility that Marx so effectively characterized. Addressing those who were tempted either to trust the promises of a so-called green Capitalism or to ignore or even deny the "inconvenient truth" announced by the IPCC scientists, I wrote that "struggling against Gaia makes no sense—it is a matter of learning to compose with her. Composing with capitalism makes no sense—it is a matter of struggling against its stranglehold" (Stengers 2015: 56).

Learning how to compose with Gaia complicates the reading of the capitalist hold over us. In this sense, my book, addressed to both ecologist and Marxist or post-Marxist activists, endeavored to prolong Guattari's (2008) insistence on the commonality of the "red" and "green" struggles. While Guattari had stressed the nonseparable character of the triple devastation affecting, respectively, the earth, the individual mentality, and the collective production of subjectivity, I stressed that capitalism is not only exploitative but also destructive of what it appropriates, including the collective capacity to think and act and imagine together, and I related this destruction to our present-day collective and individual disarray.

Today those who oppose the term *Anthropocene* often follow the proposition of Jason W. Moore (2015), to name our epoch "Capitalocene." But Moore does not just propose another name. Proposing that the Capitalocene begins not with English industrialization but with the "long sixteenth century," he situates Marxist exploitation in the larger frame of capitalist "extractivism." The enclosures, the destructive transformation of ecosystems into monoculture, the systematic destruction of forest, the slave-labor plantations—"Plantationocene" (Haraway 2015) is another proposed name—predate industrial development and tell us about the inseparability of social and ecological transformations, an inseparability that questions the Marxist trust in capitalism paving the way to socialism. It would instead herald the perfect socioecological storm, which systematic extraction is now unleashing.

However, proposing alternative names and diagnoses for our epoch is not sufficient. It may point to those responsible, but those responsible cannot be asked to repair the damage, which they are only equipped to turn into new and profitable speculative operations. Moreover, even if we escape geoengineering and even if, very hypothetically, the emission of greenhouse

gas were to be successfully limited, the process would not stop—a runaway, self-amplifying climate change may be avoided, but there will be no "return to normalcy" for many centuries.

This needs to be emphasized because today the cold panicky feeling of urgency creates the impression that 2050 is something like a deadline, after which it will be "game over." But what is awaiting us is nothing like the big flash of a nuclear "apocalypse"; it is rather the continuation of what is already happening, the ongoing erosion, or brutal destruction, of everything that we came to take for granted. Anna Lowenhaupt Tsing (2015) writes about "living in the ruins," and some autonomists I know would say that this is what we are already doing. I would agree with them, except for one important difference. We do not know what will happen when ordinary people share this conviction and realize that the future holds no promises. This is an unknown, but this unknown is already with us, and it is the one that may give autonomy a new, problematic meaning.

The Stories We Tell

Inhabiting ruins may mean many things, the most probable one being desperate barbarism, *vae victis* (woe to the defeated) and the disappearance of any democratic horizon. This is not very hard to imagine, as it is already coming. The story is ready with its self-validating effects: under duress, we can no longer afford the luxury of maintaining what was only a dream anyway; it is to be accepted that people, egotistical and irresponsible as they are, need guardians.

In contrast, we cannot today imagine, never mind theorize, what would be a life *worth living* in the ruins. It is for the coming generation, and the others that will follow, to eventually discover and sustain answers to what is for us only an abstract question. What we know, however, is that, for better or worse, they will inherit stories and experiences that may sustain or poison their imaginations. Those stories and experiences engage our present response-ability in the Harawayan sense—our capacity to respond before those who will live through what many of us will mercifully escape. Thus I will endorse one of Donna Haraway's (2016: 12) refrains—"It matters what story we tell to tell other stories."

What matters first is to reject "Gaia" as imposing a master story, from which a diversity of stories about guilt, responsibility, and duties would be derived. Gaia tells no tale about the way the situation, which now includes its intrusion, is to be addressed. More precisely, the only tale it tells is about

greenhouse gas emissions, which should be reduced, but it is mute about the manner of this reduction. It is here that the Anthropocene takes the relay and defines for the abstract Anthropos an overriding apolitical mission: "to take responsibility for the planet." Such a mission may well be coupled with capitalism in a way that promises new ruins, and it probably also heralds an authoritarian disciplinary regime with no tolerance for troublemakers. Indigenous peoples are already having a taste of the kind of global governance awaiting us, when, in the name of conservation, biodiversity experts and their quasi-military guards keep them under surveillance as suspects, liable to endanger "our" world heritage.

In other words, Gaia signals a global threat, but the way to answer this threat is, and will remain, a matter of struggle against those who will present global governance (and global capitalism) as the only "objective" answer, an answer directly derived from the signal, transforming its necessary abstraction into a power legitimated by rational necessity—probably including geoengineering attempts if the possibility of stopping extraction is to remain off-limits.

However, ignoring the signal is not an option. Gaia is well and truly intruding, and this intrusion cannot be smoothed down with epicyclical arguments revamping the master story that turns capitalist development into what prepares the way toward human emancipation. The stories we need will have to recognize that if there ever was a successful capitalist trick, it may well have been the one that characterized as reactionary nostalgia struggles resisting the ongoing process of extractive devastation wrought by the "revolutionary bourgeoisie." This entails problematizing the accusation against ecology as a kind of religion—the "new opium of the people," in the words of Alain Badiou (Feltham 2008: 139).

I will certainly not deny the very unfortunate apolitical stance that many environmental movements have adopted, as if their cause transcended social questions, or their frequent moralism denouncing "human guilt." Nor will I deny what Naomi Klein (2014: 191) describes as "the disastrous merger of Big Business and Big Green" or the neocolonialist character of many conservationist strategies. But the tale I would tell is one of a missed opportunity rather than the constitutive weaknesses of "environmentalism."

Indeed, a story may be told that emphasizes the de facto anticapitalist character of environmentalism. As we know, the birth of this movement can be associated with the release, in 1962, of Rachel Carson's *Silent Spring*, which sounded the alarm not only about the danger of DDT for human health but also about its cascading effects, bringing attention to the complicated and

fragile interdependency between living beings that the chemical was destroying. Recently, James Boyle has argued that the "protection of the environment" should never have been described as an egotist concern of the "bourgeois" for their "quality of life" (Boyle 2008: 239–40). Instead, the blind destruction of ecosystems—with ugly, dangerous, and possibly irreparable effects—is to be seen as a direct consequence of the functioning of the market, which does not, will not, and cannot demand that industrial extractivist activities internalize their environmental (and social) costs. The reference to "the environment" was thus for Boyle a successful creation of a general framework for disparate but correlated impacts. It brought together people suffering from these impacts and fostered a collective recognition of their interdependence (Boyle 2008: 239–40). Today this recognition has evolved into a remarkable "ecoliteracy" of many green activists, who have become sharp (non-Marxist) anticapitalist analysts of so-called development's vicious circles.

The point here is not to produce a new master story promoting "reconciliation" between misguided opponents. It is rather to speak about what Guattari called a "transversalization" of struggles. The ongoing European resistance against genetically modified agriculture was, and still is, a case of such a transversalization, which created a political culture to which I am indebted. For many people, it was at first just a matter of defending the environment and of protesting against potential health risks. But it produced a collective and widely shared learning process, weaving relations among the question of intensive industrial agriculture, environmentally destructive pesticides and fertilizers, the danger of monocultures, the monopoly on seeds, the patent policy, the problem of genetic transfer and acquired resistances, the direct enslaving of public research to the private sector by the knowledge economy, and the resulting conflicts of interest that make contemporary expertise deeply unreliable. This web of interdependent reasons to resist is effectively linking seeds, pests, soils, human productive activity, capitalist strategies, science, law, and politics into a transversal anticapitalist "ecoliteracy" (Capra and Mattei 2015: 174–78).

It is important to emphasize that ecoliteracy does not refer to some encompassing theoretical knowledge derived from ecology as a science—a new master story. It is about paying attention to situational interdependency, to the ramified connections that make up each particular situation. It is about the vulnerability of monocultures and the danger of any dream entailing that diverging attachments should, in one way or another, be overcome. "Life in the ruins" will demand not "sober senses" but rather senses attuned to the destructive consequences of submitting an issue to general principles.

Reclaiming

Today, when reading Klein's *This Changes Everything*, one experiences dying inside. One can only imagine what she herself experienced during her years of investigation and writing: it is indeed "capitalism vs. the climate," and we are doomed. However, in the last part of the book, when she comes to Blockadia, the creation of learning and cooperative relations between activists and more generally the involvement of indigenous peoples, one may experience life flowing again, resurfacing through layers on layers of fear and desperation.

In Notre-Dame-des-Landes, a zone to be defended (ZAD—in this case against an airport project), autonomists coexist with ecology activists and peasants refusing to leave the land, and their blockading alliance has successfully resisted all predictable divisive maneuvers (which of course are deployed around the theme of activist "violence"). Notre-Dame-des-Landes's obstinate and creative resistance may be claimed as an exemplum by many, including autonomists of all brands. But I would insist that its chief achievement, the heterogeneous crowd it succeeds in gathering, should not be seen as a case illustrating a general communicative and cooperative human capacity. It requires ongoing exchanges, generating mutual sensitivities, and learning how to cooperate and care for one another's reasons to resist. I would call such exchanges "palavers," referring to ancient practices that gathered explicitly situated, attached people, but which have been destroyed by colonialism. In palavers, the divergence of those gathered is not an obstacle to be overcome. It is rather the very condition for the generation of an "autonomous"—not imposed by any arbiter, including the rule of the majority—"consensus," "a sensing together" what the place or the issue that gathers them demands.

I am quite conscious that associating autonomy with the "regeneration" of an ancient, destroyed practice like palaver is a risky move, as if something like a "genuine," "authentic" past could be recovered and as if I were idealizing a past when people knew how to "sense together" in a manner free from "social control." But this objection is part of the regeneration process and must be posed from within it. Reviving a destroyed practice is not resurrecting the past "as it was"; it is reviving a past that is neither authentic nor imaginary because it is now related to the struggle or the need to resist what we all know only too well. It is not by chance that feminist groups were pioneers in learning how easily what Spinoza would call "sad affects" come to dominate "free" discussions and how to actively and creatively counteract this process by reinventing "ritual" constraints on the ways of taking the

floor, addressing an issue, and interpreting a disagreement, which are the arts of palaver.

This coupling of regeneration and struggle has a name familiar to activists. To "reclaim" is not only to struggle against the identification of anybody or anything as a potential resource. The word *reclaim* points to the need to heal, to recover from the devastation. Reclaiming is not a matter of theory or of critical reflexivity—those privileges claimed by Anthropos. It must be taken in the plural. One never reclaims "in general" but instead reclaims by starting where suffering or humiliation or censorship are felt together with the nasty feeling that reminds one to keep "sober," to avoid being a dupe. The fear of being a dupe is what will probably have many readers objecting and snickering: How can one believe that it is possible to give to an issue the power to make people who have diverging understandings of how this issue matters feel and think together? That can only be obtained by sociopsychological tricks! Autonomy must be something else entirely! And then comes the argument for the need for a master story that transcends the others, dispelling the trouble.

I mean to try and "stay with the trouble" (Haraway 2016), characterizing autonomy not in philosophical, conceptual terms but by starting from devastation, from the humiliation, shame, and temptation of cynicism that I take as signals of its destruction. This means that autonomy is not what "deterritorializing" extractivist capitalism would unintentionally breed, the old cunning of reason. It is what we see destroyed everywhere. It is experienced by workers when they accept the "gift" of work and learn to be "motivated," giving their very best even while they know that it will amount to nothing in the shareholders' calculation. And the destruction of autonomy is also what scientists experience when what is called the knowledge economy demands that they face their dependent condition with sober senses and forfeit any ambition to discover "good" questions opening to a partial but relevant understanding of what they address. Where extractivist mobilization is concerned, objectification is quite sufficient.

This last case may be interesting here because the way that research scientists are required to "adapt," to accept "flexibility," is widely thematized by those scientists as the loss of a collective "autonomy" that was the very condition of their practice. In "humanities" departments, we are not used to thinking of ourselves as part of a community, that is, as owing to a collective our capacity to think and question. But working with researchers in so-called natural sciences, I discovered a craft that I later characterized as a passionate and intrinsically collective attempt to create situations empowering a differ-

ence between relevant questions or representations and unilaterally imposed ones. Objectivity was a collective achievement in which a situation had obtained, through scientists' propositions and objections, the power to have them agree about the way it should be interpreted (Stengers 2000: 79–82). *Autonomy* since the end of the nineteenth century has referred to the claim that working with questions imposed from the outside would destroy the possibility of such achievements, would "kill the goose with the golden eggs." Scientists now feel betrayed by their "allies," the state and industry.

We in the humanities do not promise golden eggs to anybody, and it is fairly easy for us to understand the autonomy of the goose as tainted. But again thinking with the devastation, I will bless no gift from capitalism, even the one that would allow us to happily conclude that the (relative) autonomy that our colleagues were conceded was worthless, that its destruction is well deserved. Instead, I would ask: What would reclaiming be for scientific practitioners and their very specific, partial manner of relating with the world? Not a return to the past, but scientists struggling against the destruction of what makes them think and imagine *and* learning to recover—to heal—from their institution's symbiosis with the state and capitalism. And that means healing from the kind of autonomy they were conceded, the price of which was an ingrained partiality for those who were able to turn their "eggs" into gold, a mutilated imagination concerning the destruction of other ways of knowing, relating, having the world matter. Healing is not a matter of affirming democratic goodwill. It is a matter of scientists becoming able to disentangle their own way of making situations matter from any dream, however private, that the objectivity they achieve could be able to dispel subjective beliefs. Reclaiming scientists are those who would become able to participate in "palavers," adding their divergence to other diverging voices (Stengers 2011). We do not need "neutral" climatologists; we need struggling climatologists, acutely aware of the need to enter into alliances against those who will refer to their knowledge in order to conclude, "We have no choice but to . . ."

An Experimental Art

The regeneration of the art of palaver or other reclaiming practices does not offer grand perspectives about some common destiny of humanity. Furthermore, those who engage in such practices do not need the blessing of theoreticians or philosophers like me. What I endeavor to convey is what I learned from them and from the stories they already tell. They help me, as they helped Klein, to envisage the possibility of a life in the ruins. And what I will

address now is the question of reclaiming as it may concern us, idea-crafting people, who too often feel that our duty is to critically test and select as worthy or unworthy what tries to find its way in the world.

The feminists of the seventies, pioneers of the reclaiming adventure, did not trust academics and their theories. The experience that the personal is political was generated in closed circles, protected from the inquisitorial, ironical, or well-meaning presence of those for whom facing "reality" with sober critical senses was, or should be, enough. Critical theory has no efficacy over private dreams; it just makes them shameful or guilty. Reclaiming as the transformation of experience implies a collective demanding experimentation, an immanent cultivation of the means aiming at creation as an art of the effect. As such, it implies caution and humor, never irony, never the distancing, critical reduction of the means to mere instrumental psychosocial tricks. As neo-pagan witch Starhawk (1982: 219) says: "The smoke of the burned witches still hangs in our nostrils" (see also Stengers 2008). Witches are no longer burned, but witch hunters are still around, analyzing the mechanisms of self-deception of which witches and their prosecutors were equally the victims, or, as true children of Plato, downgrading the art of the cook and praising that of the physician who derives the means to heal from intelligible principles.

To qualify reclaiming as experimentation is to emphasize that the art of experimentation, be it a scientific one or a reclaiming one, will always be found lacking with regard to conceptual necessity, negatively contrasted with what can claim to manifest an intelligibility transcending artful operations. Experimental sciences can be disqualified as a product of instrumental reason, but the situation is obviously worse with the "artificial" constraints that "thwart" free communication. Let us not even think of rituals that convoke or invoke "fetishes," like the Goddess or Mother Earth. In their case, the claim that it "works" will not even be considered but will rather be a reason for rejection.

Benedikte Zitouni calls attention to the fate of ecofeminism, now widely characterized as an essentialist regression or, worse, a spiritualist one. But at the beginning of the eighties, ecofeminism was associated with the many "ordinary" women, not theorists, who endeavored to confront the feeling of despair and terror provoked by the looming menace of nuclear war, to break the business-as-usual anesthesia, to connect with their fear. They called themselves Women for Life on Earth, or ecofeminists, and succeeded in making themselves effective nuisances. But they first had to learn to do so, and they did it together in improvised protest camps, Greenham Common, in Berkshire, England, being the most famous one. Zitouni (2014: 256) writes:

> The camps loosened fear's grip. They broke the apocalyptic spell. This is one of the big achievements of the ecofeminist protests of the early eighties: women got out of the end-of-time paralysis; they stopped running against time and started working at change for the long run. How did they do this? How did they break the spell? It's hard to tell, as collective causality meanders, but the rituals definitely played a major role. Indeed, at the camps, all kinds of rituals were set up, all meant to raise constructive womanly powers against the powers of planetary destruction. This was no easy feat. Rituals are demanding. They require a consecrated place, a cosmology and a community of their own, if not authentic ones, at least effective ones. Only when those requisites were met, could the rituals truly take hold and the spell be broken.

Ecofeminism today has become the name for an academic doctrine criticized for ignoring gender theory, for claiming a privileged relation between what it should have recognized as two artifacts, woman and nature. As for the Goddess, she has been excised from the rituals that experimented with ways to connect with her and to receive the imagination and strength needed to resist in a life-affirming manner. And her impotent ghost, critically fixed in terms of theoretical coordinates, has been advised not to pollute academic grounds. The memory of the event sleeps in the archives.

Writing for theorists and remembering the fate of ecofeminism, I can only hope that the *operaist* adventure, learning from and with the workers, will not be forgotten and that what gave to Klein a measure of trust in the possibility of a future worth living, even in the ruins, will not be the object of critical suspicion by autonomists. Certainly, the capacity of reclaiming operations to "transform the world," as Marx would say, is very, very far from warranted. Reclaiming adventures address a devastated world, not the terrain that should make real some exalted potentiality. If they are judged in terms of such a potentiality, they will be seen as artificial reterritorializations, just as the ecofeminists were, those crazy witches. And I also can only hope that theorists will not deride what activists learn from indigenous peoples, defacing it as some kind of superfluous, even regressive, romanticism. The common feature of reclaiming operations is that they always need to betray the view that devastation is to be embraced as the condition for the manifestation of a truth that comforts critique.

Does this mean that there is no room for critical examination? The objection can be predicted: the revival of mythic pasts also worked for Hitler, and so does it for the Islamic State today. Blind pragmatism cannot do. But we must also question the easy way that pragmatism is associated with blindness. The way Zitouni tells the story of ecofeminist activism is not neutral,

but neither is the story that buried it under a blanket of critical judgment. The point is not that both are relative. The difference between them matters if we think in the presence of what it means and will mean to "live in the ruins." Zitouni's story is about women escaping anesthesia, connecting with the situation, not praying to some saving divinity, leader, or truth to dictate the way. In the words of the witches, they were experimenting with rituals that would enable them to "do the work of the Goddess," and this first meant that they would trust no authority, no charismatic or theoretical shepherd, to define this work. Telling how, in order to struggle, they had to learn to mourn together, and to generate transformative connections between them and with the situation, may well be a story worth relaying in the ruins. Pragmatism, here, means bringing "autonomy" from the sky of ideas to the earthly practices that may be needed in order to become able to cast our lot with ways of living and dying (Haraway 2016), in order to consent to the ultimate precariousness of any way of being.

Relaying

Like any experimentation, reclaiming needs critical attention. But it may well be that, just like scientific practices, the kind of critical attention it needs is to be part of what Gilles Deleuze and Guattari call a "war machine." The problem of war machines is that they call not for judging but for relaying. They need "an ambulant people of relayers" (Deleuze and Guattari 1992: 377).

This is a testing proposition because relaying is never "reflecting on" but always "adding to." It demands consenting to an ongoing process, accepting that what is added can make a difference to the process, and becoming accountable for the manner of that difference, the manner in which the thinker casts his or her lot for some ways of going on and not others. This is no blind pragmatism but an adventurous, response-able one, imposing hard demands on what is called critique.

It should be obvious that casting one's lot means partiality but does not exclude formulating matters of critical concern. It only means that the concern must be such that it is liable to be shared with those who arouse it, liable to add new dimensions to the issue of their struggle, for instance, to activate entangled transversality against the always-present danger of "black hole" sectarian closure. In other words, the concern has to be immanent, exhibiting what has been learned from the situation—not imposing abstract imperatives derived from a theory but "staying with the trouble." *Relay* means to never idealize, that is, to never demand or even hope that what one relays will

be true to one's ideal, to never take it as an exemplum only to furiously disavow it if it betrays this ideal, however justified.

Today, when it is a question of living in the ruins, precursive signs multiply about new ways of struggling that certainly require critical attention. I will not follow David Bollier's (2014) story about commoning being a new socioanthropological paradigm for an already-present "world of the commons." Social paradigms are by definition freely extensible and a favorite of the media and social engineering. The fact that more and more projects are framed in the terms of this so-called paradigm may merely bear witness to the current public authorities' concern with the creation of social linkages and motivations: collective gardening, for instance, may become a strategy for state-supported enterprises seeking to integrate the poor, the handicapped, and the jobless. A paradigm can also conceal the hard learning and healing path from the initial enthusiastic creation to the exploration of what it takes to endure; it does not dramatize the struggle necessary to escape the shackles of the market in a world where private property rights rule.

Given the rosy picture of a new paradigm, the temptation is strong to classify, to select and reject. It may be rather easily agreed that there are "no commons without commoning," which distinguishes them from common goods as an inappropriable heritage of humanity. But beyond that, critique is a bit redundant given the ongoing hard discussions about the very definition of the commons. Are they, as Elinor Ostrom (1990) first considered them, a matter of management, by a community of users, of a fragile resource, which will be destroyed if abused? Or should we, with Pierre Dardot and Christian Laval (2014), insist that true commons are antagonistic political institutions, with no compromise with the market, and thus defined not by a shared resource but by human praxis? Or do we have to take into account inclusive commonists who refuse both positions because both put human interests at the center and who define commons as including all the partners whose lives presuppose and require each other, from humans to humus?

When the problem is that of relaying, however, what matters is not to define or evaluate but to address the question that may transform the researcher into a relayer. If I choose to conclude a text problematizing autonomy with the non-Marxist perspective of living in the ruins, it is because the commons, bridging a destroyed past with a future that we can hardly imagine, may be a transversal reclaiming horizon. Relayers have to cast their lot not with a paradigm but with an ongoing question. Such is the question of what it takes to "think like a commoner." The old examples—the English forest or the urban guilds—are not models to be accepted or rejected, nor are

the analytical principles Ostrom derived a recipe. Those principles are precious as sine qua non conditions for self-governance—and thus also as what the struggle for the commons will be about—but they presuppose autonomy, the capacity of commoners to produce their own rules and also their capacity to collectively pay attention to the respect of these rules. Reclaiming the commons is not about rediscovering a lost tradition but about reactivating it, that is, reinventing it in a different epoch, a devastated epoch where this capacity itself is to be reclaimed, where the accusation of "social control" can be anticipated.

From the very beginning of this text I have cast my lot with the non-Marxist claim that the capitalist redefinition of our worlds is to be understood as devastation and that devastation as such breeds nothing other than barbarism. That is why I accept the challenge of the self-governance of commons, the invention of forms of enduring collective autonomy, even while it includes challenging what may be felt as "emancipation," a progress irreversibly separating us from the past. Meeting this challenge means reinventing/reclaiming both emancipation and the heritage of the past. In particular, it demands walking the line—or rather generating and fostering the line—between the enforcement of conformal normativity and the individualist rejection of all forms of constraint. And that is what requires relaying, the sharing of stories, experiences, and experiments of "healing," of recovering and reactivating what has been destroyed—the practices liable to confer the power to feel and think and decide together what a situation is demanding.

The need to "stay with the trouble," to not look for a reference that transcends the troubling entanglement of the diverging ways in which a situation matters, is a concern felt by many activist groups today. Such concern is what enables me to discern, and cast my lot with, a new understanding of autonomy as the invention of ways of living, not just surviving, in the ruins—whatever the final outcome. This is taking one, and only one, thing as a compass: that the outcome will not be associated with some epiphany of human exceptionality, of what is human in the human. Referring to palavers and their ritual constraints or to the specific, partial, collective way scientists relate to an issue, I tried to link autonomy with artifact, a *fact of the art*. This art could be characterized as turning interdependency, which is always the case, whether we like it or not, into an active constraint, a constraint that activates feeling, thinking, and imagining.

It may well be that, for theorists, the most challenging aspect of this proposition is the word *fact* because there is no beyond to such a fact, no

extraction of the concept from the anecdotal. But the fact has an impetus of its own: its cry, ¡*Sí, se puede!* (Yes, it can be done!), has an epidemic value, the efficacy of which is not in the model it would propose but in the imagination it may induce. As for *art*, it challenges the opposition between theory and spontaneity. Autonomy is not a flower spontaneously blooming in a devastated, depopulated desert. It needs relayed stories and experiences, the anticipation of testing, difficult choices, a sense of precariousness, the fostering of a taste for experimentation.

References

Bensaïd, Daniel. 2002. *Marx for Our Times: Adventures and Misadventures of a Critique*. Translated by Gregory Elliott. London: Verso.

Bollier, David. 2014. *Think like a Commoner: A Short Introduction to the Life of the Commons*. Gabriola Island, BC: New Society.

Boyle, James. 2008. *The Public Domain: Enclosing the Commons of the Mind*. New Haven, CT: Yale University Press.

Capra, Fritjof, and Ugo Mattei. 2015. *The Ecology of Law: Toward a Legal System in Tune with Nature and Community*. San Francisco: Berrett-Koehler.

Dardot, Pierre, and Christian Laval. 2014. *Commun: Essai sur la révolution au XXIe siècle* (*Common: An Essay on Revolution in the Twenty-First Century*). Paris: Découverte.

Deleuze, Gilles, and Félix Guattari. 1992. *A Thousand Plateaus*. Translated by Brian Massumi. London: Continuum.

Feltham, Oliver. 2008. *Alain Badiou: Live Theory*. London: Continuum.

Foster, John Bellamy. 2013. "Marx and the Rift in the Universal Metabolism of Nature." *Monthly Review* 65, no. 7. http://monthlyreview.org/2013/12/01/marx-rift-universal-metabolism-nature.

Guattari, Félix. 2008. *The Three Ecologies*. Translated by Ian Pindar. London: Continuum.

Haraway, Donna. 2015. "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6: 159–65. http://environmentalhumanities.org/arch/vol6/6.7.pdf.

Haraway, Donna. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, NC: Duke University Press.

Klein, Naomi. 2014. *This Changes Everything: Capitalism vs. the Climate*. New York: Simon and Schuster.

Lovelock, James, and Lynn Margulis. 1974. "Atmospheric Homeostasis by and for the Biosphere: the Gaia Hypothesis." *Tellus* 26, nos. 1–2: 2–10.

Marx, Karl, and Friedrich Engels. 1967. *The Communist Manifesto*. Translated by Gareth Stedman. London: Penguin Books.

Moore, Jason W. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso.

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action (Political Economy of Institutions and Decisions)*. Cambridge, UK: Cambridge Univeristy Press.

Starhawk. 1982. *Dreaming the Dark: Magic, Sex, and Politics*. Boston: Beacon.

Stengers, Isabelle. 2000. *The Invention of Modern Science*. Translated by Daniel W. Smith. Minneapolis: University of Minnesota Press.

Stengers, Isabelle. 2008. "Experimenting with Refrains: Subjectivity and the Challenge of Escaping Modern Dualism." *Subjectivity* 22, no. 1: 38–59. doi:10.1057/sub.2008.6.

Stengers, Isabelle. 2011. *Cosmopolitics II*. Translated by Robert Bononno. Minneapolis: University of Minnesota Press.

Stengers, Isabelle. 2015. *In Catastrophic Times: Resisting the Coming Barbarism*. Translated by Andrew Goffey. London: Open Humanities Press in collaboration with meson press. http://openhumanitiespress.org/books/download/Stengers_2015_In-Catastrophic-Times.pdf.

Tronti, Mario. 2013. *Nous opéraïstes*. Translated by Michel Valensi. Paris: Editions de l'Éclat; Lausanne: Editions d'en Bas.

Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton, NJ: Princeton University Press.

Zitouni, Benedikte. 2014. "Planetary Destruction, Ecofeminists, and Transformative Politics in the Early 1980s." *Interface* 6, no. 2: 244–70.

Pipeline Politics

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Introduction: Pipeline Politics

The system of oil and gas pipelines constitutes one of the world's major infrastructure and logistics networks. In 2014, it was estimated that there were more than 3.5 million kilometers of pipelines on the planet—more than nine times the distance of the Earth to the moon. While the distribution of this pipeline network depends in part on whether a country is a producer of oil and gas (with petro-states having a larger network than non-petro-states), like other aspects of modern infrastructure (from road highways to their Internet variant), the presence of pipelines mirrors existing global divisions of power and wealth. The United States, for example, possesses close to 2 million kilometers of pipelines; by contrast, Venezuela, a major producer of oil, has a system of a little over 7,500 kilometers in size. The United States is more than ten times the physical size of Venezuela; however, its pipeline system is more than *two hundred and sixty times* that of Venezuela's—a figure that should prompt us to think more seriously about infrastructure's role in enabling and sustaining differences in economic and political power.

Over the past decade, pipelines have entered political discussion and debate as never before, becoming one of the most visible points of social conflict over infrastructure and logistics. Pipelines are now part of mainstream politics and a subject of front-page news. The most well-known example of recent pipeline politics is TransCanada's Keystone XL project. This pipeline, which was to have been the final part of a multi-stage pipeline project, was intended to link up oil extracted in Alberta, Canada, with storage facilities and refineries based in the United States. The fact that the pipeline crossed the

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US border (and so was a project that had to be addressed by the US federal government) presented an opening for the environmental organization 350.org. Founded by author Bill McKibben, 350.org used the Keystone project to bring increased public attention to the environmental threats posed by the continued expansion of the fossil fuel system—both its effect on levels of atmospheric carbon dioxide and its potential impact on the water used for drinking and irrigation (the organization takes its name from the part-per-million [ppm] of carbon dioxide that has been identified as safe upper limit; as of March 2015, global levels of carbon dioxide were more than 400 ppm [Vaughan 2015]). In addition to the successful campaign waged by the 350.org against Keystone XL—the pipeline project was killed in November 2015 by an executive decision of President Barack Obama—campaigns have been waged against the expansion of pipelines within Canada and elsewhere in the United States and at sites around the world where the public wants to draw attention to the links between the energy we use and its environmental consequences.

Pipelines were never meant to be involved in politics. Though the pipeline system is as old as that of modern oil extraction and constitutes a physical structure nearly as large as highway systems (e.g., Canada's total system of paved roads is 1.35 million kilometers; its pipeline system is 825 thousand kilometers [Government of Canada 2014]), pipelines are hidden from view—underground, off in the distance, so prominent in the landscape of modernity as to be taken as a necessary part of it. As historian Christopher Jones (2014: 124) points out, pipeline infrastructure was developed as a device for controlling who would profit from the flow of oil; it was not merely a technical device for getting oil to consumers. In the United States, oil pipelines emerged in the 1870s as a system by which a new oil company—Tide-Water—was able to circumvent Standard Oil's control of the transport of resources via railways, thereby moving its oil at cheaper rates than its competitor. One of unexpected outcomes of this struggle over ownership and profit was the disassociation of energy extraction from energy consumption, which has had profound implications for the environment. As Jones (2014: 143) points out, from the very beginning of the pipeline system, "the users of oil gained the benefit of cheap energy without assuming responsibility for its environmental damage." Until recently, pipelines have not played a role in politics in large part because they were, on the whole, as socially invisible as they were physically distant and out of sight, neither encountered by the public in daily activity nor featured in their social imaginaries.

The new visibility of pipelines is due to intensified anxieties about the impact of fossil fuel use on the planetary ecosystem and its repercussions for

the future of the environment. Concerns about global warming and climate change are no longer limited to specialists. Governments around the world and the constituencies they represent are fully aware of the environmental implications of a consumer capitalism that makes heavy use of natural resources and that has tended to treat the fossil fuels that it runs on as infinite and inconsequential. To date, this awareness of and interest in mitigating the effects of fossil fuel use has not translated into effective policies or practices. This gap between awareness and action has drawn the attention of academic researchers across the disciplines, from social psychology and sociology to political science and philosophy, and it remains one of the key challenges of environmental politics today.

Oil becomes visible when the oil system fails—witness the global media attention that followed the 2010 Deepwater Horizon spill, which resulted in (among other things) the largest environmental fine in history (Macalister 2016; Rushe 2015). However, even in the context of oil spills and environmental anxieties, the true (if unexpected) reason pipelines have developed newfound visibility is because of the borders they cross. Pipelines have long been an example of what Keller Easterling (2014) has described as "extrastatecraft"—examples of infrastructural technology that contain and orchestrate the imperatives and ideologies of capitalism and neoliberalism under the guise of being the dead, neutral objects required by modernity, whatever form they might take. In the attention that governments and communities now pay to the pipelines that pass through the territories they govern and inhabit, respectively, we are witnessing the transformation of objects of extrastatecraft into those of statecraft. In the process, pipelines and the fuels they carry are no longer treated as necessary or self-evident but as objects and processes that can—and, indeed, must—be questioned and challenged.

The Keystone XL project is the most obvious example of the activation of a politics of pipelines in relation to border crossing. In addition to the work of activist groups, the movement of the pipeline across the border between the United States and Canada brought national, state, and provincial governments into play, either as advocates or as opponents of the project. Another multinational project—BP's Baku-Tbilisi-Ceyhan (BTC) pipeline, which runs from Azerbaijan to Turkey's Mediterranean Coast—has drawn the attention of environmental activists, artists, and researchers, and has resulted in a range of critical inquiries that has made the pipeline, which BP had intended to be invisible, into a centerpiece of discussions about fossil fuel futures.[1] Even within countries, a range of sovereignties has come into play to disrupt

the once easy movement of pipelines across territories. The extended debate about pipelines in Canada, the focus of which extends beyond Keystone XL to include other mega-projects such as the Energy East, Northern Gateway, and Trans Mountain pipelines, has been generated by the distinct and conflicting imperatives of the polities involved: federal and provincial governments, municipalities, and, especially, First Nations communities, who have been asserting their sovereign right to determine whether pipelines should cross their territories.[2] Even private property has become a means of challenging the right of oil and gas companies to employ eminent domain (the "takings clause" of the Fifth Amendment to the US Constitution) to lay their pipelines, in the wake of pipeline breaks and seepages that have rendered property unusable and imperiled health.

With the activation of pipelines as key sites of environmental politics, we appear to have reached a new stage in the political history of energy. For many, Timothy Mitchell's *Carbon Democracy* has become an important text in explicating the relationship between energy form and political power. One of the many compelling claims that Mitchell makes in this book concerns the rise and fall of mass political actions in relation to dominant forms of energy. The most common form of mass action is the strike, which Mitchell connects with the job actions first taken at coal mines. "The rise of mass democracy is often attributed to the emergence of new forms of political consciousness," writes Mitchell (2011: 12). "What was missing was not consciousness, not a repertoire of demands, but an effective way of forcing the powerful to listen to those demands" (21). The widespread adoption of coal as an energy source meant that, for the first time, the vast majority of people in industrialized countries became dependent on energy produced by others. The production at specific sites across northern Europe of coal that then had to be channeled to other sites along narrow railway corridors, with specialized groups of workers operating in large numbers at both ends, generated the material conditions for a form of political agency—the strike—that could be asserted through the disruption of energy flow. The ability of workers to effectively and immediately disrupt energy flow through strikes or sabotage gave their political demands special force and led to major gains for workers between the 1880s and the interwar decades, while also contributing to the development of workers' social consciousness. For Mitchell, the switch to oil from coal as the primary energy source for the global north from the 1920s onward impeded the demands of labor and constituted the basis for a form of governmentality that managed and limited the struggle for genuine democracy. The production of oil requires fewer workers than

does that of coal in relation to the amount of energy produced; oil-extraction laborers remain above ground in the sight of managers; and from the 1920s onward, 60 to 80 percent of world oil production was exported (2011: 37), which made it difficult to impact supply through strikes. Mitchell is blunt in his claim: the mass politics that emerged alongside coal was defeated by the rise of fossil-fuel networks that made mass action more difficult and changed the conditions within which class struggle took place.

The existing global networks of pipelines have not become spaces for job actions; nor have mass demonstrations next to pipelines impeded the flow of oil and gas along them, although vandalizing and destroying pipelines has proved to be an effective way for oppositional groups from Nigeria to postwar Iraq to vent their frustrations and advance their political claims.[3] Pipelines have, however, increasingly come to be figured as sites for the articulation of environmental fears, critiques, and hopes. It would be difficult—and simply wrong—to suggest that pipelines today weaken or defeat political action due to their capacity to disappear from view or to generate distance from the site of extraction and site of consumption. Politically, we appear to have come full circle, from visible coal to invisible oil to visible pipelines. Indeed, if pipelines now figure politically in ways that they never have before, it is because they index and figure the means by which infrastructure helped produce fossil fueled modernity and generate its consequences: a global society fueled by dirty energy, whose quotidian operations constitute a threat to existence.

"Every round of new pipelines and tankers and deep-water drilling rigs encumbers the next decades with an even more ponderous mass of infrastructure into which carbon has been locked: the ruts of path dependency deepen" (Malm 2016: 9). Each contributor to this special section highlights the dangers of adding to the ponderous mass of pipelines—or, in some cases, the system of oil transport that arises to make oil invisible again—and the possibilities that open up when we escape the ruts of depending on them.

Notes

1 In addition to the critical work of artist Ursula Biemann's video *Black Sea Files* (2005), major studies of the BTC project include James Marriott and Mika Minio-Paluello's *The Oil Road: Journey from the Caspian Sea to the City of London* (2013) and Andrew Barry's *Material Politics: Disputes Along the Pipeline* (2013). Barry (2009: 69) notes perceptively how the construction of the BTC at a moment of pipeline visibility has generated a new regime of "visible invisibility." In order to hide the pipeline from view, it had to be protected via "an extraordinary regime of observation: a more or less organized system of as many as ten levels of monitoring, involving both experts and non-experts."

2 For an overview and analysis of pipeline politics in Canada, see Szeman, forthcoming.

3 For reports on recent developments in Nigeria, see, for instance, News Nigeria 2016. Pipeline bombings, which were common in years following the United States' invasion of Iraq in 2001, have continued, with recent violence in Iraqi Kurdistan. See Johnson 2016.

References

Barry, Andrew. 2009. "Visible Invisibility." *New Geographies* 3: 67–74.

Barry, Andrew. 2013. *Material Politics: Disputes along the Pipeline*. London: Wiley-Blackwell.

Biemann, Ursula. 2005. *Black Sea Files*. Video. 43:51.

Government of Canada. 2014. "Pipelines across Canada." Ottawa: Ministry of Natural Resources, September. www.nrcan.gc.ca/energy/infrastructure/13751.

Easterling, Keller. 2014. *Extrastatecraft: The Power of Infrastructure Space*. New York: Verso.

Johnson, Keith. 2016. "A Mysterious Pipeline Closure Is Bankrupting Iraqi Kurds. *Foreign Policy*, March 2. http://foreignpolicy.com/2016/03/02/a-mysterious-pipeline-closure-is-bankrupting-iraqi-kurds/.

Jones, Christopher. 2014. *Routes of Power: Energy and Modern America*. Cambridge, MA: Harvard University Press.

Macalister, Terry. 2016. "BP Faces Further $2.5bn Charge Over Deepwater Horizon Spill." *Guardian*, July 2. www.theguardian.com/business/2016/jul/14/bp-fined-further-25bn-over-deeepwater-horizon-spill.

Malm, Andreas. 2016. *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming*. New York: Verso.

Marriott, James, and Mika Minio-Paluello. 2013. *The Oil Road: Journey from the Caspian Sea to the City of London*. London: Verso.

Mitchell, Timothy. 2011. *Carbon Democracy: Political Power in the Age of Oil*. New York: Verso.

News Nigeria. 2016. "Niger Delta Avengers bomb Shell's export pipeline the New Nigeria." *News Nigeria*, June 3. http://thenewsnigeria.com.ng/2016/06/again-niger-delta-avengers-bomb-shells-export-pipeline/.

Rushe, Dominic. 2015. "BP Set to Pay Largest Environmental Fine in US History for Gulf Oil Spill." *Guardian*, July 2. https://www.theguardian.com/environment/2015/jul/02/bp-will-pay-largest-environmental-fine-in-us-history-for-gulf-oil-spill.

Szeman, Imre. Forthcoming. "Pipeline Politics: Oil, Borders, and Energy Futures." *Resilience: A Journal of the Environmental Humanities*.

Vaughan, Adam. 2015. "Global Carbon Dioxide Levels Break 400ppm Milestone." *Guardian*, May 6. www.theguardian.com/environment/2015/may/06/global-carbon-dioxide-levels-break-400ppm-milestone.

Rachel Havrelock

The Borders Beneath: On Pipelines and Resource Sovereignty

The rise and desired fall of the Islamic State in Iraq and Syria have reopened the question of borders in the Middle East. Many commentators point to the long-term negative effects of joining disparate ethnic and religious groups within artificial borders, and view both the Syrian civil war and the dissolution of Iraqi federalism as indicators of the crumbling nation-state. Others insist that citizens always adapt to arbitrary boundaries, noting that the problem rests not in the states themselves but in their governments. Perhaps political structures are to blame, particularly authoritarian leaders who have pressed ethnic and sectarian alliances rather than fostering a unified populace. Still other critics fault transnational forces, first colonial and then Islamist, and hang onto national democracy as the redemptive paradigm. I enter the discussion as someone who researches the history of the oil industry in the Levant and writes about the various ways in which twentieth-century colonial borders have been domesticated and nationalized. From my perspective, the main issue is not borders but, rather, the historical configuration of sovereignty in the Middle East. The problem, furthermore, is not primarily one of territorial sovereignty but of sovereign claims to underground petroleum stores.

The history of the modern Middle East is also a history of pipelines, infrastructure that can "transform who controls the flows of petroleum and who profits from them" (Jones 2014: 124). A pair of pipelines, in particular, reflects a hundred years of corporate resource extraction and extreme militarization on the ground. The first pipeline, completed in 1934 to carry oil from Kirkuk in Iraq to Tripoli in Lebanon, was the colonial French line built

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in the name of Compagnie Francais de Petrols (Total) that asserted its jurisdiction at the same time as it restricted the exercise of Syrian or Lebanese nationalism. The second pipeline—the focus of my interest—was completed in 1935 and ran from Kirkuk to Haifa as a signature piece of British colonial infrastructure, which exerted considerable influence on the founding and subsequent histories of Iraq, Jordan, and Israel/Palestine (see figure 1). And, although sectarian dispute in Iraq may seem quite separate from the Israeli-Palestinian conflict, following the links of the pipeline reveals similar cases of ethnic warfare stoked by the financial beneficiaries of oil export. As anthropomorphized as it sounds, Western oil companies have ancestors from other colonial moments—so how I name them is subject to some historical debate—but it is safe to say that BP, Shell, ExxonMobil, and Total have promoted war in Iraq for close to a century.

The outcome of World War I brought the companies to the region as holders of concessions to everything beneath the ground in Iraq, Syria, Jordan, Lebanon, and Palestine. Anachronism is difficult to avoid here since the countries bearing these names came into being along with the concessionary grants.[1] These countries were born of agreements drawn among colonial powers during and following World War I. The Sykes-Picot Accord that bifurcated territory into spheres of British and French influence—corresponding with rough ideas of where dedicated British and French pipelines would run (Havrelock 2016)—set the tone for subsequent divisions into discrete nation-state colonies. Britain and France might have been happy with direct colonization had "annexation" through force not proven so expensive or unfavorable in the eyes of President Woodrow Wilson, who saw "self-determination" as coextensive with markets open to the United States.

After the surface area gained definition as spheres of influence, the colonial powers set up systems of governance. The semblance of local autonomy and the reality of foreign ownership of everything of value took different forms. The organizing principle was that of the mandate—ostensibly a form of European handholding on the way to national independence—recognized internationally at the postwar conferences in Paris and San Remo.[2] Mandates were intended as strategies of political management to protect European and American ownership of resources while keeping the price of local labor low. One effect was rivalry over which local ethnicity should rule, something the colonial powers noticed and promoted.[3] As it turned out, ethnic discord was the perfect distraction from the conversion of local minerals into a commodity. Within Iraq, officials emphasized ethnic and sectarian differences among Kurds, Sunnis, Shias, Jews, Yazidis, and Assyrians through different kinds of employment and treatment (Shlimon 2013: 32).

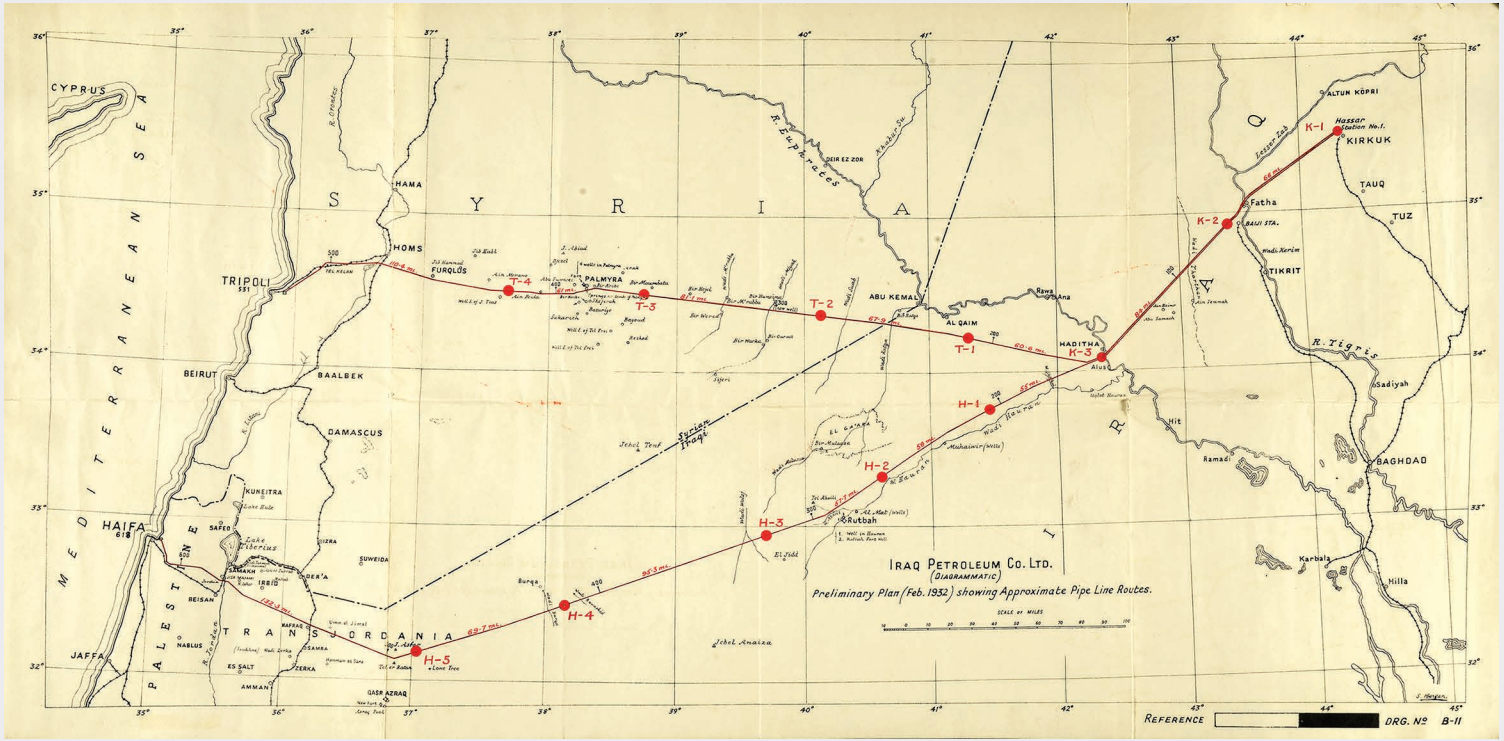

Figure 1. Haifa-Tripoli-Kirkuk pipelines map. Courtesy of the British National Archives

Beyond the "racialized labor management" recognizable in the oil industry across the world, the impact of this divide and conquer strategy was ethnic polarization as part of the very structure of the Middle Eastern State (Vitalis 2006: 22). Because colonial institutions and the oil companies foregrounded ethnic difference to counter the bonds among workers, ethnicity bedeviled the principle of citizenship and fractured national identity.

Sovereignty in these states depended on the alienation of locals from the oil beneath their feet. This is particularly true in oil-rich Iraq, where the Iraq Petroleum Company (IPC) established permanent control over subterranean oil fields, conferring human management on the British Foreign and Colonial Offices.[4] As observed by Eyal Weizman (2012: 12), aerial surveillance tends to enforce the architecture of this manner of colonial control. And, indeed, the British Air Ministry chartered flights along the paths of pipelines and built bases at pumping stations. A new lexicon emerged along with the colonial ordering of the political sphere. Those who opposed the mandate system were labeled "extremists." By virtue of their "extreme" demands, they could be attacked by land and air. Their moderate counterparts, in contrast, could be "placated by proof of our constitutional intention" or "discussion of electoral law" (Cox 1920). Moderates could be strung along by political promises, but extremists could be nothing but military subjects. This way of dividing the population, coupled with practices emphasizing Sunni, Shia, and Kurdish differences, persisted after Indian divisions of the British military suppressed the 1920 rebellion in Iraq and Faisal I became king of the thin surface covering the oil.[5]

Just as the borders of the nascent states were drawn to accommodate engineered paths of oil, so was the internal space militarized to thwart local claims to oil, surrounding land, and taxation. The companies owned the oil, yet the task of securing the path of pipelines fell to colonial governments. As much as the ownership of the subterranean sphere might be enforced through rule of the skies, the ground proved difficult to control. The solution took the form of local subcontractors where necessary or the more preferred proxy soldiers. As one of the few sources of livelihood, there was competition among local groups for guarding the conveyance of resources out of the region. As indebted as I am to Timothy Mitchell's *Carbon Democracy* (2011), it is here that my argument most acutely diverges from his (see 155–58). Where Mitchell views the militarization of the Middle East as a largely American solution to lost profits following the nationalization of oil by producing countries (insofar as lost oil profits were recuperated through weapons sales), the archive shows me that militarization was a strategy simultaneous with the development of oil concessions. Militarization followed an

ethnic or sectarian premise—certain groups were armed by particular companies to protect their assets from other locals or rival companies. When the young states later nationalized, they simply absorbed militarized space along with the concession structure that stressed ethnic and sectarian division.

For example, IPC air bases formed the nucleus of the Iraqi, Jordanian, and Israeli air forces. Because they marked the way to Haifa, the bases were known as the "Hs." H1, 2, and 3 in the Anbar Province formed the basis for the Iraqi air force following nationalization. H4, in Ruwaysid, became a Jordanian army base close to the Iraq border, and H5, in the IPC company town of Safawi, is the birthplace of the Jordanian air force. In 1931, the IPC's Mafraq Depot landing ground—currently alongside of Za'atri, the largest Syrian refugee camp in Jordan—became an official base of the British Royal and later Jordanian Air Force. The core of the Israeli air force complex Ramat David is the IPC base established by Roald Dahl in the early 1940s following the spate of attacks on the pipeline during the Palestinian revolt of 1936–39. While it is hardly exceptional for young nations to appropriate colonial infrastructure, the Hs quickly became the staging ground for attacks on immediate neighbors.

The year 1948 marked the end of the line from Kirkuk to Haifa. The IPC did not grant Iraqis the autonomy to advocate for commodity ownership, but it did allow them to assert nationalism by shutting down the Haifa line in the name of boycotting the Jewish state. At a cost of one million pounds to Iraq's treasury, finance minister Ali Muntez spoke of it as "a sacrifice which Iraq cannot escape to attain her sublime aims" (Iraq Petroleum Company 1948). The very last British troops remained in Palestine to guard oil infrastructure but eventually even they evacuated. The countries created by Britain to facilitate oil export could no longer accommodate the circuit that had so impacted their development. In other words, connections forged in the imperial context could not be sustained by Middle Eastern nationalisms. Suffice it to say that the various nationalizations of the concessions involved the absorption of ethnic competition and militarized space into the very fabric of the nation-state. Nationalist paradigms endured until the first decade of the twenty-first century, at which time oil and its infrastructure underwent re-privatization. This coincides with two military sequels—the Second Gulf War and the Second Intifada—which, among other things, raised ethnic and sectarian competition to a fever pitch.

The re-privatization of Kirkuk oil wells did, however, open the door for local Kurdish businessmen to acquire shares in the oil contracts and to initially enrich the region, albeit in uneven ways. The pumping of existing wells fell to Iraq's national oil company with partners of its choosing, but local bodies like the Kurdistan Regional Government (KRG) gained the right

to explore new wells and forge their own partnerships. The 2005 Iraqi Constitution suggests a conception of resource sovereignty that is both national and regional. According to Article 108, for example, "oil and gas are the ownership of all the people of Iraq in all the regions and governorates" (Associated Press 2005). This implies that while oil belongs to all Iraqis, the distribution of benefit from oil follows a regional principle (see also Article 109). Insofar as the premise strengthens local oversight and gain from petroleum resources, it is valuable to Iraq and beyond. The KRG with its long-standing parastate institutions found itself in the best position to maximize the option, and KRG spokesperson Safeen Dizayee continues to emphasize the "huge potential" for newfound oil reserves to be developed in the Kurdish region. However, major obstacles of a transnational—ISIS—and national—Iraq—nature have presented themselves. ISIS sets out to disrupt state and parastate functions and to capture petroleum resources for its own enrichment as Baghdad leverages the considerable petroleum stores of Basra in the south against oil companies who sign contracts with the KRG. The contest between the state and the regional government escalated in 2014 when Baghdad severed the KRG's budget as punishment for initiating independent oil deals. In turn, the KRG began marketing and distributing its oil, which is why this episode pertains to pipelines. Although it can envision oil routes branching off in all directions, the KRG has been moving its oil through a pipeline to the Turkish port of Ceyhan.[6] The Kurdish-Turkish-Israeli alliance emerging from this oil route shows the power of pipelines to restructure politics at not only the local but also the national level.

These moves toward Iraqi Kurdish oil independence mark the first structural departure from the concessionary structure. With around 5.5 million residents of Iraqi Kurdistan and 2 million (and growing) refugees and internally displaced people to support, the KRG must export Kirkuk oil and look toward new development options. Kurdish oil shares have made all the difference since ISIS came on the scene in 2014 and the Peshmerga had more to protect than the integrity of Iraq. The largely effective Peshmerga fight against ISIS is in no way incidental—those who hold a stake in their local resources are certain to fight to protect them. Kurds harbor long-standing desires for autonomy, but their current jurisdiction over local oil exhibits a form of sovereignty over resources rather than territory that models a path forward in the Middle East. Importantly, the Kurdish case proves that local stakeholders will raise an army where oil companies will not.

It also marks a test case for resource sovereignty in which a regional authority oversees resource sales and financial distribution while remaining within a federal system. To clarify, the principle of resource sovereignty

means here that Iraqi Kurdistan remains part of Iraq while having full jurisdiction over its petroleum, gas, and water resources. Since oil comprises 95 percent of the Iraqi Kurdistan economy, the KRG would enjoy financial independence without isolation or further militarization. However, a successful outcome of resource sovereignty depends on the dissolution of another colonial holdover: claims based on ethnicity. Therefore, as much as the Kurds need and deserve Kirkuk oil, settling the dispute between the KRG and Baghdad creates the opportunity for the sovereignty in question to extend to all permanent residents of northern Iraq/Kurdistan irrespective of ethnicity or religion. The bulk of the oil profits should support the lives of all residents in a historically multicultural place, rendering Kurdistani oil less Kurdish as KRG institutions form the basis for the regional resource authority. Long-standing local populations would have jurisdiction over the flows that run beneath them with the right to build consortia and partnerships of their own design.

As the war continues and local communities must continually mobilize against ISIS, it is high time to dispense with political structures that have benefited the same corporations again and again and instead confer the oil and gas claims in Iraq and its neighboring states on the people who live there. Long-standing residents certainly deserve to claim some blessing from their war-torn lands, which require substantive rebuilding. Mass consumers of oil may be far enough along the commodity chain to know that oil is really a curse, but local communities in the Middle East desperately need the revenue in order to initiate a process of basic stabilization. Therefore, we in the West should advocate for total local control of natural resources as we recognize that the kinds of ethnic divisions that plagued the nation-state should not constitute the basis for resource claim or management. That means there would not be Shia control or Saudi, Turkish, Syrian, or Kurdish claims but, rather, multiethnic regional authorities that operate oil wells and refineries as revenues are distributed among residents. To prevent the type of restricted ownership that has characterized the oil industry, local residents would vote in referenda on significant oil contracts.

In addition to serving as a financial pipeline to local armies for self-defense, resource sovereignty in the Middle East also makes the most environmental sense. As the carbon dioxide ratio in the atmosphere climbs (at this writing, 400 parts per million), communities everywhere face extreme trade-offs between fossil fuel consumption and the viability of human life on the planet. Where universal dictates such as the Paris climate agreement move too slowly to impact collective behavior, local initiatives catalyze positive behaviors in the name of saving watersheds from decimation.[7] In the

case in point, Iraqi and Syrian communities are in the best position to develop their oil in conjunction with projects to restore their devastated water sources. Now that the link between water mismanagement and the Syrian uprising is widely accepted (see Fountain 2015), world policy should insist on stabilizing Syria through water restoration projects. Better than Western, Russian, Chinese, or Gulf State aid, the Syrians themselves could fund such projects through mutually productive partnerships with companies and countries. On the Western side, such a scenario would liberate us from an accelerated pace of freshwater destruction as an outcome of extreme oil extraction in the form of tar sands mining and hydraulic fracturing. Insofar as extracting and transporting oil has had ruinous effects in the Middle East, reforming the ownership of oil marks the first step in dissolving the enduring legacies of colonial administration, authoritarian governments, and systematic militarization. It is high time for the concessions to expire in both letter and spirit.

Notes

1 In the 1925 Iraq Concession, for example, Iraq relinquished all claims to the subterranean sphere and received no share in the oil company for a period of seventy-five years, in exchange for which the Iraq Petroleum Company (IPC) agreed to pay the Iraqi government 400,000 pounds per year after oil profits began to circulate. Not due to expire until the year 2000, Saddam Hussein nationalized the concession in 1972. As an outcome of the Second Gulf War, however, BP returned to its original Kirkuk fields in 2007. The 1925 concession in Jordan granted Royal Dutch-Shell a one-hundred-year claim on any minerals discovered underground. The concession was changed in 1948 in the name of setting American companies (ARAMCO/EXXONMOBIL) free from its "self-restricting clause," which would have meant including the French and British in the American-Saudi partnership. The effect on Jordan was a reduction of the concession to eastern territory alone, which was never highly valued and therefore never abrogated. Shell initiated hydraulic fracturing in eastern Jordan in 2013 under the concession's enduring tax umbrella.

2 In the Treaty of Sèvres (1920), which concluded the San Remo conference and established the League of Nations, Syria and Mesopotamia were "provisionally recognised as independent States subject to the rendering of administrative advice and assistance by a Mandatory until such time as they are able to stand alone."

3 James Renton (2007: 11–17) describes how, during World War I, Britain reconceptualized the Ottoman "Middle East" as a region defined by ethnicity and the demand for national self-determination.

4 The only thing Iraqi about the company was the location of its oil. Through the 23.75 percent held by the Anglo-Persian Oil Company (what became BP) and Shell, Britain could count on a double share of 47.5 percent. It had wanted more for its trouble in Iraq but the US Department of State exerted pressure to assure a 23.75 percent share for the Near East Development Corporation (NEDC), essentially a Standard Oil outfit. The split among the Compagnie Francais de Petrol, NEDC, Royal Dutch-Shell, and APOC

was 23.75 percent rather than 25 percent in order to accommodate the eternal 5 percent of Calouste Gulbenkian, the cosmopolitan Armenian gentleman whose survey maps had inspired the whole project.

5 Constrained by borders and mandates and alienated from their natural resources, Arab nationalists across the region rebelled against their new overlords in 1920. T. E. Lawrence, who had fought on behalf of Arabia, begged his government in a July 23, 1920, opinion piece in *The Times* of London to take the oil and then grant Iraq political independence. Faisal, who had fought against the Turks with Lawrence, attempted to establish his rule over Greater Syria with support of the Syrian National Congress. After the French drove Faisal from Syria and put down the Syrian rebellion, the British brought him to Iraq as king.

6 Pipelines for oil, gas, and water are planned in the Mediterranean Sea from Ceyhan in Turkey to Haifa and Ashkelon, Israeli refinery cities.

7 My evidence derives from the two watersheds where I am most involved: the Jordan River Valley (through Ecopeace Middle East) and the North American Great Lakes (Alliance for the Great Lakes, Great Lakes Commons, Great Lakes and Saint Lawrence River Cities Initiative, etc.).

References

Associated Press. 2005. "Full Text of Iraqi Constitution." *Washington Post*, October 12. www.washingtonpost.com/wp-dyn/content/article/2005/10/12/AR2005101201450.html.

Cox, Sir Percy. 1920. High Commissioner of Iraq, June 21, 1920, British National Archives, formerly the Public Records Office FO 371/5227.

Fountain, Henry. 2015. "Researchers Link Syrian Conflict to a Drought Made Worse by Climate Change." *New York Times*, March 2. www.nytimes.com/2015/03/03/science/earth/study-links-syria-conflict-to-drought-caused-by-climate-change.html?_r=1.

Havrelock, Rachel. 2016. "Pipelines in the Sand: The Middle East after Sykes-Picot." *Foreign Affairs*, May 17. www.foreignaffairs.com/articles/middle-east/2016-05-17/pipelines-sand.

Jones, Christopher F. 2014. *Routes of Power: Energy and Modern America*. Cambridge, MA: Harvard University Press.

Mitchell, Timothy. 2011. *Carbon Democracy*. London: Verso.

Iraq Petroleum Company. 1948. "Oil: Iraq Petroleum Company." British National Archives, formerly the Public Records Office FO 624/130.

Renton, James. 2007. *The Zionist Masquerade: The Birth of the Anglo-Zionist Alliance 1914–1918*. New York: Palgrave Macmillan.

Shlimon, Arbella Bet. 2013. "The Politics and Ideology of Urban Development in Iraq's Oil City." *Comparative Studies of South Asia, Africa, and the Middle East* 33, no. 1: 26–40.

Treaty of Sèvres. 1920. Foreign Office press statement, Bagdad, June 22, 1920. British National Archives, formerly the Public Records Office FO 371/5227.

Vitalis, Robert. 2006. *America's Kingdom: Mythmaking on the Saudi Oil Frontier*. Palo Alto: Stanford University Press.

Weizman, Eyal. 2012. *Hollow Land: Israel's Architecture of Occupation*. London: Verso.

Toby Craig Jones

After the Pipelines: Energy and the Flow of War in the Persian Gulf

Energy's mobility within and out of the Persian Gulf has been a structural feature of war over the last four decades in the Middle East. Since the 1970s, the region has been the epicenter of energy "crises" and struggles by various powers to control oil's availability, its extraction, and how (or whether) it moves. American political-economic and military interests have been at the center of much of this so-called crisis. The convergence of Cold War anxieties, the uneven American approach to Israel's occupation of Palestine, a surge of resource nationalism, revolution, and a commitment in Washington, DC, to militarizing access to and managing the "free flow" of oil helped produce an arc of almost constant war. Much of the region's contemporary conflict is rooted in the rise of the supertanker and the post-pipeline flow of oil. In the last half of the twentieth century, ensuring the movement of energy in networks beyond the pipeline produced often unseen connections between oil and war. It is a history that began with the massive militarization of regional oil producers, including selling more than $25 billion in weapons to Iran and Saudi Arabia in the 1970s. Perceived failures in this period—revolution in Iran and the Soviet invasion of Afghanistan in 1979—led to permanent, ongoing interventions (Jones 2012). Although claims about American militarism in the Middle East are often attributed to terrorism, rogue states, weapons of mass destruction, and geopolitical anxieties, the mostly unseen movements of energy, and efforts to secure them, are at the heart of war in the region.

For critics (and even some supporters) of America's wars in the Middle East, it is hardly controversial to assert that there is a relationship between

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energy and war. Since at least 1991, when the United States led a campaign to dislodge the Iraqi army from Kuwait, criticisms that leaders in Washington were leading a war for oil resonated across the global political spectrum. Well before then, officials and observers began expressing their concern about oil's scarcity, the uncertainty of access, and the possibility of the disruption of its movement from the Persian Gulf as some of the main reasons for maintaining a strong US military presence aimed at securing the region. In the contentious 1970s, when oil politics fueled anxieties about "energy security," American leaders made a clear strategic choice to protect oil in the Gulf. Late in his presidency, President Jimmy Carter prioritized the use of military force to protect and secure what he called "strategic resources" in the Middle East. Protecting oil proved difficult, however, because oil-producing countries nationalized their oil industries and drove out foreign companies, which had historically managed the extraction and distribution of the region's resources. Reconciling the absence of direct control over oil with the political desire to assert power over Middle East energy emerged as a central dilemma for American strategists in the late twentieth century. Why and how were energy and war connected in the region at the end of the last century? If the American struggle to secure oil has been not so much about controlling this valuable resource and its pricing then how should we understand the relationship between the United States, oil, and war in the Middle East? The answer lies in the expansion of the Iran-Iraq war in the 1980s, the threats to energy that the war's spread seemed to represent, and the terms according to which the United States entered the conflict and sought to protect oil's "flow."

Ensuring the flow of oil and providing security for oil producers like Saudi Arabia are central to American interests in the Gulf. But the security-for-oil argument is a formulation that obscures more than it reveals. Neatly dividing energy and security into separate though related concerns misses the more important ways in which the two have become physically and technologically built into one another. The distinction between energy and war and the systems, networks, means, and infrastructures in and through which they move has been erased.

Since the mid-1980s when the United States entered the Iran-Iraq war as a belligerent military power, American policy makers and military leaders created a militarized system to coordinate the material means of distributing and moving both energy and the machines of war. The United States and its allies in the Gulf, a group that included the governments of Kuwait, Iraq, Saudi Arabia, Bahrain, as well as the governments of other countries,

understood that protecting (not controlling) the flow of oil required the creation of a physical network—a system on the waters of the Persian Gulf, that enabled their own movement, assured their primacy, and simultaneously limited the mobility of Iran. Naval and political leaders directly connected the movement of oil—its flow—to the movement of the American military. The arrangement and passage of US ships, including the rules and terms by which they acted, violently created new patterns of spatial politics, war, and security on the waters of the Gulf in the 1980s. The terms by which they did so were made in relation to the movements of oil supertankers and energy's infrastructure. The alliance of the United States and Arab oil producers helped build an order in which existing objects in motion, most importantly the giant supertankers that transported Arab oil, were linked to new ones, including US military warships as well as new kinds of militarized technologies. The result was a system in which energy was not just protected. Rather, it was a system in which energy, the "military," and war became constituent components.

Understanding the connection between energy and war, then, does not mean looking for evidence that American leaders sought to control oil in the ground or to assert a kind of nineteenth-century imperial position along littoral pathways; it means seeing the importance of militarized networks on water. Moving oil was critical, of course. But equally important was the creation and protection of the militarized network of transportation and distribution itself. This mobile network was a waterborne infrastructure that was both elastic and productively endangered.[1] The system itself was the "thing" in constant motion. Incapable of and uninterested in controlling the oil in the ground, American militarism in the Gulf aimed to control the ways that oil was transported—sea lanes, transit routes, waterways, and the maneuvering of the supertankers that moved energy. Of course, thereafter in the late 1980s and ever since, the United States and its partners in the region, especially Kuwait and Saudi Arabia, expanded the building of military bases and other facilities on land, creating an elaborate militarized network around the Gulf and Arabia. The origins of the regional militarized complex, however, were on the sea.

In particular, it was the spread of the Iran-Iraq war into and above the Gulf, as well as subsequent attacks on oil facilities and pipelines, that would eventually draw the United States in and lead to the permanent militarization of Gulf energy. Beginning in 1983, Iraq, followed by Iran, intensified its efforts in the Gulf, spreading the war from land to water. The war, which started with Iraq's invasion of Iran in 1980, stalled after several years, with

both sides struggling to assert primacy and control the course of violence. The United States, which had become increasingly hostile to Iran following the fall of the Shah in 1979 and the holding of American hostages in Tehran and Lebanon, backed Iraq during the war.

By late 1983, the Iranian and Iraqi militaries had made few gains on the ground. While both sides had periodically targeted one another's shipping in the early stages of the war, Iraqi leader Saddam Hussein, who figured that spreading the war geographically would perhaps facilitate a breakthrough, intensified what would become known as the "Tanker War," an aptly named new phase in the war that would last until 1988. Iran had anticipated that Iraq might target its extensive Gulf shoreline early on. In 1980, the country's military command declared "all waterways near the Iranian shores" to be "warzones" (Defense Mapping Agency and Hydrographic Centre, quoted in De Guttry and Ronzitti, 1993: 133). Midway through the war, both sides committed in earnest to attacking one another's shipping as well as merchant vessels from other countries carrying materials to ports and, eventually, energy infrastructure—oil platforms, refineries, and supertankers—belonging to one another and their opponents.

Iraq's strategic aim in expanding the war in the Gulf was to damage the Iranian economy by eroding Tehran's ability to generate the revenue necessary to sustain its war machine. Iran followed through in striking tankers and shipping from countries that were supporting the Iraqi war effort. Between 1984 and 1987, the two countries combined for 408 attacks on shipping. Iraqi forces carried out 240 (nearly 60 percent) of these. Iran responded between 1986 and 1988 not only by targeting Iraqi ports and facilities but also by striking at the shipping of Iraq's allies, Kuwait and Saudi Arabia, mining the Gulf, and harassing international merchant shipping. The targeting of infrastructure, including oil supertankers, set the stage for the further entanglements between war and energy. American officials almost universally understated Iraqi aggression. This was partly, as ranking members of the House Committee on Armed Services remarked, because "the Iraqis were virtually allies" (Aspin, Dickinson, and Nichols, quoted in De Guttry and Ronzitti, 1993: 152). In understating Iraq's provocations, Iran was cast as singularly belligerent. While its attacks did accelerate, the terms of policy talk tipped the scales against Iran in a manner that made further escalation likely.

The Tanker War produced several critical effects, the most important of which was the legacy of turning the flow and movement of the Gulf's oil into a militarized enterprise. While energy facilities and the networks of its distri-

bution had been targeted at various times earlier in the war, oil and the systems of its production and transportation were made systematically more central to the patterns of violence that unfolded from 1984 going forward. For both Iran and Iraq, the political objective of surveilling and policing one another's movements was to make movement—enabling or interrupting it—the new strategic imperative. Indeed, it was the damage potentially done by interrupting various kinds of flow that was prioritized, although this proved difficult to achieve in practice. Timothy Young (1992: 7), a former US Navy commander, captured this strategic imperative by arguing that "interrupting logistics was . . . the primary purpose behind the exclusion zones declared by both sides." Because most ships that traveled into the Gulf were never targeted at all, it meant that Iraqi and Iranian targeting was unpredictable, constrained by the availability of resources and opportunity. While the system of movement and transit continued to function, mariners piloting their ships through the Gulf did so with considerably more anxiety and fear, weighed down with constant worry that attacks from above or below were imminent.

Since neither country possessed particularly valuable military assets in the northern Gulf, the targeting was almost always commercial and, most importantly, almost always involved oil. Once oil facilities and transport were linked to military maneuvering and attack, the American concern over energy security took on additional layers, coming increasingly to include oil's connection to infrastructure, to the objects through which it was transported (ships in this case), and to the space in and on which it flowed, as well as to the "natural" environment of the network. Indeed, it was this expansive view of energy that would make it central to the emerging militarized order. In intensifying their assault on each another's and neighboring countries' oil and natural gas infrastructure and shipping, Iran and Iraq facilitated the most rapid militarization of the Gulf since the departure of the British. The terms of this escalation were unprecedented in the scale of its violence. The two countries ushered in what would become an era of almost permanent war in the Gulf.

After having three of their tankers attacked in the preceding ten months, Kuwaiti officials appealed to both the Soviet Union and the United States to protect their country's vessels from further Iranian aggression in November 1986. Although the Soviet Union had very little influence in the region, Moscow immediately agreed to charter three of its tankers to the Kuwaiti national oil company beginning in early 1987. The United States, alarmed by the specter of potential Soviet gains in the region, went further.

The United States intensified its military presence in the mid-1980s in response to escalating tensions. Secretary of State George Shultz captured

US concerns about the expansion of the war spatially, although he downplayed Iraq's role when he wrote to Congress in 1987 that it was "Iranian threat to the free flow of oil and to the basic freedom of navigation which is unacceptable. The frequent and accelerating Iranian attacks on shipping have spread the war geographically to the lower Gulf and have heightened the risk to all littoral states" (Shultz 1987: 308).

In February 1987, American officials informed their Kuwaiti counterparts that the United States would provide direct political and military protection for endangered Kuwaiti supertankers. Assistant Secretary of State Richard Murphy rationalized that policy makers viewed "the reflagging of Kuwait tankers in the United States as an unusual measure to meet an extraordinary situation" and that "our response to Kuwait demonstrates our resolve to protect our interests and those of our friends. . . Our goal is to deter, not provoke" (De Guttry and Ronzitti, 1993: 148–49). By way of protection, the United States agreed to reflag Kuwait's eleven nationally owned supertankers, re-registering them as American owned, sailing them under the American flag, and providing them the kinds of military protection and privileges that all American-owned merchants would enjoy. Shultz (1987: 308) remarked in May of that year that Washington was "prepared to defend U.S. vessels and U.S. interests when necessary. We intend . . . to provide protection for ships flying the U.S. flag in the Gulf, including certain Kuwaiti tankers which have applied for U.S. registry." The US Navy would go on to do just this. Over the next two years, the United States moved from a policy of deterrence and protection to one of direct intervention. Between the summers of 1987 and 1988, the United States became an active belligerent in the Iran-Iraq war.

Officials justified the expansion of American action as a result of Iranian provocation. The initial American effort to protect oil's flow was through the creation of a military convoy system designed to shepherd reflagged Kuwaiti tankers through the Gulf. Not surprisingly, Iran viewed the American presence as an indication of its backing of Iraq and responded by escalating its own military efforts, including mining the passageways used by convoys. During the very first convoy, American ships failed to prevent a Kuwaiti supertanker from hitting a mine. What followed was the escalation of violence, culminating in the expansion of the American presence from a handful of ships and vessels in the Gulf in 1986 to more than one hundred. It also resulted in the arrival of the US Air Force, Navy Seals, and a broad US military effort to project its power, to protect friendly oil shipping, and, arguably most importantly, to not just deter but also defeat Iran in the

Gulf. Rapidly shifting strategic priorities resulted in regular violent clashes between US and Iranian forces and intense concerns that Iran was poised to inflict even more harm in the Gulf and, in particular, that it could shut off the flow of oil and free navigation. Crucially, the possibility that Iran would close the Strait of Hormuz to shipping, which was unlikely, remains a fear that has consistently figured as a kind of "doomsday" scenario.

With the purchase of anti-ship silkworm missiles from China in late 1986, Tehran seemed to possess the ability to realize America's worst fears. Murphy warned that the Chinese anti-ship missiles presented "a potentially serious threat to U.S. and other shipping" (Murphy quoted in United States Congress House Committee on Foreign Affairs and Subcommittee on Europe and the Middle East 1987: 19). With an 85-kilometer range and 100-pound warhead, "these missiles," he argued, "can span the Strait at its narrowest point and represent for the first time a realistic Iranian capability to sink large oil tankers. Whatever Iran's motivation for procuring such threatening missiles, their presence gives Iran the ability both to intimidate the Gulf states and Gulf shippers and to cause a real or *de facto* closure of the Strait" (19).

As American military vessels and personnel were deployed in growing numbers, and as they both encountered challenges and contributed to the war, policy makers and strategists came to associate threats to energy with threats against the navy itself. In their view, the machines and military assets that had originally been designed and dispatched to do the protecting were also increasingly vulnerable. Perhaps the most significant consequence of this alignment was that the very notion of providing security for oil was wiped away in practice, as the material and political boundaries between "energy" and "military" were blurred.

By bolstering a military presence and linking up with regional oil producers through the coordination of (what had been) the mundane task of piloting ships, policy makers hoped to both create material and infrastructural barriers—technological and physical practices in space—that would, along with deterring Iran, deny the Soviet Union a chance to seek its own foothold in the Gulf. Edward W. Gnehm, a top official at the Pentagon, outlined these hopes clearly in the summer of 1987. In June of that year, he claimed that in agreeing to reflag Kuwaiti vessels as American ships and in committing additional US naval resources to protect them, "what we have now done is to keep the Soviets from getting into the Gulf in a major way. . . . You know, if you get the right to escort and to charter and you have a lot of ships in there, the next thing you have to have is access, you've got to have a

port, you've got to have a dock" (Gnehm quoted in United States Congress House Committee on Merchant Marine and Fisheries 1987: 74). Gnehm presciently expressed a vision for precisely the kind of infrastructural development and base building that would follow the war: the long-term consolidation of American power through the creation of an increasingly militarized and permanent physical network in the Gulf.

America's actions in bolstering its military presence had the effect of creating multiple political and material layers of entanglement in the region, rendering energy's flow dependent on the practice of security, not just the promise of it. This understanding of dependency, in which the movement of oil in the region was bound to the United States' projection of its military power, marked (and continues to mark) a fundamental reconfiguration—indeed, an inversion—of how observers usually characterize American dependence on Arab oil.

The increased American military presence in the region also produced terrible results. In July 1988, an American missile cruiser, in the midst of a surface skirmish with small inflatable Iranian boats, shot down Iran Air Flight 655, killing all of the two hundred and ninety passengers and crew on board (Fisher 2013). The navy dismissed the attack as a tragic accident that was the result of the fog of war, the kind of confusion that hangs over difficult battlefield environments. However, the United States was not supposed to be at war at all. The shooting down of Flight 655 effectively ended the Iran-Iraq war, compelling Iran to sue for peace. It marked the beginning of what would be a permanent American presence in the region.

The United States' involvement in the Iran-Iraq war would shape its approach to the Gulf in the future. Keeping a permanent military presence afloat on the waters of the Gulf became a key component of American military strategy in the years that followed. Securing this military presence and shoring up the ways that energy is integrated with and ostensibly "secured" *by* this presence remain key points of emphasis among military and political leaders in the United States.

Despite the spread of the Iran-Iraq war to the Gulf, and before American intervention in 1986, oil production and distribution from the Persian Gulf actually increased. While policy makers claimed that oil's flow was threatened by the war's spread and used that claim to justify military action, the claim itself was never true. Anxieties about energy's security and intense efforts to do something about a perceived danger obscured what was actually happening in the Gulf. Energy's availability was never threatened. Oil prices also declined during the closing stages of the war. And yet, alarmism over

access to oil, its availability, its security, and protecting its flow became and remains today a central talking point in American policy, as though Gulf energy exists in a constant state of precarity. Protecting the flow of oil is equivalent to protecting a fiction.

Note

1 For more on elasticity and the frontier, see Weizman (2012: 4), who writes that "against the geography of stable, static places, and the balance across linear and fixed sovereign borders, frontiers are deep, shifting, fragmented and elastic territories. Temporary lines of engagement, marked by makeshift boundaries, are not limited to the edges of political space but exist throughout its depth. Distinctions between the 'inside' and 'outside' cannot be clearly marked."

References

De Guttry, Andrea, and Natalino Ronzitti. 1993. *The Iran-Iraq War (1980-1988) and the Law of Naval Warfare*. Cambridge, UK: Grotius.

Fisher, Max. 2013. "The Forgotten Story of Iran Air Flight 655." *Washington Post*, October 16. www.washingtonpost.com/news/worldviews/wp/2013/10/16/the-forgotten-story-of-iran-air-flight-655/.

Jones, Toby Craig. 2012. "America, Oil and War in the Middle East," *Journal of American History* 99, no. 1: 208–18.

United States Congress House Committee on Foreign Affairs and Subcommittee on Europe and the Middle East. 1987. *Overview of the Situation in the Persian Gulf: Hearings and Markup before the Committee on Foreign Affairs and its Subcommittees on Arms Control, International Security, and Science, and on Europe and the Middle East. House of Representatives, One Hundredth Congress, First S*ession (markup of H.R. 2533, H. Con. Res. 135, H.J. Res 216, H. Con. Res. 137). May 19 and June 2, 9, 10, 11, and 23. Washington, DC: United States Government Printing Office.

United States Congress House Committee on Merchant Marine and Fisheries. 1987. *Kuwaiti Tankers, Hearings before the Committee on Merchant Marine and Fisheries, House of Representatives, One Hundredth Congress, First Session, on Oversight on the Reflagging of Kuwaiti Tankers, June 18, 1987; U. S. Naval Escorts for Kuwaiti Tankers—H. R. 3039, August 6, 1987*. Washington, DC: United States Printing Office.

Shultz, George. 1987. "Letter to the Speaker of the House of Representatives," May 20. In *Tankers, Hearings before the Committee on Merchant Marine and Fisheries.*

Weizman, Eyal. 2012. *Hollowland: Israel's Architecture of Occupation.* New York: Verso.

Young, Timothy. 1992. "Maritime Exclusion Zones: A Tool for the Operational Commander." Paper submitted to the Naval War College, July 2. oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA253218.

Brian Holmes

What Can Art Do about Pipeline Politics?

Chicago is known for its blues bars, its futures markets, its gun crimes, and the sprawling rail yards that make it the freight hub of North America. What's missing from that list is a vast nexus of underground pipes that exerts a subterranean influence on the entire metropolitan region. Without the knowledge of most inhabitants, the "Windy City" has become the Midwestern capital of the oil industry.

Let us have a look from the four directions. Up north, Enbridge's main lines from Edmonton take aim at Chicago from the 450-acre Superior Terminal in Duluth, Minnesota. One of these pipes, infamous Line 61, is gradually being tripled in capacity to reach a staggering 1.2 million barrels of diluted bitumen a day, more than enough to replace the defeated Keystone XL project. A northward-flowing line, also operated by Enbridge, pumps diluent from the massive BP refinery on the southeast edge of Chicago to buyers in the faraway Tar Sands region. From the south, three major pipelines connect Texas oil wells to Chicago area refineries by way of the giant storage hubs of Patoka, Illinois, and Cushing, Oklahoma. Two more Enbridge lines flow in the opposite direction, bringing the deluge of Tar Sands oil within reach of thirsty Gulf Coast markets. Out west, the pipeline story continues along the rails, in the form of hundred-car-long tanker trains filled to bursting with explosive Bakken crude. Some forty of these rolling pipelines—also known as "bomb trains"—cross the densely populated Chicago metro area every week, so far without any catastrophic incident (the closest explosion yet was in Galena, some 150 miles away). To the east, the oil flows away from the city along the rails and by way of Enbridge's freshly enlarged

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Line 78, formerly known as "6B" when it dumped twenty thousand barrels of diluted bitumen (dilbit) into the Kalamazoo River in 2010. Still more crude oil is pumped east by smaller and more intricate pipeline networks maintained by corporations like Buckeye Partners and Wolverine. In a broad arc around the Chicago metropolitan region, and especially along its southern fringe, the white plastic vents and orange warning signs of the pipeline industry are so ubiquitous that most inhabitants no longer even bother to see them. "What we don't want to know," they seem to say, "can't possibly hurt us."

The ostrich strategy reached its limits in 2013, when three huge piles of a refinery by-product called petroleum coke, or petcoke, began accumulating along the Calumet River in Southeast Chicago. Petcoke is a hot-burning fuel that looks like a fine grade of coal. It is produced in giant vertical drums called cokers, where the carbon-rich residue of fractionated heavy crude is evaporated one last time to release a few more barrels of high-value fuel. Diluted bitumen from the Alberta oil sands leaves behind excessive quantities of petcoke: some six thousand tons of the stuff roll out of the BP refinery every day, while yet more of it is produced at the Citgo refinery in Lemont and the Exxon-Mobil refinery in nearby Joliet, which have also switched to Tar Sands oil. The sheer visual eyesore of the petcoke piles, along with the fine dust blowing directly onto the adjacent neighborhoods, finally revealed the crude truth of Chicagoland: its refineries process approximately one-quarter of all the heavy Canadian oil exported to the United States.[1] Our fair city has become the single largest market for the environmental disaster known as the Athabasca Tar Sands. The inhabitants of Southeast Chicago were the first to learn that truth, from the grit in their throats, the grime on their windowsills, and the rapidly rising asthma rates of their children.

Neighborhood groups, an environmental justice organization, a downtown nongovernmental organization, and the officials of the Environmental Protection Agency went into action, squaring off against the local corporation Beemsterboer Slag and a more formidable entity called KCBX Terminals, owned by Koch Industries. The first was relatively easy to dislodge: Beemsterboer had not even bothered to pull a permit for a major industrial operation that was carried out daily in plain public view. Standing up against the Koch brothers required a more serious legal case, along with a larger bloc of concerned citizens mobilized by the upstart alderwoman Sue Garza, who ran for office in 2015 with a campaign centered on the petcoke issue. In the three-year period between August 2013, when the petcoke first hit local headlines, and June 2016, when KCBX ceased its stockpiling operations,

there was plenty of time for Chicago-area artists to get involved, inventing new forms of representation, expression, and action along the way.

Terry Evans, an acclaimed aerial photographer, literally came down to earth in this campaign, joining neighborhood organizations and producing extraordinary portraits and photos of street demonstrations; she also contributed fascinating aerials of the BP refinery and the accumulating piles of toxic waste. In a later phase of work she recorded interviews with the activists whom she had portrayed, so that they could speak in their own voices. When Evans finished her first series of images, Henry Henderson of the Natural Resources Defense Council said to her, "Now you have to get these out to the public." So they went together to the Museum of Contemporary Photography at Columbia College in the downtown Loop.

Museum director Natasha Egan and curator Karen Irvine embraced the idea of a politically engaged show, which is not exactly common for downtown Chicago institutions. They reached out not only to a number of local artists but also to members of the Southeast Environmental Taskforce and the Coalition to Ban Petcoke, who welcomed the artists to their neighborhood and wrote texts for the catalog. During the year after the first Koch terminal was shut down in March 2015, the artworks began to take form while the activist campaign continued in full swing. When the exhibition opened on July 21, 2016, a significant victory had been won: Koch Industries had just cleared out its remaining dusty pile.

"Petcoke: Tracing Dirty Energy" puts the close-up documents of a local struggle at the center of a far-ranging exploration of the petroleum world.[2] For the exhibition, videomaker Steve Rowell filmed roadside scenes in the oil blocks north of Fort McMurray and then launched his camera-equipped drone into the sky along stretches of the Enbridge pipeline routes through Canada and all the way down to Chicago, with a detour to the global headquarters of Koch Industries and their family compound in Wichita, Kansas. Photographer Victoria Sambunaris captured oceangoing tankers in the Port of Houston, a number of which are tracked on a marine traffic monitor installed in the exhibition space. Sculptor Claire Pentecost assembled a "Library of Tears" made of hanging blown-glass droplets, some almost a yard long, filled with material documents of a toxic industry: sulfur, mercury, asphaltum, petcoke, polluted water from the Athabasca River, shredded US currency, snakeskin, dead bees, Bakken oil, light sweet Texas crude, and so on. Videomakers Marissa Lee Benedict and David Rueter developed a science-fiction scenario around scenes of dust-choked northern China; while photographers Geissler/Sann produced a striking image of liquid metha-

done, which they liken to the dubious carbon-trading schemes that are supposed to wean us off a poisonous addiction, while making big money for the carbon traders in the bargain. I contributed a large wall map of Chicago's Southeast Side (see figure 1), plus an online cartographic archive exploring the petroleum industry and its discontents at local, metropolitan, continental, and global scales (Holmes 2016). Finally, the work of performance artist and community activist Rozalinda Borcilă started only after the exhibition opened. She set up a series of carefully prepared public walks and a participatory mind-mapping workshop, exploring the direct perception of daily life in the Oil City.

A politics of perception lies at the heart of this endeavor, whether on the artistic or activist sides of the coin. Clearly, "Petcoke: Tracing Dirty Energy" is not about the vague liberal ideal of "having a conversation" on petroleum and global warming, as though slippery aesthetics and cheap talk could change everything. Nor is it about direct action at all times and all costs, to the exclusion of any reflection on the labyrinthine pathways of fundamental social transformation. Instead, the exhibition struggles to connect the lived experience of the urban territory to all the scales of energy extraction, transportation, production, and trade, as well as to the geologic "deep time" of the Anthropocene. At stake in the meeting of artists and activists is an intimate sense of where one stands and how one moves within the tightly imbricated strata of the petroleum world. How do we begin to grasp the intricate immensity of the logistical system that brings buried carbon into the incandescence of personal pleasure and power, at the price of hidden pollution, invisible gases, and irreversible damage to the Earth system? How do we experience the forms and consequences of contemporary desire, when it is pervasively mediated by the massive expenditure of energies that are always somehow ecologically disruptive, whether they are reputedly "clean" or "dirty"?

Art, like the scholarship and cultural critique that it inevitably draws upon, suffers from the infinitely dilating and delaying character of its experimental process and its excruciatingly tentative conclusions. That is why art is so much more valuable when directly (though still contradictorily) linked to an activism that seeks both immediate effects and long-term societal change. As an unwilling subject of mounting social and ecological disaster in the fragile twenty-first century, I am often thrust back into a tragic contemplation of the forms and causes of voluntary blindness and managed oblivion. Participating in this Chicago exhibition, and in the communities of engagement from which it sprang, opened up a fresh sense of possibility. On the one hand, it was institutional: it turns out that you *can* take a stand in a

Figure 1. *Petropolis* (2016) by Brian Holmes. Large red icon marks the spot of the BP refinery in Whiting, Indiana; black cones represent open piles of bulk materials along the Calumet River; yellow thunderbolts mark electric power stations; blue factories signify steel mills; purple beakers are chemical industries; and dark blue tanks represent fuel storage depots. See http://environmentalobservatory.net /Petropolis/map.html for more information about all of these elements of the petroleum world. Icons designed by Freepik and distributed by Flaticon. CC-BY 3.0. © OpenStreetMap contributors

downtown university museum and reach beyond the usual circles of art and culture to a much wider field of conflict and cooperation. On the other hand, it was interpersonal: it turns out that you *can* cross barriers of race and class, when a complex cultural project shows clear concern for the raw unmitigated violence of the urban territory.

Does this single case offer any wider perspective for the future relations of art and pipeline politics? I am sure it does, but only if you seek those relations yourself and then maintain them. Art for art's sake, like ivory-tower withdrawal, is a broken straw in the maelstrom of climate change. As the global shift advances, with its train of threatening and disruptive effects, individuals will increasingly be called upon by conscience to participate in complex projects to repurpose or dismantle industrial energy systems that resist even the slightest transformations. There is a naive and hopeful call for this to be done in one glorious blow—what was formerly known as "the revolution." The rest of us better get busy inventing new tools and social routines, as well as forms of imagination and valuation to help carry them beyond the blocked horizons of the present. Utopian dreams find realization in direct confrontation with what is.

The premonitory signs of the Apocalypse are now simple facts: rivers of flame have *already* poured from the sky over the Athabasca Basin, just last July during the great Fort McMurray fire. But neither signs nor even simple facts mean anything substantial until they are embodied in the process of creating another world. That requires beginning with complex and partially hidden realities that you slowly learn to see and then start showing to other people. As conceptual artist Antoni Muntadas put it in a fascinating series of works: "Warning: perception requires involvement."

Notes

1 For a visualization of the petroleum economy in the Chicagoland region, as well as ample documentation of the issues discussed in this text, see Holmes 2016.

2 Further information on the exhibition "Petcoke: Tracing Dirty Energy" can be found at http://www.mocp.org/exhibitions/2016/07/petcoke-project.php.

Reference

Holmes, Brian. 2016. *Petropolis*. http://environmentalobservatory.net/Petropolis/map.html.

Kaveh Ehsani

Pipeline Politics in Iran: Power and Property, Dispossession and Distribution

Far from being inert technological infrastructures, pipelines are transformative social and political projects. Materially, pipelines are little more than tubes of highly engineered steel interspersed with pumping stations that meander through rugged and remote or sometimes populated landscapes, carrying the vital fluids (oil, liquefied natural gas, water) that fuel modern urban and industrial societies. But pipelines also have a revolutionary social and spatial impact in that they impose the hegemony of new legal regimes of property by central states or multinational corporations. This process has repeatedly led to the dismantling of local and customary claims to land and territory that underlie existing social structures and political arrangements (Marriott and Minio-Paluello 2012; Barry 2013; Kandiyoti 2012). The social history of pipelines is a paradoxical tale of the dispossession of local communities, resulting in their often coercive integration into wider national and global political economies. By connecting distant locales, pipelines allow the geography of one terminal point to be framed as a viable source of resource extraction and the other as the site of consumption, regardless of existing conditions. The reliability of this spatial connection between the terminals requires relentless and consistent maintenance, surveillance, and security along the route. Thus, whether pipelines traverse international borders or stay within national territories, they end up imposing the absolute sovereignty of a unified legal regime along the entire route. The nature of the politics of pipelines depends on whether this imposition is negotiated and participatory or coercive and exclusionary. I present here three brief snapshots

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of the historical politics of pipelines in Iran since the turn of the twentieth century in order to juxtapose the variegated power struggles around seemingly similar pieces of materials transport technology.

In 1908, the first major oil field in the Middle East was discovered in the Bakhtiyari Mountains of southwest Iran by a consortium of British speculators that came to be called the Anglo Persian Oil Company (APOC). At the time, oil was not yet the strategic global commodity that it would become after World War I, and pipeline and refining technologies were rudimentary at best (Ferrier 1982). The construction of a pipeline to transport crude oil from Masjed Soleyman (MS) to the newly built refinery-port terminus on the Shatt al-Arab river at the mouth of the Persian Gulf became one of the greatest technical as well as political challenges facing APOC. The MS fields and the proposed pipeline route were located on the territories of the Bakhtiyari tribes, a fractious confederation of martial, pastoral nomads who were locked both in perpetual internal rivalries and in power struggles with a central government that had been severely weakened following the Constitutional Revolution (1906–11). The pipeline's proposed terminus was the river island of Abadan, populated by Arab date farmers and pastoralists under the rule of the paramount Sheikh Khaz'al.

In the eyes of APOC the entire territory, from the rugged and remote fields of MS, through the proposed pipeline route, to the river island of Abadan, was an empty wasteland granted to it by the Iranian central government in the remarkably generous 1901 oil concession. Framing the territory as "wasteland" was convenient because the concession authorized APOC to take free possession of all such land without compensation. APOC justified this claim based on the absence of permanent settlements, agricultural farms, and private property claims registered by the central government. This perception conveniently overlooked the fluid nature of property relations in migratory pastoral societies and the social and political relations that underlined them. Tribal territory and its control was the foundation of the Bakhtiyari economy and its social and political structures. Pastoralists made seasonal use of pastures, and the maintenance of their flocks relied on migratory routes that were assigned to each clan by the tribe. Although the final decisions regarding these allocations were made by the senior *khans* (chieftains) after annual deliberations, it was the tribal confederacy as a whole that controlled its territory, and the khans were in no position to transfer it to outsiders for their personal benefit.

APOC entered into protracted negotiations with senior Bakhtiyari khans and Sheikh Khaz'al to permanently lease territories for oilfields, pipeline routes, and the refinery site. APOC was meticulous in its approach. It

carried out cadastral mapping of all its desired territories, converting variable local units into standard British units of measurement. It conducted lengthy and hard-nosed negotiations with chieftains to draw up a firm and unambiguous legal contract over land, labor, and compensations. APOC negotiators routinely labeled the khans as greedy and dishonest for demanding unjustifiable compensation for uncultivated and empty wasteland, conveniently overlooking the fact that local land use and property relations in Bakhtiyari pastoral society or in the adjoining Khuzestan Province were not similar to rural capitalist England.[1]

British diplomats joined APOC representatives in their negotiations with tribal leaders, ignoring the vociferous objections of the Iranian central government that the oil concession had been granted to a private company and not a foreign government. The British insisted on a contractual language that treated the leased territories as alienable private property to be permanently transferred to APOC for the duration of the concession (sixty years). Eventually, an arrangement was made between APOC and the Bakhtiyari khans to set up a shell company called Bakhtiyari Oil Company, with the senior khans as nominal shareholders who would personally benefit from 3 percent of net profits of the oil business conducted in their territory. In addition, APOC recruited local guards to protect the pipelines, and hired tribesmen as unskilled workers organized in labor gangs to work the fields, lay the ninety-mile pipeline, and build access roads and pumping stations (Lockhart 1938).

These arrangements fundamentally undermined the cohesion of Bakhtiyari social structures and ultimately led to their permanent decline. Oilfields, pipelines, access roads, and pumping stations disrupted seasonal land use and migratory routes, which were now claimed and enclosed by APOC and defended by armed guards recruited from among the Bakhtiyari themselves. Tribal chiefs had considerable power to allocate land and territory within the confederacy, but pasture was a collective property that could not be arbitrarily alienated. According to a senior clan patriarch, "from the easternmost winter region (*sardsir*) of the Bakhtiyari to its westernmost summer territory (*garmsir*) there is not a single "hand-width" (*vajab*) of land without its own property deed (*bonchaq*), and whose ownership is uncertain" (Karimi 1978: 70).

APOC claimed it could only negotiate with the khans and that they, in turn, would be responsible for distributing the benefits of the deal to their followers. However, the contracts were drawn in such a manner that the khans benefited personally. The windfall of wealth allowed the khans to move to cities, and they became absentee landlords, forfeiting their legitimacy among

their rank and file along the way. Many ordinary tribesmen rebelled against the enclosures of their pastures and migratory routes, and soon a situation developed where the hired guardsmen and laborers would themselves collude in raids and sabotage the pipelines and oil installations when they were off work or could get away with it. The problem became especially acute during World War I, when German operatives working with disgruntled tribesmen attempted to sabotage the pipelines that were supplying the crucial fuel needed to support Britain's invading army in Mesopotamia (Ehsani 2014).

Poverty-stricken tribesmen who benefited from the supplementary income initially welcomed the creation of a labor market in the fields and along pipelines. But they had the inconvenient habit of leaving wage work to return to their flocks and fields when seasons changed. APOC stepped up its efforts to create a permanent labor force by imposing greater spatial control. It created company towns and exclusive enclaves to house and train workers and control their spatial movements and extensive family ties and criminalized alternative forms of tribal economy in the territories under its control.

Iranian nationalists and the central government became highly concerned by APOC's virtual dominion over the region and its alliance with the Bakhtiyari and Arab tribal chieftains. Pastoral tribes began to be presented in the national press and the *Majlis* (parliament) as a major threat to national sovereignty, and the government rejected the validity of contracts between southern tribes and APOC. Soon after the 1921 coup d'état, the newly formed national army moved aggressively to confront and subdue the tribes. With the legitimacy of their leaders compromised, the once powerful Bakhtiyari and Arab tribal confederacies no longer had the cohesion to resist these incursions (Cronin 2007). By the mid-1920s, the central government was powerful enough to declare all tribal territories as state land. It voided all contracts drawn between APOC and local chieftains, and the new conscript army took over the security of the oil fields and pipelines from the Bakhtiyari guards. APOC ditched its local allies and made a new alliance with the central government. By the 1930s, scattered local rebellions had been crushed, most of the senior tribal leaders were neutralized or physically eliminated, and the authoritarian government of Reza Shah imposed a brutal program of forced settlement on all pastoralists that effectively eliminated the last vestiges of their remaining autonomy.

The advent of oil capitalism in Iran and the construction of the first oil pipeline in the Middle East were based on APOC's refusal to acknowledge collective property relations among pastoralists, and the insistence on contractual relations with tribal chieftains was based exclusively on Lockean notions

of clearly demarcated and permanently alienable private property. Enforcing the contracts over pipeline routes led to protracted and often violent upheavals that eventually ended in dispossessing local populations and altering existing social relations and the region's geography and political economy. The politics of property around the building of the MS-Abadan pipeline was at the center of and enabled this oil encounter (Ghosh 2007: 138–51). On the one hand,the advent of this oil capitalism "modernized" local peasants and pastoralists by integrating them into a national and global labor and consumer market. Bakhtiyari and Arab pastoralists and peasants resisted these incursions, sometimes attacking and sabotaging the pipelines and oil facilities; but they also tried to take advantage of the wage labor market in a period of great hardship caused by World War I and its aftermath. On the other hand, once the cohesion of their tribal collectives had been undermined and their leaders had lost their legitimacy by striking lucrative individual deals with APOC, they could no longer offer an effective resistance to the combined forces of APOC and the central state.

This early instance of pipeline politics during the initial phase of protocolonial oil capitalism is quite different from the power struggles over pipelines in the same region in the late twentieth century, following the Iranian Revolution. The 1979 popular uprising that overthrew the monarchy has been conventionally framed as an "Islamic" revolution. However, I have argued elsewhere (Ehsani 2009) that it would be more accurate to designate it as a provincial revolt of the peripheral regions against the center—of spatially marginalized rural, provincial, and urban underclass populations against an authoritarian and delegitimized political and economic elite. The 1980s was a stark decade in postrevolution Iran, marked by the destructive Iran-Iraq war and a bloody and repressive civil war waged by the new Khomeinist state against an opposition that included the Left, nationalist, ethnic autonomists, liberals, and Islamist rivals. However, that postrevolution decade also witnessed grassroots initiatives by local populations organized in committees and newly formed revolutionary organizations such as the Construction Jihad (Jahad-e Sazandegi) to build social and physical infrastructure, such as roads, schools, electricity, and water and gas pipelines that would benefit underserved and remote local communities and regions. The scale of social and geographic changes brought about by these grassroots initiatives was staggering, but their realization was predicated on massive changes in property relations. All social revolutions challenge existing property relations, but in addition to confiscating the properties of the old elites,

the tumultuous decade following the Iranian Revolution also witnessed extensive confiscations of public land by migrants, war refugees, displaced farmers and pastoralists, and the urban poor. The result was a widespread privatization of the public domain by desperate, lucky, or opportunistic individuals (Ehsani 2013). However, the combination of high populism and contentious struggles over property relations allowed a vast network of oil, gas, and drinking and irrigation water pipelines to be constructed, often with considerable local support and participation.

Thus, despite immense deprivation caused by war, the flight of capital, and social chaos, the decade following the revolution also witnessed populist redistribution that benefited wide sectors of the ordinary population that had not shared in the material advantages of the Pahlavi Monarchy's authoritarian modernization. In particular, the widespread expansion of pipelines for water (drinking and local irrigation) and gas (for residential household consumption) during this postrevolution decade were embraced locally as an inclusive attempt to integrate and develop hitherto marginalized localities and communities.

The end of the Iran-Iraq war and the period of postwar reconstruction in the 1990s was accompanied by a sharp turn away from the redistributive populism of the previous decade, toward a neoliberal structural adjustment program of rebuilding the war-shattered economy. As part of this controversial program of postrevolutionary "normalization," the state began to reinforce and protect private property rules. It steadily reduced the public sector and its support of welfare networks, and it turned to the market and commercial relations as the cornerstone of economic revival. On the one hand, an impoverished and exhausted population that had experienced a decade of war and upheaval welcomed these measures, hoping that a turn to the free market would put an end to the severe wartime austerity and curtail the intrusions of the highly ideological Islamist state in the economy and everyday life. On the other hand, the resulting rise in social inequality and rampant commercialism led to mounting resentment against the betrayal of the egalitarian aspirations of the revolution. In particular, the widespread construction of large-scale infrastructure projects, especially major dams and water transfer pipelines, became highly controversial. Many of these projects have been built in the southwest, including Khuzestan and Bakhtiyari provinces, where the first oil pipeline was built a century ago. Multipurpose dams and water transfer projects were built in the name of national development. Dams such as Gotvand, Karun 3, or Karkheh displaced large numbers

of remaining pastoralists and villagers in the highlands of Bakhtiyari, Khuzestan, and Lurestan.

As part of its agricultural and regional development planning, the state began discussing major water transfer projects through pipelines, for example, from the Karun river headwaters (many in the Bakhtiyari Mountains, from dam reservoirs) to the central plateau and the fertile plains of Isfahan and even more distant provinces. In the 1990s, another highly controversial project was floated to build a pipeline from the newly built Karkheh Dam to transfer and sell drinking water to Kuwait. State claims to rivers and water as a purely economic resource and as state property to be disposed of by technocrats negates both existing local customary rights and claims to water by riverine communities, as well as ecological and environmental considerations. Increasingly vociferous public resistance to water transfer pipelines have gathered pace since the mid-1990s. Protests began turning violent as severe droughts and global warming threatened the very sustainability of agrarian and urban communities in Khuzestan, Lurestan, and Bakhtiyari provinces. Dams and proposed water transfer pipelines have become the main target of recurring public protests against what is perceived to be the enclosure of a common resource for the benefit of more affluent customers and politically influential communities elsewhere.[2]

The history of pipeline politics in southwest Iran has been closely tied to relations of power around contending politics of property. Looking at the social history of pipelines in southwest Iran reveals that when local communities have had a stake and a voice in the process, the laying of pipelines has proceeded with little friction, as it did after the 1979 revolution. But when pipelines are implemented by distant and unaccountable authorities such as multinational oil corporations or the central government, they are treated as instruments of dispossession and enclosures that threaten the well-being of local society, and they are resisted.

Notes

1 As Karl Marx, Karl Polanyi, William Cronon, Andro Linklater, and numerous other historians and critical social thinkers have documented, the assumption of the universality of private property and its superiority in making productive use of land and resources has been a recurring theme in contractual dealings by colonial powers with indigenous populations.

2 See, for example, the latest protest, "The Parliament Hears a Report on Clashes in Beldaji, Which Have Left 100 Wounded and 70 People Arrested" (2016).

References

Barry, Andrew. 2013. *Material Politics: Disputes along the Pipeline*. Chichester: Wiley-Blackwell.

Cronin, Stephanie. 2007. *Tribal Politics in Iran: Rural Conflict and the New State 1921–1941*. London: Routledge.

Ehsani, Kaveh. 2009. "Urban Provincial Periphery in Iran: Revolution and War in Ramhormoz." In *Contemporary Iran*, edited by Ali Gheissari, 38–76. Oxford: Oxford University Press.

Ehsani, Kaveh. 2013. "The Politics of Property in Post-Revolution Iran." In *The Rule of Law, Islam, and Constitutional Politics in Egypt and Iran*, edited by Said Amir Arjomand and Nathan Brown, 153–78. Albany: State University of New York Press.

Ehsani, Kaveh. 2014. "The Social History of Labor in the Iranian Oil Industry: The Built Environment and the Making of the Working Class (1908–1941)." PhD diss., Leiden University.

Ferrier, Ronald. 1982. *The Developing Years*. Vol. 1 of *History of the British Petroleum Company*. Cambridge, UK: Cambridge University Press.

Ghosh, Amitav. 2007. *Incendiary Circumstances: A Chronicle of the Turmoil of Our Times*. Boston: Mariner.

Kandiyoti, Rafael. 2012. *Pipelines: Flowing Oil and Crude Politics*. London: IB Tauris.

Karimi, Asqar. 1978. "Nezam-e Malekiyat-e Arzi dar Il-e Bakhtiyari" ("System of Land Ownership in the Bakhtiyari Tribal Confederacy"). *Honar va Mardom*, no. 189/190: 67–83.

Lockhart, Laurence. 1938. *The Record of the Anglo-Iranian Oil Company, Ltd. Volume 1 (1901–1918)*. London: Anglo Iranian Oil Company.

Marriott, James, and Mika Minio-Paluello. 2012. *The Oil Road: Travels from the Caspian to the City*. London: Verso.

"The Parliament Hears a Report on Clashes in Beldaji, Which Have Left 100 Wounded and 70 People Arrested." *BBC Persian*, August 8. www.bbc.com/persian/iran/2016/08/160808_l26_iran_boldaji_clashes_case.

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