



February 2023

Waste in the Limits to Capital: How Capitalism Lays Waste to the Web of Life, and Why It Can't Stop

Jason W. Moore

Binghamton University--SUNY, jwmoore@binghamton.edu

Follow this and additional works at: <https://scholarsjunction.msstate.edu/emancipations>



Part of the Environmental Studies Commons

Recommended Citation

Moore, Jason W. (2023) "Waste in the Limits to Capital: How Capitalism Lays Waste to the Web of Life, and Why It Can't Stop," *Emancipations: A Journal of Critical Social Analysis*: Vol. 2: Iss. 1, Article 4.
Available at: <https://scholarsjunction.msstate.edu/emancipations/vol2/iss1/4>

This Research Article is brought to you for free and open access by Scholars Junction. It has been accepted for inclusion in *Emancipations: A Journal of Critical Social Analysis* by an authorized editor of Scholars Junction. For more information, please contact scholcomm@msstate.libanswers.com.

The reinvention of modern Environmentalism around 1970 told us two things. They've stuck with us ever since.¹ One was Pogo's lament: "We have met the enemy and he is us" (Dunaway 2000). Two: the source of "*the* environmental crisis" – which did not then exist – was the manifestation of an eternal conflict. "Too many people" were pressing against the earth's "carrying capacity" (Ehrlich and Ehrlich 1968, xi). The taproot of too many people? "Billions of years of evolution" (ibid., 29). Populationism, long the "scientific" abode of policymakers, became a unique blend of metaphysics in the popular imagination: the cause of war, famine, pollution and inequality (Robertson 2012; Moore 2022a).

It was not a novel formulation, although in 1968 its newfound traction amongst young professionals and students was. We'll circle back to that class demography in a moment. For now, let me underline capitalism's long Malthusian cycle, defined by the periodic resurgence of bourgeois naturalism and claims of Good Science in eras of popular revolt and global restructuring. The Ehrlichs' populationism was embedded in one such moment.

Malthus had of course formulated a similar thesis – but without the Ehrlichs' eco-catastrophism – two centuries earlier (1798). The problem, however, goes beyond demography, which emerged as a crucial scientific pillar of postwar American imperialism (Ross 1998). Malthus and the Ehrlichs agreed that the source of inequality was not enclosure, exploitation, and imperialism, but a highly mathematized natural law.

Missed in the radical critique is the essence of the Malthusian formulation. Its essence was never reducible to human numbers, although this loomed large in 1798 and 1968. Rather, the long Malthusian cycle fuses two entwined ideological claims into Nature (Moore 2021a, 2022b). In one, Nature is reduced to substances to be managed and instrumentalized. In the other, Nature is conceptualized as ahistorical and determining: as natural law beyond the history of human sociality. Although malleable, natural

¹ Correspondence: Jason W. Moore: jwmoore@binghamton.edu. Special thanks to two anonymous reviewers, Keally D. McBride for inviting and encouraging my reflections, and to Diana C. Gildea, Malcolm W. Moore, John Antonacci, Christian Parenti, Marija Radovanovic, Adam Benjamin, John Havard, Kai Heron, Fathun Karib Satrio, Andrej Grubacic, Kushariyaningsih C. Boediono, Raj Patel, Joshua Eichen, Engin Burak Yilmaz, Edmund Burke III, and Neil Brenner – and to all my students at Binghamton University – for conversations on this essay's themes.

law and natural conditions could be negotiated. This could be done negatively, as with the “savages” living in “states of nature” identified by Locke (Arneil 1996). Here one finds in Nature humans without reason: savages. Or it could be pursued positively, carried out by the Enlightened Civilizers whose virtue and “rational mastery of the world” might allow for managing the guest list at “nature’s mighty feast” (Moore 2022b; quotations, respectively, Weber 1951: 248; Malthus 1803: 531)

Malthusian moments recurred in successive eras of anti-colonial, peasant and proletarian revolt. Even before Malthus’s *First Essay* hit the bookstores in 1798, its pulsations span the history of capitalism: from early modernity’s gendered primitive accumulation to classical Malthusianism to eugenics and neo-Malthusianism (Federici 2004; McNally 1993; Chase 1977; Robertson 2012). Its remit was never overpopulation – as Federici’s account of early capitalist proletarianization and its irreducibly gendered “proletarian struggles” reminds us (2004: 80).

This long Malthusian cycle brewed the ideological alchemy of Good Science and the Civilizing Project (Moore 2021a, 2022c). Each moment produced new scientific and imperial regimes that simultaneously mapped, secured, and justified ever more extensive and violent appropriations of unpaid work/energy for capital. Every moment of enclosing waste (the commons) involved grand movements creating waste on the frontiers. In this long history of natural law, Good Science has been mobilized not only as a “productive force” but as the ideological cement for securing the “general interest” (Marx 1973, 694ff; Marx and Engels 2010, 60-61). Thus Rationality’s decisive ideological function for successive class compacts between ruling strata and the scientific, administrative, and military strata – today reckoned as a professional-managerial class – necessary for endless accumulation (Wallerstein 1983).

Across the long arc of monopoly capitalism, beginning in the 1870s, the problem of limits was practically, institutionally, and ideologically defined as a problem of resource management and scarcity (Marsh 1864; Bavington 2002; Baran and Sweezy 1966). This was indeed the priority of America’s “first” Environmentalism, from which Taylorist scientific management emerged (Nash 2014; Moore 2022d). Many “second wave” Environmentalists after 1970 took this premise at face value – dramatized by Ehrlich and

Simon's famous "bet" over commodity prices – and continue to do so (Guha 2000; Sabin 2013; Meadows et al. 1972).

A significant literature has challenged that emphasis in recent years. The "waste of nations" has entered the scholarly imagination as never before (Dowd 1989). It's a literature that raises a decisive question – one rarely posed by critical waste studies, or academic Environmental Studies as a whole – that goes beyond toxification.²

What if capitalism's decisive socio-ecological limit turns not on population- or class-driven resource scarcity after all, but toxification and generalized overpollution? What if those limits were not purely substantialist, but relational? What if we situated overpollution within the imperial bourgeoisie's sacrifice zone strategies? Marco Armiero puts this question to us in a beautiful little book called the *Wasteocene* (2020).

If you've had enough with the Popular Anthropocene and its torrent of "critical" Genes, don't despair (Chwałczyk 2020; Moore 2017a). Armiero is doing something different – and so am I.

Wasteocene illuminates an essential capitalist logic: every moment of capital accumulation requires the political creation of "sacrifice zones... [of] wasted people and places" (Armiero 2020, 2, 10). That *wasting* implicates far more than pollution and facile discussions of inefficiency; it signifies the absurd and horrific logic of squandering and devaluing human and extra-human life under the law of value (Moore 2017e). Armiero's waste is not a set of dangerous substances as such. It is a dialectical process, a relation, not simply a substance but a strategy and terrain of class struggle and exploitation. To borrow an old chestnut from resource economics: waste is not; it *becomes* (Zimmermann 1951, 814-15).

² A compelling, and exceedingly modest, sample includes Armiero 2020; Boetzkes 2019; Gille 2022; Irvine, 2022; Knapp 2016; Krones 2020; Langston 2011; Liboiron 2021; Pellow 2004; Reno 2015, 2016; Romero 2022; Schindler and Demaria 2020; Yates 2011. This does *not* imply that waste studies ignore militarization in manifold forms (e.g., Romero 2022). Rather, I would underline how the geohistorical relations between toxification and imperialism – between waste and laying waste – is rarely foregrounded. But see Dowd 1989; Foster 1993, 1994.

Armiero's provocation thereby unsettles the Popular Anthropocene and its imperial Environmental Imaginary.³ He is among the few dissidents who understand that the Anthropocene is not merely a fashionable term; it's a cultural formation, an ideological battleground, a "narrative struggle" (2020: 23). It's an apt turn of phrase. It reminds scholars that we are not quibbling over language; we are not throwing our favorite phrases and conceptions against others (Marx and Engels 2010). We are debating patterns and turning points in world history. This is true even and especially when critical scholars ignore those histories – as they typically do (Moore 2022d).

That world-historical lacuna makes for more than inadequate theory (Marx and Engels 2010). It makes for terrible politics. Our narratives inform everything about our climate politics. Stories of climate crisis driven by too many people, too much carbon dioxides, too much consumption... these favor politics starkly different from an account of the climate crisis driven by the Capitalocene, Wasteocene and the capitalogenic logic of death and devaluation – of laying waste.

I want to take the argument one step further, towards a question Armiero, waste studies, and even the Critical Anthropocene has not posed. What are the interpretive and political implications of joining *waste* and *laying waste* in the history of capitalism? And how might the insights won from that dialectic help us reimagine a socialist politics of planetary transition, struggling to be born under the cultural hegemony of the Environmentalism of the Rich?

From the Columbian Invasions to Spaceship Earth

How many remember *Spaceship Earth*, the Green super-metaphor of the 1970s (Fuller 1969; Höhler 2015; Moore 2023a)? Like Spaceship Earth, the Anthropocene and its cognates deploy Good Science to convert the messy and contentious politics of climate crisis into techno-scientific management problems. It represents something akin to the repressed unconscious of the imperial bourgeoisie – think the World Economic Forum's

³ The literature is vast. Major expressions of the Popular Anthropocene include Hamilton 2017; Chakrabarty 2021; Wallace-Wells 2019; McNeill and Engelke 2016. Critical assessments include Demos 2017; Bonneuil and Fressoz 2016; Moore 2017a, 2022e.

Great Reset (Witt 2022). Its ambition is to “solve” the climate crisis through a new mode of production led by the super-rich and administered by an internationalist Green technocracy (Moore, 2021a, 2022e). The Popular Anthropocene – and the broader eco-industrial complex of Green parties, universities, government ministries, NGOs and Foundations in which it’s embedded – is a textbook case of an anti-politics machine (Ferguson 1990; Swyngedouw 2011; Moore 2021a). Let’s call that eco-industrial complex the Environmentalism of the Rich (after Dauvergne 2016; Moore 2022f). Like Development in an earlier era, the Anthropocene expresses imperialist class politics through superficially apolitical arguments for planetary management. It insists that the answers to the planetary crisis can be found in Good Science and “earth-system governance” rather than a radical extension of democracy.⁴

The *Wasteocene* lays bare the bourgeois conceit that pollution and toxification – including atmospheric carbonization – are “environmental” consequences of inefficient economic management. The poisoning of life and land and sea, Armiero argues, is not a “bug” in an otherwise optimal operating system; it’s a *feature*. It’s a key consequence, and an ongoing terrain, of the worldwide class struggle in the web of life.

The lineages of today’s Environmentalism of the Rich reach deeply into the capitalist past. In stark contrast to the Anthropocene’s flight from world history – that past is not dead, but very much alive (Moore 2022d). It is a history of waste: of pollution and toxification; and it’s a history of *laying waste*: of imperial power and militarized accumulation. This dialectic animates the Wasteocene’s world-historical logic of producing “wasted people and wasted places” (Armiero 2020: 10).

The origins of that logic are found in the rise of capitalism during the long sixteenth century (Armiero 2020: 8-9; Wallerstein 1974; Moore 2003a, 2003b, 2007, 2017c, 2018, 2021b). Golden spikes notwithstanding, it’s clear that 1492 was a geobiological watershed. Within a half-century, a capitalist Pangea was created, biologically unifying Old and New Worlds in a fashion unknown since the supercontinent drifted apart 175 million years earlier. This was the so-called Columbian Exchange (Crosby 1972). (*Exchange*. What a deliciously neoliberal turn of phrase!)

⁴ An expressive intellectual expression of such managerialism is Dryzek and Pickering 2019; for a critique of the managerialist worldview, see Moore 2021a.

Within a century, the Columbian invasions co-produced capitalism's first great climate crisis. Once considered a biological accident, the depopulation of the Americas is better understood as the outcome of slaving, evangelizing, and village "reductions" – all Cheap Labor strategies (Cameron, Kelton and Swedlund 2015). As indigenous modes of life were laid waste, their numbers collapsed. Forests regenerated. Agriculture retreated. And the atmosphere decarbonized (Lewis and Maslin 2015). Here was an "Anthropocene event," if you will, with a decidedly *capitalogenic* wrinkle.⁵ It amplified natural forcing to co-produce the "long, cold seventeenth century" (1550-1700) (Ladurie and Daux 2008; Parker 2013). It was the coldest moment of the Little Ice Age, itself the coldest period of the past 8,000 years (Wanner, Pfister and Neukom 2022).

Such cold periods are – or should I say, *were* – a recurrent feature of Holocene climate. They have often been moments of civilizational crisis. Feudalism's crisis was tightly connected with the onset of the Little Ice Age. The Roman West's crisis followed the sunset of the Roman Climate Optimum and the arrival of the Dark Ages Cold Period (Patel and Moore 2017; Harper 2017).

Climate may not be destiny, but it's unwise to think that the metabolisms of class society are free from climate determination. Such climate shifts have often been profoundly destabilizing for ruling classes. And so it was in the long, cold seventeenth century. An era that began with capitalist triumph – the Brazilian sugar planting and Andean silver mining revolutions, the first great financial revolution in the Dutch Republic, the shipping and shipbuilding revolutions – ended with catastrophic world war and political crisis. The first of three major Thirty Years Wars (1618-48) devastated the Germanies for more than a century; meanwhile, just outside London, Cromwell, having decapitated Charles I, found himself wondering what to do with a proletarian army and its dangerously "commonist" sympathies (Parker 2013; Linebaugh and Rediker 2000; Arrighi 2010; Moore, 2010a, 2010b).

The story of the era's climate fix – one that rescued capitalism from the epochal crises experienced by its feudal and Roman predecessors – cannot be told here (see

⁵ I am tweaking the earth-system rendering of Anthropocene Event for a geohistorical reckoning that identifies multiple punctuated moments of capitalist environment-making; see Gibbard, et al. 2022; on capitalogenic climate change, see Moore 2017b.

Moore 2021a). Allow me to spotlight one decisive moment. The long, cold seventeenth century was a *developmental* – rather than epochal – crisis because the Empires were able to cohere ramshackle but effective forms of *planetary management*. These managerial strategies were necessary to move from the initial “plunder” economies to productivist complexes – like those in sugar planting and silver mining – that required on-site management of unhappy and coerced workforces. Those brutal technical divisions of labor had to be coordinated – *managed* – across geographical divisions of labor on a scale unprecedented in human history. The latter was significant, lest regional economies withdraw from the global circuits of capital. Its chief expressions were new, thoroughly rationalized, forms of geopower: the explosive growth of cadastral surveying, a cartographic revolution, census-taking, and quantification in all domains of power, profit and life (Moore 2015a, 2018). The new “means of mental production” aspired to nothing less than the “measure of reality” (Marx and Engels 2010: 60; Crosby 1997).

Meanwhile, the Cartesian Revolution established the managerial premise of this new “rational mastery of the world.” The Revolution separated, and elevated, the managers (“thinking substances”) from the riff-raff of “extended substances” (Descartes 1996; Moore 2021a). Centuries later, Braverman codified this as the “separation of conception from execution” in scientific managerialism (1998, 79). Its origins were tightly bound with the gendered counter-revolution, aimed at fixing the era’s underproduction of labor-power through new forms of cultural domination. As Federici explains, its novelty was a forced marriage of dualism and managerialism. Descartes’

reduction of the body to mechanical matter allow[ed] for the development of mechanisms of self-management that make the body the subject of the will...

The outcome is a redefinition of bodily attributes that makes the body, ideally at least, suited for the regularity and automatism demanded by the capitalist work-discipline (2004: 140).

Here was the civilizational operating system for an audacious climate fix that killed two birds with one stone. On the one hand, its imperial fix restructured production and re-

production from Brazil to the Baltic. On the other, it was a managerial-technocratic fix that crystallized a new geocultural order (Moore 2010a, 2010b, 2021a).

Enter capitalism's Civilizing Project and its double register of Cheap Nature. It was at once ruthlessly cost-reducing and committed to the cultural devaluation of the lives and labors of Nature. *That* Nature, the ruling abstraction, encompassed not just birds and bees, but all manner of "savage" populations. The ruling abstraction, Nature, became a practical ideological guide that directed law, legitimate violence, and cultural power to secure unpaid work/energy. *Cheap* Nature became a strategy to secure everything, human and extra-human, that the bourgeoisie wanted, and for which it could not (or did not wish to) pay. The stage was set for an entirely novel trinity that defines the contemporary climate conjuncture: the climate class divide, climate apartheid and climate patriarchy (Moore 2019, 2021c, 2022c).

If the origins of planetary management took shape not in the 1970s, but during the rise of capitalism – think of Iberian botanical imperialism and Evelyn's (1664) call for effective forest management – there is also a middle-run history that centers on American imperialism (Cañizares-Esguerra 2004; Robertson 2012; Ross 1998). It is a history that has been thoroughly erased by the Popular Anthropocene and its Critical variants (e.g., McNeill and Engelke 2016).

Environmentalism, Environmental Studies & the Professional-Managerial Class

Although Environmentalism in the imperialist countries is sometimes regarded as a movement of the political left, a closer look suggests a different interpretation (Dowie 1996). Its world history coincides with the Anthropocene's "Great Acceleration" – a narrative cleansed of class, empire and science in the American reconstruction of capitalism after World War II (McNeill and Engelke 2016). This despite scholarly recognition of Big Science's centrality in American world hegemony (Selcer 2018; Hamblin 2013; Edwards 1996).

The divide between Anthropocenic narratives and the history of imperialism is therefore non-accidental, which is to say ideological. Whether or not its practitioners are fully conscious of this ideology is beside the point – indeed, ideology functions in great mea-

sure through its capacity to suppress such awareness, which would lead to reflexive critique and demystification. Environmentalism, because it integrates material purpose, scientific rationality, and moral virtue, is unusually effective in promoting such scholarly doxa (Bourdieu and Wacquant 1992).

Hence the significance, well beyond environmental affairs, of the Environmentalism of the Rich and the Popular Anthropocene as cultural formation. They are significant expressions of Fraser's (2019) "progressive neoliberalism" – forms of identity-reductionist, "virtue hoarding" and single-issue politics delinked from broad-based working class demands for the democratization of investment, production, and social reproduction (Liu 2021). Within the academy, the new Environmentalism manifested in Environmental Studies. From the outset, it was dominated by a professional-managerial logic that "has rendered knowledge safe for power, thereby making it more dangerous than ever to the larger human prospect" (Orr 2004, 100-101; also Huber 2019).

Its Critical expression is committed to forms of superficially radical critique that denies the centrality of capitalism – shorthand for the world-historical dynamics of class, capital, and empire in the web of life – in the climate crisis. Since the Criticals can only imagine the specific and concrete in fragmented terms, capitalism in such approaches can only be recognized in fragmented form, typically through straw person exercises that reduce capitalism to an *economic* formation. So with the Critical Anthropocene and the Cene Craze (e.g. Haraway, et al. 2016). The Criticals cast themselves as radical critics of the Anthropocene – think Plantationocene, Technocene, Eurocene and all the rest.⁶ At the end of the day, however, they incorporate its basic approach, proposing and assembling multiple reductionisms in place of the binarized reductionism Man and Nature.

In a fit of causal pluralism, the Criticals insist at every turn that the imperial bourgeoisie's world-historical responsibility must be "complicated," a term that often embraces a narrow empiricism – Latour's concept of the Earthbound is only a dramatic instance. (Leading to, amongst other claims, a "defense... of the European Homeland" [Latour 2018; for a critique see Moore 2021a, 2022c].) These Critical Anthropocenes

⁶ See respectively Wolford 2020; Hornborg 2016; Grove 2017; for a survey, Chwałczyk 2020.

propose a fragmented pluralization of human sociality in the web of life, invoking meta-physical conceptions of civilization, race, gender and colonialism over dialectical reconstructions of difference-in-unity (Marx 1973: 99; Moore 2022a). Like the Popular Anthropocene, the Criticals embrace a mode of interpretation that privileges parts over wholes, not-so-paradoxically producing a chaotic coexistence of particularist reductionism and promiscuous generalization (Moore 2017d).

One traces the lineages of the Popular and Critical Anthropocenes to the era of Spaceship Earth environmentalism (Höhler 2015). The metaphor is apt because it was so readily appropriated by ruling class figures in the mid-1960s and prefigures the massification of Environmentalism after 1968. *Spaceship Earth* was coined by the quirky architect and visionary R. Buckminster “Bucky” Fuller in the early 1960s (1969). It was quickly seized upon by Adlai E. Stevenson, who used the term in a United Nations address in 1965 – his last major speech. Barbara Ward, an imperialist Labour Party intellectual, immediately wrote a short book on world order entitled with Fuller’s newly-minted phrase (1966). Importantly, for Stevenson and Ward Spaceship Earth was an imaginary of American world order and Cold War Developmentalism – not the biosphere. (Although there was a biospheric scientific infrastructure organized through postwar American hegemony [Selcer 2018].) It was but a short step to a value-oriented retrofit around “the Environment.” Ward made that transition seamlessly. She became the first major organic intellectual of the new eco-industrial complex, as it took shape through the 1972 Stockholm Conference and the subsequent formation of the UN Environmental Program (Dubois and Ward 1972; Selcer 2018).

Until 1970, Environmentalism had always been an elite – and imperialist – affair. Its demography changed apace with the unusual legitimation crisis of the late 1960s. Among American capitalism’s strategic contradictions was the postwar era’s massive enlargement of White Collar occupations (Mills 1951). By the Sixties, the expansion of the welfare-warfare state induced a temporary rupture in the universities’ capacity to socialize the new would-be professionals. Their ranks had swelled beyond the „old“ White Collar strata. The new arrivals were different; these were the daughters and sons of

truck drivers and nurses, autoworkers and waitresses (Ehrenreich and Ehrenreich 1977a, 1977b).⁷ By the late 1960s, blue-collar blues were becoming white-collar woes. Students and young professionals moved sharply to the left. New Left radicalization threatened to get out of hand, as young professionals formed radical caucuses at a rapid clip – punctuated by 1967’s New University Conference (Schrecker 2019). Although most students did not identify as radical, a majority entertained ideas of radical change coming from “outside the system,” as a May 1970 Harris Poll underscored (Scranton 1970, 47-49).

In a long story that cannot be told here, “second wave” Environmentalism after the first Earth Day (1970) became a prefigurative “wedge” issue to bring the professional-managers back into the fold. Environmentalism split New Left anti-establishment and anti-imperialist sentiment from centrist-liberal eco-managerialism, dressed up with individualized virtue signaling. It was a bargain for the ruling class. On the economic front, the PMC could be enlisted into what became the neoliberal project at pennies on the dollar compared to redistributionary proposals. All it took was a modest increase in real wages and reassurances that the White Collars were not like the other workers. It was one thing to integrate, say 10-20 million new professionals into a new social compact. It was quite another to integrate 100+ million urban and industrial workers, who could at any rate be divided, pacified, and defunded relatively cheaply. The history is clear: the PMC was modestly enlarged and awarded modest raises while the rest of the working class suffered wage repression and mass incarceration.

Through Environmentalism – although not only Environmentalism – White Collar boomers could be satisfied on the economic and value fronts. This made it easy to forget the blue collar majority, for whom they never much cared, even in their New Left days. Starting with Carter in ‘76, it became the winning combination for neoliberal De-

⁷ The professional-managerial class is not a class but cultural formation (Liu 2021), and subset of proletarian relations that demand professional certification where employment is regulated through what David Gordon and his colleagues call a “primary labor market” (Gordon, Edwards and Reich 1982). These labor markets tend to offer relatively greater job security and rising incomes across the life course. As the Ehrenreichs noted in 2013, this labor market has been undermined since the Great Recession of 2008-10 (Ehrenreich and Ehrenreich 2013). For the original debate over the PMC, see Walker 1979. The Ehrenreichs’ thesis (2013) on the ongoing demise of the PMC finds growing support in the White Collar purge unfolding in Tech and other sectors in the run-up to deepening economic turbulence as of this this writing (Cambon 2023).

mocratic politics. Progressive neoliberalism finds one of its primary sources here: the rise of second-wave Environmentalism. Combining old-fashioned elitism and managerialism with a new mass PMC base, it offered a values politics that never threatened imperial hegemony abroad and the gutting of working class power at home. (The rightwing expression was the New Right's market-oriented evangelism.)

The PMC realignment reshaped Environmentalism in ways that were deeply compatible with neoliberalism – and with us still. Let's be clear that the new Environmentalism did not take shape out of mass protest against toxification. Rachel Carson's *Silent Spring* was ideologically unacceptable because it targeted the corporate sources of "biocides" (1962: 8). A Carson-type Environmentalism had *enemies*. It contradicted Pogo's lament: "We have met the enemy and he is us." When the anti-toxic movement emerged after Love Canal in 1978, it was led by working-class women like Lois Gibbs – ostracized by Big Green and who refused to identify as an Environmentalist (Gottlieb 2005).

For good reason. After 1968, second-wave Environmentalism, especially but not only in the U.S., cared about pollution – but mostly when it spilled on the beaches of affluent Santa Barbara, and virtually never when it came to workers (Guha 2000; Montrie 2011). California farmworkers, Louisiana chemical workers, West Virginia coal miners, New York working class mothers and their children, Black working-class communities across the American South – these became "sacrifice populations" for capital (Moore 2022a). The new Environmentalism provided moral cover for capital's sacrifice zone strategy at home – and abroad. Progressive neoliberalism at home implied and necessitated "military neoliberalism" abroad (Fraser 2019; Retort 2005). This was not accidental. For the new Environmentalism, workers anywhere in the world were part of the problem – not the solution.

The Limits to Empire & the Limits to Growth: Laying Waste in the Web of Life

Environmentalism, as luck would have, has more than a longstanding race and class problem. It has an imperialism problem. (They are intimately linked.) The problem was apparent from the first Earth Day. Drawing twenty million Americans to teach-in events

in and around April 22, 1970, no one confused Earth Day (and Week) for Chicago-style Days of Rage. In its front-page coverage the next day, *The New York Times* likened it to Mother's Day – and environmentalism in these years was often likened to a “motherhood” issue (Robertson 1970).

Unlike Mother's Day, however, the new Environmental Imaginary had little room for antiwar politics. A week after the first Earth Day, South Vietnamese and American forces rolled into Cambodia under Nixon's orders. The invasion sparked the largest anti-war mobilization in American history. Over four million students – half the American university student population – poured onto the streets of 1,350 campuses. The University of California and California State University systems were shut down. Governors mobilized National Guard units twenty-four times. In Ohio and Mississippi, they opened fire on students, killing four at Kent State and two at Jackson State University (Sale 1973, 445ff).

Meanwhile, the Earth Day infrastructure – and the Environmentalist majors – was nowhere to be found. What merits attention is not only the New Environmentalism's complicity in American imperialism at the moment of the antiwar movement's greatest influence; but also the historiography's silence on the relation of environmentalism and imperialism.⁸ If the former remains something of a riddle, the latter makes it nearly impossible to raise the question: Where is Environmentalism in the anti-war and anti-imperialist struggle?

That question is even more relevant today than it was in 1970. It's with us still in the Popular Anthropocene – and its Critical expressions. As most of us know by now, the term was coined in 2000 by Stoermer and Crutzen. It was the neologism that launched a thousand ships. But hardly anyone wanted to address American unipolarity and its endless wars since 2002. No one has pointed out that one-third of America's 500-plus military interventions have occurred since 1999 (Military Interventions Project 2022; Torreon 2017). *Anthropocene* appears in tens of thousands of scholarly articles and books. None (to my knowledge) have foregrounded the pivotal role of the American war

⁸ Sale 1993; Shabecoff 2003; Rome 2013. Tellingly, the only account I could find that offers even a narrative mention of the coincidence of Earth Day and the invasion is an undergraduate honors thesis from fifteen years ago! See Henn 2007: 86-87.

machine, its regime change politics, and its unipolar fantasies in the drive to the planetary inferno. When this happens – that is when the sample size is big enough – we know it's not happenstance but a designated function.

The Popular Anthropocene bears all the marks of a longstanding imperial Environmentalism. It's distinctive in its contempt for workers at home, generally viewed as “deplorables” (after Hillary Clinton's arrogant characterization) (Merica and Tatum 2016). Abroad, the hatred of the working class is resignified through race, only reinforcing the contempt. PMC liberals cringed in 2015 when then-candidate Trump referred to Mexican immigrants as drug-dealing rapists: “not the right people” (*Time* Staff 2015); and again three years later when he called Haiti and several African states “shithole countries” (in Davis, Stolberg and Kaplan 2018).

They may have cringed. But Trump was just saying the quiet part out loud. *Deplorable* and *Shithole Country* are simply different ways of doing the same thing: demonizing the world's working-class and peasant majority. For the past century – especially since 1970 – the Environmentalism of the Rich has either agreed with, or failed to oppose, the American Empire's policy of creating “wasted people and wasted places” across the world and Latin America in particular (Moore 2022a). It's been robustly anti-immigrant (e.g. Ehrlich, Bilderbach and Ehrlich 1979; see Park and Pellow 2013). And I can think of no Big Green organization that condemned, and mobilized against, America's bloated war machine and its bloody recovery from the Vietnam Syndrome. Environmentalists may not call Haiti a shithole country, but none of its representatives lifted a finger when Haiti's democratically elected government, led by Jean-Bertrand Aristide, was overthrown in two U.S.-backed coups (1991 and 2004). Nor was Big Green concerned about the violent ecologies of structural adjustment anywhere in Latin America and the rest of the South in the Eighties, a “slow violence” enabled by US-backed Third World oligarchs and US-trained death squads (Faber 1992; Chomsky and Herman 1979). Trump's transgression was to state clearly the conventional wisdom of the American ruling class and its professional-managerial cadres – but without the centrist-liberal handwringing that Environmentalists perform when faced with the Empire's crimes.

From its origins, as we've seen, post-1970 Environmentalism has remained silent about – and therefore complicit in – America's endless wars and the apocalyptic practice of unipolar hegemony. From Vietnam to Iraq to any number of “low-intensity” conflicts and counter-insurgency operations worldwide, post-1970 Environmentalism has been silent on neoliberalism's horrific marriage of capital-intensive war and disposable labor, life, and landscapes (Moore 2022a). Nor is this a strictly American phenomenon. Consider the German Green Party's recent support for massive rearmament – the greatest since the 1930s – in support of NATO expansion (Soltz 2022).

As the example of Haiti attests – where the world's first national liberation movement won independence – this imperialist ecology has a long history. The neoliberal moment is just the latest in a five-century history of laying waste to countries that dare challenge the imperial distribution of wealth, power and poverty. Little in this is new – save that the sacrifice zone strategy now extends to the biosphere. Hence the acceleration of the climate crisis and its increasingly militarized contradictions.

Imperialism is, amongst other things, the management of Cheap Nature on a world-scale. The American Century was no different. Here is Isaiah Bowman, one of the founders of American academic geography and an organic intellectual of the ruling class (Smith 2004). Writing in 1924, Bowman reflected on the resource problems occasioned by America's entry into the First World War: “Formerly our international relations concerned us little, largely because we had plenty of natural resources at home; now they concern us much, for we have now to give earnest thought to ultimate resources, *wherever they may be in the world*” (Bowman 1924, 59, emphasis added).

Nearly a half-century later, 1972's *The Limits to Growth* sounded a similar concern, albeit in less ethnocentric terms (Meadows et al. 1972). It's an extraordinarily resilient framing, one that still animates neo-Malthusian “overshoot” – and even many ecosocialist – narratives (Catton 1980). Capitalism, on the bourgeois view, is limited and contested not by class struggles, but by its “stocks of... physical resources, since they are the *ultimate determinants* of the limits to growth” (Meadows et al. 1972, 45).

The pioneering contribution of the Meadows and their colleagues was to move beyond the one-sided determination of resource limits. *This* argument from *Limits* has

been underappreciated (but see Parenti 2012). If the overall trajectory of *Limits* was decidedly neo-Malthusian, the Meadows team approached pollution in a manner that was indebted to dissident scientists like Rachel Carson (1962) and Barry Commoner (1971). The argument ran something like this: Growth induces a non-linear, geometric increase in pollution. This produces non-linear impacts on the *qualitative* conditions of biospheric reproduction, including human health. Presciently, the *Limits* group identified toxification's qualitative and temporal character: “[When it comes to] the earth’s capacity to absorb pollution... the presence of natural delays in ecological processes increases the probability of underestimating the control measures necessary, and therefore of inadvertently reaching those upper limits” (Meadows et al. 1972, 69). (A matter to which we’ll turn presently.)

The implication? The decisive biophysical contradictions are not confined to resource supply – the question of so-called “taps.” Rather, *Limits’* authors suggested, the question of “sinks” may well pose uniquely intractable problems for “economic growth,” further amplifying global inequality. The two are closely tied. That’s what we see in the climate crisis, as continued atmospheric carbonization overwhelms terrestrial and aquatic sinks and stokes the planetary inferno. That inferno, in turn, is suppressing agricultural and labor productivity, the real basis of capital accumulation (Moore 2010e, 2015a, 2015b, 2021b). The accumulation of waste is a limit to capital.

From Surplus Value to Surplus Pollution: Civilizing Projects & the General Law of Overpollution

Armiero’s signal contribution is to explore these questions of the limits to capital from the standpoint of “wasted people and places” (2020: 23). This is not a wasting of things or substances but of the relations that make and unmake those relational entities. It illuminates a constitutive moment of the Capitalocene (Moore 2016, 2017c, 2018). In contrast to the Popular and Critical Anthropocenes, the Capitalocene is a family of concepts and geopoetics – Necrocene, Polemocene, Proletarocene, and now Wasteocene

– that foregrounds capitalism as a world-ecology of power, profit and life.⁹ For Capitalocene and Wasteocene, capitalism is not a “social” factory of “environmental” consequences; it is a class society that produces changes in the web of life and is, in the same breath, produced through those webs of life (Moore 2015a). Above all, against the Gene Craze’s current, the Wasteocene is not a fragment but an expressive moment of capitalism as a whole.

Taken as an organic whole, Capitalocene and Wasteocene contribute to a richer conception of capitalism’s *general law of overpollution*. It is a “general law” in the sense of Marx’s Hegelian reckoning of capitalism’s world-historical tendencies and counter-tendencies (Sweezy 1946: 11-22). Just as the general law of capitalist accumulation renders “the accumulation of misery a necessary condition, corresponding to the accumulation of wealth,” the general law of overpollution makes increasingly toxic accumulations a “necessary condition” of the endless accumulation of capital (Marx 1977: 799). Building on previous formulations of capital’s “first” and “second” contradictions, the general law of overpollution recognizes two dynamics in its synthesis (O’Connor 1998). It addresses the spatial polarization towards ideological and biophysical “cleanliness” and “contamination” (Armiero 2020: 10). It also implicates the violence of accumulation. Even if Armiero pulls his punches regarding militarized accumulation, he demonstrates how capitalism’s sacrifice zone strategy is not merely an output of an economic logic; it *constitutes* this logic, entangling class, capital, and geocultural domination at every step. This historical-geographical movement maps onto Hage’s reckoning of the Civilizing Project, ongoing primitive accumulation, and manifold expressions of the world color line (2017). As Hage highlights,

The idea that capitalist societies produce and need savage spaces... reinforces the idea that the violence and discrimination that characterizes racism is not an aberration of democratic societies but a permanent feature associated with the government and exploitation of colonized spaces. But the logic of primitive accumulation tells us more than that two different spaces exist: it tells us that the civilized space of legality

⁹ Crucial interventions include Antonacci 2021; Brenner 2019; Brookes 2020; McBrien 2016; The Salvage Collective 2021.

and democracy is dependent on the racist colonial space of unregulated accumulation for its existence, sustenance, and regeneration... Primitive accumulation, then, helps us delineate a state of permanent oscillation between two coexisting states of the social, the civilized and the uncivilized, as the very definition of capitalist social normality. The logic of the “tendency of the rate of profit to fall” that propels this normal oscillation also offers an explanation of how it can degenerate into crisis. Normality as a kind of acceptable and functional oscillation between regulated and unchecked exploitation, is predicated on the capacity of the oscillation to offset the tendency of the rate of profit to fall. If it doesn't, capitalist accumulation initiates a more intense [and more violent: JWM] drive toward the exploitation of human and natural resources (Hage 2017: 61-62).

Hage in conversation with Armiero allows for a revolutionary synthesis with Luxemburg and Said. That's a mouthful, so let me explain briefly. Hage proceeds from the widely-understood world-historical oscillation between phases of primitive accumulation and expanded reproduction (Arrighi 2010; Harvey 2003). This is necessarily a Civilizing Project that “exports” the contradictions of class and capital to the peripheries – and the frontiers. These contradictions combine the two principal English-language meanings of “waste”: as commons to be enclosed, as pollutants to be dumped. These two meanings emerged during successive capitalist transitions, in the long seventeenth and long nineteenth centuries respectively. For this export to proceed, a sacrifice zone strategy had to be employed.

Waste frontiers do not just happen; they must be created, typically at gunpoint. Historically, this required a practical synthesis of laying waste and deploying “force as a permanent weapon” to restructure Cheap Natures through new rounds of frontier-making (Luxemburg 2003: 351). For this strategy to work, it had to be legitimated; hence successive class-imperial projects to create “the Other” (Said 1978). Legitimated in whose eyes? Imperialists needed little convincing. Their cadres, however, did. These were earlier incarnations of the professional-managerial class; they had to be convinced of imperialism's virtue as well as its practicality. The problem persists, and Environmentalism is a perfect salve for a troubled PMC conscience today.

What of capitalism's "normal oscillation"? From the beginning, capitalism worked through Civilizing Projects, from Columbus to Truman's Developmentalism to the Washington Consensus (Moore 2022d, 2023a). These were premised not merely on the promise of Salvation (or Civilization, or Development...) but also on the management of the zone of Savagery, comprising all those human and extra-human natures that capital needs but cannot pay for, lest the rate of profit slow and disaccumulation threaten (Patel and Moore 2017). Managing sacrifice zones depends, of course, on the maintenance of ideologically persuasive, and materially policed, boundaries between the Civilized and the Savage.

What happens once that sacrifice zone strategy extends to the biosphere? This has already occurred. But its guiding threads are not grasped, as they were by an earlier generation of revolutionaries confronting an earlier moment of planetary enclosure. This was the conclusion of the "new imperialism" of the late nineteenth century. It marked the near-total subordination of extra-European labor and life to imperial domination, formal and *de facto*. In such a conjuncture, Lenin and Luxemburg argued, the contradictions of the imperialist system were destined to explode into ruinous war between the Great Powers. In short: planetary enclosure led rival imperial-capitalist blocs to pursue by military means what they could not realize through innovation and competition on the world market. A Thirty Years War followed (Moore 2023a).

Today, the Lenin-Luxemburg problem has returned, but with a wrinkle. Not only has American unipolarity generated irresolvable antagonisms with China, its Belt-and-Road ambitions, and the Global South. Unlike a century ago, the exhaustion of Cheap Nature is nearly complete. The nail in the coffin of Cheap Nature is the climate crisis, the terminus of the centuries-long enclosure of the atmospheric commons as a dumping ground for greenhouse gas emissions. Everyone on the left acknowledges the enclosure of the atmospheric commons. Hardly anyone on the left is willing to follow Hage's tantalizing breadcrumbs. Once the sacrifice zones metastasize, the whole world is opened to "unchecked exploitation, theft, and pillage" (Hage 2017). Few today are willing to emphasize capitalism's use of "force as a permanent weapon" to enable runaway carbonization; or to link the climate crisis to a new phase of permanent war that accompanies the death throes of monopoly capitalism. Complemented by a new militarization of

geopolitical conflict, planetary management becomes the totalizing management of “savagery” – subordinating humans and the rest of life in pursuit of containing the biospheric crisis while maintaining a starkly unequal class structure.

This line of march allows us to flesh out Foster’s tantalizing conception of the “absolute general law of environmental degradation” (Foster 1992). Three decades ago, Foster observed how capitalism tends towards the “maximum economically feasible levels... [of] entropic degradation... [for] any given historical phase of [capitalist] development” (ibid., 85). With rising entropy, capital seeks to offload its worst consequences onto the Global South and working classes in the imperialist countries. In this specific sense, entropy as “economic process” can be reversed – temporarily – within the heartlands of accumulation (Georgescu-Roegen 1971). As monopoly capitalism sinks more deeply into its “normal state” – *stagnation* – new rounds of entropic degradation are effected in capitalist efforts to counter-act that stagnation (Baran and Sweezy; Biel

2006).¹⁰ Increasingly intractable political and economic contradictions follow: “It is a foregone conclusion that the economic repercussions of the second contradiction will grow by leaps and bounds – partly under the pressure of social movements – making nature’s ultimate ‘revenge’ on the accumulation process” (Foster 1992, 85).

The general law of overpollution synthesizes these insights, highlighting three moments. It specifies the relational asymmetry between surplus value and surplus pollution, the latter reckoned as forms of toxification “surplus to” the geobiological capacities to metabolize – and neutralize – wastes of all kinds. *Overpollution* implicates a tendency

¹⁰ This argument bears on a matter that has been subject to considerable – and unfortunately influential – mystification. Malm extracts my world-historical comments on social entropy in characteristically positivist fashion. From our time together in Lund, Malm is well aware that my arguments are a Marxist elaboration of Biel’s (2006) and Hornborg’s (1998) views on the thermodynamics of imperialism. He proposes that I have suggested “entropy is reversible and cyclical” (my words). Having extracted words and alienated them from the geohistorical thesis, Malm then denounces me as an idealist, because “entropy is defined by the second law of thermodynamics precisely as never being that”: *reversible*. The result is that I posit “no laws of society and no laws of nature” (Malm 2018). This is exceedingly curious to say the least, given a quarter-century of reconstructing socio-ecological patterns and “laws” in the Marxist sense of that term.

What bears emphasis is Malm’s bad faith critique. In the above-quoted passage, I do not specify “entropy” in general, in the sense of the second law of thermodynamics. Malm is either too lazy to see this – I spend the whole book (2015a) laying out the problems of nature “in general” – or is engaged in sectarian behavior. I specify the “*economic process*” of entropy, drawing on Georgescu-Roegen (1971). This is formulated through a historical and dialectical synthesis of capitalism in the web of life: Malm’s “laws of society and nature,” dialectically grasped. The *historical* problem of entropy unfolds within *historical* natures, which operate accordingly to transhistorical “laws” and are, in the same breath, both producers and products of capitalist sociality. As I wrote in *Capitalism in the Web of Life*, these

historical natures are subject to broadly entropic processes—the degradation of nature—but these are also reversible within certain limits. Much of this reversibility turns on capitalism’s frontiers of appropriation. Thus the centrality of the ‘Great Frontier’... [The problem of accumulation crisis is shaped by the] entropy problem: matter/energy move from more useful to less useful forms within the prevailing configuration of the *oikeios*. The ‘law of entropy’ – whereby ‘all economic process[es]... transform valuable matter and energy into waste’ – operates within specific patterns of power and production. It is not determined by the biosphere in the abstract. *From the standpoint of historical nature, entropy is reversible and cyclical—but subject to rising entropy within specific civilizational logics*. Capitalism’s logic of appropriating work/energy therefore allows recurrent fixes to rising entropy by locating uncivilized natures on the frontier (2015a: 84, 97, emphases added).

Now, here is something exceedingly curious. In its broad outlines, my argument is similar to Hornborg’s thesis on the thermodynamics of imperialism and the “export” of entropy from the imperialist centers to the peripheries (1998). My critique of Hornborg is well-known: he abstracts class, capital, and the law of value from the conception of imperialism (Moore 2000b). Malm knows this, and – one would think – would support a critical reformulation of Hornborg’s anti-Marxist position. But Hornborg was Malm’s PhD supervisor and the two have collaborated. It appears that Malm’s “ecological Leninism” operates only when convenient (2020). If he had the courage of his convictions, he would implicate Hornborg for his *actual* anti-Marxism rather than inventing reasons to read comrades out of Marxism.

towards non-linear shifts in all manner of socio-ecological systems that, in threaten to exceed “maximum economically feasible levels.” Second, it underlines the centrality of frontiers of Cheap Nature – through which every commodity frontier implies a waste frontier – to world accumulation. In so doing, it identifies an unbreakable connection between skyrocketing overpollution and imperial projects of “laying waste.” Third, it identifies the non-linear evolution of overpollution in historical capitalism, such that each new ecological regime not only produces more waste, but qualitatively new and more toxic forms of waste. At the same time, the quantitative growth of pollution – as with carbon dioxide – propels qualitative “state shifts” in the biosphere, with the climate crisis its crowning achievement (Barnosky et al. 2011). All of which, as Foster and O’Connor imagined three decades ago, amplifies the surplus capital problem and sets qualitatively new forms of the class struggle from below *and* above in motion.

These interpretations crystallize through Marx’s Dialectics 101: substances are not things but relations. What kind of relations? Of the class struggle in the web of life. Carbon dioxide is just a bundle of molecules; only under definite relations of power, profit and life does it become a greenhouse gas. Armiero’s *Wasteocene* refuses the Popular Anthropocene’s treatment “environmental” problems as managerial tasks independent of its imperialist anti-politics. In arguing that “class matters in the Anthropocene” he opens a fresh interpretive vista: class struggles and imperial power as *environment-making* processes (Armiero 2020: 6; Moore 2015a).

Toxification is not, then, a capitalist accident but a design. Capitalism forms through strategies of Cheap Nature that activate qualitatively new toxifications, triggering potential “state shifts” at multiple and increasingly global scales. Today, those contradictions can no longer be offset. The waste frontiers overflow – which is to say, they are gone. Their consequences are managed in increasingly violent fashion.

These accumulation strategies necessarily treat landscapes and lifeways as disposable. This sacrifice zone orientation is therefore not only a consequence of economic logic, the default position of critical waste studies. It’s also a constitutive moment; a rule of systemic reproduction that *requires and depends upon the creation of* wasted people and places. If some toxifications resemble Rob Nixon’s “slow violence,” its underlying conditions rest in empires, their war machines, and their property-making regimes

(Nixon 2011). Across the long arc of historical capitalism, *this* violence is anything but slow:

The Wasteocene logic which makes someone disposable is older than the steel factory... We should remember the Indigenous people killed without any right to be buried or deprived of their ancestors' burial grounds, the women who disappeared without leaving any traces, the miners who were never recovered from the bowels of the earth, the thousands of migrants dead while crossing the Mediterranean Sea (Armiero 2020: 23).

The Wasteocene's beating heart is a toxic cocktail: of militarized accumulation, Civilizing Projects, and the ceaseless production of socio-ecological sacrifice zones. This is the Wasteocene logic. Implicit in Armiero's thesis is the metamorphosis of civilizational logic into world-historical tendency. For every moment of commodification, there is a disproportionately greater moment of potential toxification. *Potential* is important. For capitalism not only activates new *useful* "potentialities slumbering within nature" (Marx 1977: 283). It also awakens other potentialities that challenge the basis of capitalist civilization and its specific articulation of use- and exchange-value through the law of value (Moore 2017e).

Negative-Value: The Negation of the Negation in the Capitalist World-Ecology

This latter is negative-value. Negative-value can be understood as the qualitative co-production of limits to capital in the web of life (Moore 2015a). Negative-value is not subtraction; it's dialectical: a *negation*.¹¹ Historically, the accumulation of negative-value assumed a latent or potential form. It is increasingly activated through late capitalism's marriage of productivism, imperialism and the global division of labor. The contradictions are immediate, direct, and deepening in the early twenty-first century.

¹¹ "Negation in dialectics does not mean simply saying no, or declaring that something does not exist, or destroying it in any way one likes. Long ago Spinoza said: *Omnis determinatio est negatio* – every limitation or determination is at the same time a negation. And further: the kind of negation is here determined, firstly, by the general and, secondly, by the particular nature of the process" (Engels 1987b: 131).

Negative-value is not a substance that adds to, or subtracts from, “the ecological footprint” or any other, equally wretched, neo-Malthusian concept (Wackernagel and Rees 1998). It’s an emergent process activated by capitalism’s drive to appropriate the *biotariat*: the unpaid work/energy of planetary life (Collis 2014; Moore 2021d, 2022f). In this process, forms of life are “awakened” such that they are *unfixable* within the capitalist mode of production.¹² While technological solutions may be possible, they are undeveloped because they are unprofitable – regenerative technological possibilities are either left to languish, or reduced to a narrow, profitable fragment that can be taken straight to market (Goldstein 2018).

Negative-value’s antagonisms can no longer be resolved for two reasons. First, previous imperial fixes have enclosed the terrestrial, atmospheric, aquatic and bodily commons (“wastes) necessary to resolve significant accumulation crises, between the 1550s and the 1970s. These enclosures not only enabled the quantitative expansion of world accumulation. They secured sufficient supplies of *specific* resources necessary to drive technological change. This is what the history of the steam engine, initially developed at the pit head of coal mines to drain water suggests. Once sufficient to resolve accumulation crisis, these frontiers of Cheap Nature no longer exist (Moore 2014, 2015a).

Second, the long history of enclosure, appropriation, and capitalization has effected the *qualitative transformation* of planetary life and lifeways. These awaken “slumbering potentialities” in webs of life that increasingly escape capitalist control: the “superweed effect” (Moore 2015a). This intransigence encompasses not only intractable biophysical problems like climate change; they extend to forms of revolutionary politics whose underlying contradictions can no longer be managed. It’s a mistake to separate Nature as the domain of “substance limits” and Society as the zone of “relational limits.” This is the bourgeois separation of the “external and internal forces of development” – born in the sixteenth century and expressing in thought the separation of the re/producer from the

¹² The world-ecological reading of “fix” – indicating both a temporary resolution to capitalist crisis and a spatio-temporal arrangement *fixed* in a specific historical-geographical moment – takes as its point of departure Harvey 1982, elaborated in Moore 2015a.

means of re/production (Levins and Lewontin 1985: 278; Lewontin, Rose and Kamin 1984).

Engels“ ’revenge of nature” includes the politics of labor (1987a) – itself a “natural force” as Marx reminds us.¹³ The limits to capitalism are, then, political and ecological at the same time. And it’s here that we find the revolutionary possibilities of movements that seek to “reclaim the commons” – atmospheric, terrestrial, urban, agrarian, reproductive and beyond. For today, in contrast to previous moments, such reclamations can no longer be “fixed” by offloading capitalism’s contradictions onto new subordinated people and places. (That strategy persists, but its geographical basis is exhausted and therefore it cannot re-establish the conditions for renewed accumulation.) This means something elementary but rarely appreciated: the politics of reclaiming the commons has entered into a zero-sum contest with the forces of capital. Such zero-sum situations are fraught with danger – and pregnant with revolutionary possibilities.¹⁴ The one thing on which capital cannot compromise, given its productive dilapidation and overaccumulated capital (Moore 2021b), is decommodification and democratization.

Negative-value works in a temporally discontinuous – but tendentially rising – form. “Natural delays” (to borrow from *Limits*) separate the initial enclosure and appropriation from the activation of forms of life increasingly impervious to capitalism’s techno-managerial disciplines: herbicide-resistant superweeds, antibiotic-resistant infections, runaway pandemics, not to mention capitalogenic climate change. In short, negative-value is not arithmetic “ –a subtraction” – but a dialectical *negation* of capitalist Prometheanism. Thus the general law of overpollution’s long arc. The conquest of nature, once realized with ease, is negated. Engels“ ’revenge of nature” is in full flower.

The Wasteocene illuminates this tendential activation of the general law of overpollution across the history of capitalism. Many wastes in capitalism are not essentially toxic, and indeed in modest volumes are necessary accompaniments to production. Consider the manure produced by livestock. Under conditions of simple commodity production, a small farmer who builds a moveable cattle pen allows these creatures to fertilize pas-

¹³ The phrase recurs throughout Marx’s *corpus*, see 1973: 612.

¹⁴ This is the indispensable insight of a now-buried literature, see Paige 1975.

tures. Contrast this with today’s industrial-scale pig farming and the enormous “lagoons” of porcine waste that can and do rupture – producing catastrophic flooding, which is just what happened in eastern North Carolina after 2018’s Hurricane Florence (Bethea 2018).

In the same breath, this quantity-quality transformation of non-toxic waste into rivers of shit is accompanied by another, even more toxic, *qualitative* transformation. The twentieth century’s petro-chemical revolution directly poisoned humans and other life, as Rachel Carson (1962) made clear six decades ago, to create new profit-making opportunities (Romero 2022; Schindler and Demaria 2020). But these opportunities today generate entropic contradictions that overwhelm capital’s reproduction. Their qualitative contradictions are inducing toxic “state shifts” that cannot be managed or contained in the capitalist world-ecology – although perhaps they could under a different mode of production. In the present conjuncture, capital’s unprecedented penetration of our bodies with plastics, herbicides and pesticides has produced what Shanna Swan calls the “count down” – to an absolute fertility crisis for the human species (Swann and Colino 2021).

In sum, the *Wasteocene* unfolds qualitatively more toxic and more invasive transformations of planetary life. These invasions are functionally and dialectically joined to capitalism’s absolute general law of overpollution, which compels a disproportionality between capitalization and waste production. For every commodity frontier, there must be a more expansive, and over time, more toxic, waste frontier.¹⁵ For every quantum of surplus value, there must be a greater, and over time, more toxic quantum of surplus pollution. The arc of capitalist development is to pollute – quantitatively and qualitatively

¹⁵ Important interventions on waste and commodity frontiers include Irvine (2022), Krones 2020, and Schindler and Demaria 2020. Their readings of commodity frontier differ significantly from mine. (This is not to say better or worse in the abstract, only that the alternative conception of commodity frontier signifies a very different set of interpretive tasks and empirical emphases.) Properly identifying capital’s capacity to recycle profitable elements from waste, they identify the latter as a commodity frontier. In my thinking, however, *waste* frontiers crystallize as the dialectical negation of commodity frontiers. The commodity frontier is a socio-ecological process that generates contradictions that can only be offset through new rounds of geographical expansion and expanded opportunities for accumulation by appropriation. Moreover, commodity frontiers should not be confused with the outer spatial edges of a specific commodity. For me, commodity frontiers are world-historical geographical movements of “mass” primary commodities such as early modern sugar and silver, or oil and gas frontiers in the long twentieth century. See Moore, 2000a, 2003a, 2003b, 2007, 2009, 2010a, 2010b, 2010c, 2010d, 2011, 2021b.

– in ways that exceed the web of life’s capacity to absorb it without inducing one or another “state shift.”

The Wasteocene is consequently something more interesting than the “destruction of nature” – a term Armiero wisely eschews. The Capitalocene’s ecocidal logic of imperial accumulation – from the silver mines of Potosí to American nuclear and chemical warfare in East Asia – did not “destroy the environment.” Environments cannot be destroyed, only their habitability for specific biota (Lewontin and Levins 1997). These imperial practices – of waste and laying waste, creating “wasted people and places” as conditions of endless accumulation – created the environments conducive to successive world hegemonies and a “good business environment” (Moore and Avallone 2022; Moore 2023b; Patel and Moore 2017). Such environment-making dynamics – what I have abbreviated as Cheap Nature – shape who and what is valuable, and who and what will be subject to violent devaluations. These transform webs of life, and they are in turn conditioned by webs of life.

Conclusion: From the Global Dump to Planetary Socialism

How does this inform a revolutionary interpretation of capitalist crisis in the planetary inferno? Armiero rightly insists that ours is an epochal “socio-ecological crisis.” But what kind of crisis? Of capitalism or just its neoliberal phase? Of excessive greenhouse gas concentrations? Of class society, or just its capitalist form?

How we answer such questions determines our politics. Identifying a logic and a crisis tendency is a necessary but not sufficient basis for an internationalist and socialist strategy of planetary justice. One’s evaluation of the climate crisis and our political imaginary flow from an assessment of the history: above all, of class society and capitalism in the web of life.

We can ignore those histories, essentially doing away with world-historical movements by conceptual fiat. That’s what the Popular and Critical Anthropocenes do (Moore 2022d, 2023a). But only a revolutionary synthesis – one that fearlessly pursues a “radically honest” assessment of capitalism’s general laws and challenges dogmas at every

turn – will suffice (Williams 1980). Such historical materialist synthesis begins by recognizing how the Wasteocene is a class struggle in the web of life. This snaps into focus, even if Armiero and others (including in my previous work) do not address it, the question of imperialism and the differentiated unity of “laying waste” and “wasting people and places.”

Against the violence of Cheap Nature and its ruthless devaluation of life, we can articulate and advance a socialist alternative that democratizes popular control over the means of investment, re/production, and coercion. This will require, to be sure, not merely political-economic revolution but a cultural revolution too – one that revalues the reproduction of life in diversity, oneness, and harmony. That is not a once-and-for-all event but, as Mao might have said, a continual and continuous class struggle in the web of life. I take this to be Armiero’s dialectical suggestion: in unmasking the agents of the Wasteocene, we open the possibility for revolutionary democratization, revaluing life, land, and labor at the end of the Capitalocene.

Against the Anthropocene’s Limits-to-Growthism, we can chart a different course. With Marx, we may pursue the *dialectical* interpretation of capitalism’s limits in the web of life. This interpretive vista underlines the centrality of frontiers in counter-acting the tendency for the rate of profit to decline. It’s a dialectical reckoning that focuses on the non-linear relation of waste and Cheap Nature frontiers – zones of minimally-capitalized work, food, energy and raw materials (the Four Cheaps).

Great industrializations are bound to great waves of pollution and toxification. Recall the general law of overpollution’s disproportionality thesis: every quantum of surplus value demands a disproportionally greater quantum of surplus pollution. The geographical expansion of commodity complexes implies – and necessitates – new and expanded *waste frontiers*. These frontiers are not just places where capital shits – although that’s an element of it. They are zones where capitalism’s entropy is exported (Caffentzis 1980).

Because such exports must be achieved through political and military power, it’s an imperial process. But the export of entropy is not merely the export of thermodynamic problems (Hornborg 1998). It’s a perpetual search to contain the class and capital contradictions of capitalism’s brutal marriage of affluence and effluence. It’s the effort to

contain and manage the mounting contradictions of waste-making and waste-enclosure as *negations* of the capitalist world-ecology.

New industrializations and new imperialisms are consequently unified from Day One. This is, as we've learned, partly because of the endless search for the Four Cheaps. It's also because turning blood into capital – to borrow Marx's class poetics – is an alchemy of poisoning human and other bodies, establishing sacrifice zones and populations into which the most toxic forms of waste may be dumped.

So long as waste frontiers could be enclosed, conquered, or otherwise subordinated, the costs of toxification could be effectively externalized. For a long time, various forms of pollution and toxification posed episodic and regional troubles – but no systemic barrier to world accumulation. This was a situation that could not endure. At some point, the waste frontiers would be enclosed and “sinks” would overflow. The damage to human and extra-human life would begin to register on global capital's ledger.

But it's not just that the sinks overflow. That's too linear. The sinks are shattering, imploding. This is because “waste” is not a thing but a relation. Capitalism's Wasteocene logic brings not just quantitative expansion but *qualitative* shifts in the biogeography of waste – and therefore the ecologies of empire. The petro-chemical and agricultural revolutions since the 1940s, poisonous hi-tech production, increasingly toxic fossil fuel extraction in coal, oil, and gas (e.g. fracking, mountaintop removal, etc.), the rise of the postwar nuclear power complex – all reveal qualitative transformations of the waste regime in its double register of waste and laying waste. Not to mention the military-industrial complex – in the United States above all – which now ranks among the world's leading carbon polluters, and infamous for poisoning its own soldiers. (Think: burn pits, depleted uranium, Agent Orange.)¹⁶

Nowhere is the waste frontier's non-linear character more evident than in the climate crisis. Here is another narrative struggle. This is not a linear story of the enclosure – and thence closure – of waste frontiers, followed by incrementally rising damages to life and costs to capital. It's a story of how capitalism's 500-year Cheap Nature strategy is im-

¹⁶ These soldiers are proletarians, many of whom hail from the “wasted” places and populations highlighted by Armiero's searing indictment of environmental injustice.

ploding – an epochal reversal of the cost-minimization that has underwritten world accumulation since 1492 (Moore 2021b).

Front and center are three contemporary expressions of waste under the general law of overpollution: the imperial-bourgeois enclosure of the atmospheric commons; the prodigious output of greenhouse gases; and laying waste to any who dare challenge American unipolar hegemony. (The Pentagon is the world’s largest institutional emitter of greenhouse gases [Crawford 2019].) The massive expansion of fossil fuel production with the rise of monopoly capitalism in the late nineteenth century reveals the qualitative shift in stark relief: the movement from pollution as waste problem to *overpollution* as a key element in capitalogenic planetary crisis. The waste/laying waste dialectic was again fundamental. Monopoly capitalism was not merely an economic movement of the “second industrial revolution” but a “new imperialism” underscored by the Scramble for Africa (Platt 1968).

The final enclosure of the Global Dump, as Armiero puts it, is the relational limit of Cheap Pollution: the epochal activation of negative-value in politics, soils and crops, the climate. This does not put an end to capitalism’s business as usual. Capital continues to pursue militarized accumulation even as its capacity to revive the conditions of world accumulation wanes. Here is the Great Involution. Absent new frontiers, capital’s contradictions turn inwards, yielding an unprecedented onslaught of toxification and violence which also – as in Geertz’s famous formula – suppresses labor productivity and induces a reproduction crisis of labor: biotariat and proletariat in uneven combinations (1963, 58ff).

Why this should be so is straightforward: capitalism’s business as usual, its ensemble of technical innovation, militarized accumulation, and Cheap Nature flowed through the Great Frontier. Those frontier movements enabled imperial bourgeoisies to check the tendency towards the rising costs of production, and to contain the dangerous classes set in motion by industrialization and imperialist superexploitation. Its closure represents a quantity-quality tipping point: an *epochal* crisis of capitalism.

Capitalism is now activating new “potentialities slumbering in nature” (back again to Marx). The web of life, poisoned, dominated, and managed since 1492, is in open revolt. The capitalist world-ecology, it turns out, makes not only the proletariat – but also

the biotariat – the gravediggers of the bourgeoisie. Whether or not the One Percent will morph into a post-capitalist, techno-authoritarian ruling class – one suggested by the Davos Project and its Great Reset – is up for grabs (Moore 2022e, 2023b). So too is a planetary socialism that takes to heart Marx’s insistence on the differentiated unity of the “soil and the worker.” But to think that capitalism can weather the storms of the planetary inferno – driven by Wastocene’s logic and amplified by the end of Cheap Nature – is, truly, to endow capitalism with supernatural powers.

The alternative? As Armiero proposes, we must confront the mystifications served up by the Popular Anthropocene’s “invisibilization and normalization” of capitalism’s imperial-bourgeois logic (2020: 26). The narrative struggle is a class struggle. But confronting is too vague. It allows for moral outrage but offers no guiding thread.

Here’s my contribution. The struggle against the Capitalocene and its Wastocene trajectory of laying waste to people and places must join support of concrete working class struggles with a ruthless critique of the bourgeois Environmental Imaginary and its conditions of reproduction, inside and outside the academy. We might begin to discuss openly how the Knowledge Factory does more than train and socialize new workers (Aronowitz 2001; Thompson 1970); it manufactures consent, providing either Good Science to allow for the management of the savages, or fragmented knowledges whose cultural priority is the erasure of class, work, and capital from our interpretive vistas.

When the Popular Anthropocene insists that the problem is ineffective management and irrational resistance to Good Science rather than a crisis of democracy and imperialist forever wars, it is performing the work assigned to it by the dominant structures of knowledge and its institutional masters. We must find ways to liberate – and reimagine – the “means of mental production.” We must recognize the imperative to create institutional liberated zones capable of generating revolutionary thought for a revolutionary consciousness of capitalism in its Zombie phase: dead but moving, and very deadly.

Seizing the means of mental production may be a good slogan, but it has to be more than that. Bourgeois-PMC hegemony in the knowledge factory fragments the possibilities for an internationalist critique of capital. It is possible that recent labor unrest in the American university system signals, at long last, a working-class challenge to decades of neoliberal degradation. Does it also signal a moment of reconstructive pos-

sibility for alliances between intellect workers and wider struggles for socialism and planetary justice? It is of course too soon to tell. But there is an opening.

How we take advantage of this moment is decisive. Against the tide of the “critical” intelligentsia born of the neoliberal transition, we can advance the argument that the climate crisis calls for internationalism – in our method, theory, and action – as never before. I’ve called this the internationalism of the planetary proletariat, unifying the differentiated but common relations of work under capitalism, carried out by human and extra-human nature, paid and unpaid (Moore 2022e). This is central to transcending the Wasteocene logic. Its sacrifice zone dialectic – of waste and laying waste – can only be adequately grasped as an internationalist strategy on the part of imperial capital.

Capitalism’s negation requires an even grander internationalism and a more-than-human solidarity. Meanwhile, methodological nationalism is everywhere: from workerist “ecological Leninism” to woke ethno-nationalisms. Such analytics, and the politics they inform, will not be adequate to the task of revolutionary internationalism. With Lenin, we can understand the struggle against imperialism as fundamental to the socialist project (Heron and Dean 2022) – a struggle that includes the violence of imperialist state-formation and its expression in methodological nationalism. The intellectual alternative is a ruthlessly dialectical and historical methodological internationalism, one that informs and expresses the standpoint of the planetary proletariat: proletariat, femitariat, and biotariat. Only such a flexible and solidaristic standpoint can grasp the combined and uneven dynamics of accumulation and class struggle amidst the present epochal transition. To borrow from Samir Amin (2018), that transition may be “decadent” (from above) or “revolutionary” (from below). But without a triple critique of knowledge in the knowledge factory, ideology, and world-praxis of the imperial bourgeoisie, it will never be anything but decadent.

References

Amin, Samir. 2018. “Revolution or Decadence? Thoughts on the Transition between Modes of Production, on the Occasion of the Marx Bicentennial.” *Monthly Review* 70(1): 17-23.

- Antonacci, John Peter. 2021. "Periodizing the Capitalocene as Polemocene." *Journal of World-Systems Research* 27(2): 439-467.
- Armiero, Marco. 2020. *Wasteocene*. Cambridge: Cambridge University Press.
- Armiero, Marco and D'Alisa, G. 2013. "Voices, clues, numbers: roaming among waste in Campania." *Capitalism Nature Socialism* 24(4): 7-16.
- Aronowitz, Stanley. 2001. *The Knowledge Factory: Dismantling the Corporate University and Creating True Higher Learning*. Boston: Beacon.
- Arrighi, Giovanni. 2010. *The Long Twentieth Century*. London: Verso.
- Arneil, Barbara. 1996. *John Locke and America: The Defence of English Colonialism*. Oxford: Oxford University Press.
- Baran, Paul A., and Sweezy, Paul M. 1966. *Monopoly Capital*. New York: Monthly Review Press.
- Barnosky, D., et al., "Approaching a State Shift in Earth's Biosphere." *Nature* 486: 52-58.
- Bavington, Dean. 2002. "Managerial Ecology and its Discontents." *Environments* 30: 3-22.
- Bethea, Charles. 2018. "Could Smithfield Foods Have Prevented the 'Rivers of Hog Waste' in North Carolina After Florence?" *New Yorker* (30 September), <https://www.newyorker.com/news/news-desk/could-smithfield-foods-have-prevented-the-rivers-of-hog-waste-in-north-carolina-after-florence>.
- Biel, Robert. 2006. "The Interplay between Social and Environmental Degradation in the Development of the International Political Economy." *Journal of World-Systems Research* 12: 109-147.
- Boetzkes, A. 2019. *Plastic Capitalism*. Cambridge, MA: MIT Press.
- Bonneuil, Christoph and Fressoz, Jean-Baptiste. 2016. *The Shock of the Anthropocene: The Earth, History and Us*. London: Verso.
- Bourdieu, Pierre and Wacquant, L.J.D. 1992. *Invitation to Reflexive Sociology*. Cambridge, UK: Polity.
- Bowman, Isaiah. 1924. *Supplement to the New World: Problems in Political Geography*. Chicago: World Book Company.

- Braverman, Harry. 1998 [1974 original]. *Labor and Monopoly Capitalism: The Degradation of Work in the Twentieth Century*, second edition. New York: Monthly Review Press.
- Brenner, Neil. 2019. *New Urban Spaces*. Oxford: Oxford University Press.
- Brookes, Alex. 2020. "Three Aral Sea Films and the Soviet Ecology." *October* 171: 27-46.
- Caffentzis, George. 1980. "The Work/Energy Crisis and the Apocalypse." *Midnight Notes* 3: 1-29.
- Cambon, Sarah Chaney. 2023. "As White-Collar Layoffs Rise, Blue-Collar Resilience Faces Test in 2023," *The Wall Street Journal* (8 January).
- Cameron, Catherine M., Kelton, Paul, and Swedlund, Alan C., eds. 2015 *Beyond Germs: Native Depopulation in North America*. Tucson: University of Arizona Press.
- Cañizares-Esguerra, J. 2004. "Iberian science in the renaissance: Ignored how much longer?" *Perspectives on Science* 12: 86-124.
- Carson, Rachel. 1962. *Silent Spring*. Boston: Houghton Mifflin.
- Catton, William R. *Overshoot*. Urbana: University of Illinois Press, 1980.
- Chakrabarty, Dipesh. 2021. *The climate of history in a planetary age*. Chicago: University of Chicago Press.
- Chwałczyk, F. 2020. "Around the Anthropocene in Eighty Names." *Sustainability* 12: 44-58.
- Chomsky, Noam, and Herman, Edward S. 1979. *The Washington Connection and Third World Fascism*. Boston: South End Press.
- Chase, Allan. 1977. *The Legacy of Malthus*. New York: Alfred A. Knopf.
- Collis, Stephen. 2014. "Notes Towards a Manifesto of the Biotariat," *Beating the Bounds* (July), <https://beatingthebounds.com/2014/07/25/notes-towards-a-manifesto-of-the-biotariat/>.
- Commoner, Barry. 1971. *The Closing Circle*. New York: Bantam.
- Crawford, N.C. 2019. *Pentagon Fuel Use, Climate Change and the Costs of War*, Working Paper, Watson Institute, Brown University.
- Crosby, Alfred W., jr. 1972. *The Columbian Exchange*. New York: Academic Press.
- Crosby, Alfred W., jr. 1997. *The Measure of Reality*. Cambridge: Cambridge University Press.

- Dauvergne, Peter. 2016. *The Environmentalism of the Rich*. Cambridge, MA: MIT Press.
- Davis, J.H., Stolberg, S.G. and T. Kaplan, T. 2018. "Trump Alarms Lawmakers With Disparaging Words for Haiti and Africa." *New York Times* (11 January).
- Descartes, René. 1996. *Meditations on First Philosophy*, ed. and trans. John Cottingham. Cambridge: Cambridge University Press.
- Demos, T.J. 2017. *Against the Anthropocene*. New York: Sternberg Press.
- Dowd, Douglas. 1989. *The Waste of Nations*. Boulder, CO: Westview Press.
- Dowie, Mark. 1996. *Losing Ground*. Cambridge, MA: MIT Press.
- Dryzek, John S. and Pickering, J. 2019. *The Politics of the Anthropocene*. Oxford: Oxford University Press.
- Dunaway, Finis. 2008. "Gas Masks, Pogo, and the Ecological Indian: Earth Day and the Visual Politics of American Environmentalism," *American Quarterly* 60: 67-99.
- Edwards, Paul N. 1996. *The Closed World: Computers and the Politics Of Discourse in Cold War America*. Cambridge, MA: MIT Press.
- Ehrenreich, Barbara, and Ehrenreich, John. 1977a. "The Professional-Managerial Class," *Radical America*, 11(2): 7-32.
- Ehrenreich, Barbara, and Ehrenreich, John. 1977b. "The New Left: A Case Study in Professional-Managerial Class Radicalism." *Radical America* 11(3): 7-22.
- Ehrenreich, Barbara, and Ehrenreich, John. 2013. *Death of a Yuppie Dream: The Rise and Fall of the Professional-Managerial Class*. New York: Rosa Luxemburg Stiftung.
- Ehrlich, Paul R., and Ehrlich, A.H. 1968. *The Population Bomb*. New York: Ballantine.
- Ehrlich, Paul R., Bilderbach, Loy, and Ehrlich, A.H. 1979. *The Golden Door*. New York: Ballantine.
- Engels, Frederick. 1987a. "The Part Played by Labour in the Transition from Ape to Man." In *Collected Works*, Vol. 25: *Engels*, Karl Marx and Frederick Engels, 452-464. New York: International Publishers.
- Engels, Frederick. 1987b. *Anti-Dühring: Herr Eugen Dühring's Revolution in Science* [1894]. In *Collected Works*, Vol. 25: *Engels*, Karl Marx and Frederick Engels, 5-312. New York: International Publishers.
- Evelyn, John. 1706 [1664 original, 1908 reprint]. *Sylva, Or A Discourse of Forest Trees*. 4th edition. London: Arthur Doubleday & Company.

- Faber, Daniel. 1992. "Imperialism, revolution, and the ecological crisis of Central America." *Latin American Perspectives* 19: 17-44.
- Federici, Silvia. 2004. *Caliban and the Witch*. Brooklyn, NY: Autonomedia.
- Ferguson, James. 1990. *The Anti-Politics Machine: 'Development,' Depoliticization, and Bureaucratic Power in Lesotho*. Cambridge: Cambridge University Press.
- Foster, John Bellamy. 1992. "The Absolute General Law of Environmental Degradation Under Capitalism." *Capitalism Nature Socialism* 3: 77-86.
- Foster, John Bellamy. 1993. "'Let them eat pollution': Capitalism and the world environment." *Monthly Review* 44: 10-21.
- Foster, John Bellamy. 1994. *The Vulnerable Planet: A Short Economic History of the Environment*. New York: Monthly Review Press.
- Fraser, Nancy. 2019. *The Old is Dying and the New Cannot Be Born*. London: Verso.
- Fuller, R. Buckminster. 1969. *Operating Manual for Spaceship Earth*. Carbondale: Southern Illinois University Press.
- Geertz, Clifford. 1963. *Agricultural Involution*. Berkeley: Univ of California Press.
- Gibbard, Philip, Walker, Michael, Bauer, Andrew, et al. 2022. "The Anthropocene as an Event, not an Epoch." *Journal of Quaternary Science* 37: 395-399.
- Gille, Z. 2022. "The Socialocene: From Capitalocene to Transnational Waste Regimes," *Antipode* (in press).
- Goldstein, Jesse. 2018. *Planetary Improvement*. Cambridge, MA: MIT Press.
- Gordon, David M., Edwards, Richard and Reich. 1982. Michael. *Segmented Work, Divided Workers: The Historical Transformation of Labor in the United States*. Cambridge: Cambridge University Press.
- Gottlieb, Roger. 2005. *Forcing the Spring: The Transformation of the American Environmental Movement*, second edition. Washington, D.C: Island Press.
- Grove, Jairus. 2017. "The geopolitics of extinction: From the Anthropocene to the Eocene." In *Technology and World Politics*, ed. D.R. McCarthy, 204-223. New York: Routledge.
- Guha, R. 2000. *Environmentalism: A Global History*. New York: Longman.
- Hage, Ghassan. 2017. *Is Racism an Environmental Threat?* Cambridge, UK: Polity.

- Hamilton, Clive. 2017. *Defiant Earth: The fate of humans in the Anthropocene*. New York: John Wiley & Sons.
- Hamblin, Jacob Darwin. 2013. *Arming Mother Nature: The Birth of Catastrophic Environmentalism*. Oxford: Oxford University Press.
- Haraway, Donna, Ishikawa, Noboru, Gilbert, Scott F., Olwig, Kenneth, Tsing, Anna L., and Bubandt, Nils. "Anthropologists are Talking – about the Anthropocene." *Ethnos* 81(3): 535-564.
- Harper, Kyle. 2017. *The Fate of Rome: Climate, Disease, and the End of an Empire*. Princeton: Princeton University Press.
- Harvey, David. 1982. *The Limits to Capital*. Chicago: University of Chicago Press.
- Henn, Jameson C. 2007. *Out of the Wilderness: The First Earth Day*. B.A. thesis, Middlebury College.
- Heron, Kai and Dean, Jodi. 2022. "Climate Leninism and revolutionary transition," *Spectre* (26 June), <https://spectrejournal.com/climate-leninism-andrevolutionary-transition/>.
- Hornborg, Alf. 1998. "Towards an Ecological Theory of Unequal Exchange: Articulating World System Theory and Ecological Economics." *Ecological Economics* 25: 127-136.
- Hornborg, Alf. 2016. *Technologies of Appropriation from Ancient Rome to Wall Street*. New York: Palgrave Macmillan.
- Höhler, S. 2015. *Spaceship Earth in the Environmental Age, 1960-1990*. New York: Routledge.
- Huber, Matt. 2019. "Ecological politics for the working class." *Catalyst* 3(1): 7-45.
- Irvine, Benjamin. 2022 "Working the Waste Commodity Frontier: Metabolic Value and Informal Waste Work," *Antipode* (in press).
- Knapp, Freya L. 2016. "The birth of the flexible mine: Changing geographies of mining and the e-waste commodity frontier," *Environment and Planning A* 48: 1889-1909.
- Krones, J.S. 2020. "The Emergence of a Food-Waste-Based Commodity Frontier in the United States." *Capitalism Nature Socialism* 31: 91-105.
- Ladurie, Emmanuel Le Roy, and Daux, Valerie. 2008. "The climate in Burgundy and elsewhere, from the fourteenth to the twentieth century." *Interdisciplinary Science Reviews* 33: 10-24.
- Langston, Nancy. 2011. *Toxic Bodies*. New Haven, CT: Yale University Press.

- Latour, Bruno. 2018. *Down to Earth: Politics in the New Climatic Regime*. New York: John Wiley & Sons.
- Levins, Richard and Lewontin, Richard C. 1985. *The Dialectical Biologist*. Cambridge, MA: Harvard University Press.
- Lewis, Simon L., and Maslin, Mark A. 2015. "Defining the Anthropocene." *Nature* 519: 171-80.
- Lewontin, Richard, and Levins, Richard. 1997. "Organism and Environment." *Capitalism Nature Socialism* 8: 95-98.
- Lewontin, Richard C., Rose, Steven and Kamin, Leon J. 1984. *Not in Our Genes: Biology, Ideology, and Human Nature*. New York: Pantheon.
- Liboiron, Max. 2021. *Pollution is Colonialism*. Durham, NC: Duke University Press.
- Linebaugh, Peter and Rediker, Marcus. 2020. *The Many-Headed Hydra*. Boston: Beacon.
- Liu, Catherine. 2021. *Virtue hoarders: The Case Against the Professional Managerial Class*. Minneapolis: University of Minnesota Press.
- Luxemburg, Rosa. 2003. *The Accumulation of Capital* [2012 original]. New York: Routledge.
- Malm, Andreas. 2018. "In Defence of Metabolic Rift Theory" Verso blog (16 March), <https://www.versobooks.com/blogs/3691-in-defence-of-metabolic-rift-theory>.
- Malm, Andreas. 2020. *Corona, Climate, Chronic Emergency*. London: Verso.
- Malthus, T.R. 1798 (1966 reprint). *First Essay on Population, A Reprint in Facsimile of An Essay on the Principle of Population as It Affects the Future Improvement of Society*. London: Palgrave Macmillan.
- Malthus, T.R. 1803. *An Essay on the Principle of Population*, Second ed. London: J. Johnson.
- Marx, Karl and Engels, Frederick. 2010. *The German Ideology* [1846]. In *Collected Works*, Vol. 5: *Marx and Engels 1845-1847*, Karl Marx and Frederick Engels, 19-539. London: Lawrence & Wishart.
- Marx, Karl. 1973. *Grundrisse*. New York: Vintage.
- Marx, Karl. 1977. *Capital*. New York: Vintage.
- McNally, David. 1993. *Against the Market*. London: Verso.

- McBrien, Justin. 2016. "Accumulating Extinction." In *Anthropocene or Capitalocene? Nature, History and the Crisis of Capitalism*, ed. Jason W. Moore, 116-137. Oakland: PM Press.
- McNeill, J.R. and Engelke, Peter. 2016. *The Great Acceleration: An environmental history of the Anthropocene since 1945*. Cambridge, MA: Harvard University Press.
- Meadows, Donella H., Meadows, Dennis L., Randers, Joergen and Behrens III, William W. 1972. *The Limits to Growth*. New York: Universe Books.
- Merica, D. and Tatum, S. 2016. "Clinton expresses regret for saying 'half' of Trump supporters are 'deplorables'." *CNN* (12 September).
- Military Intervention Project. 2022. *Military Intervention Project*. Fletcher Center for Strategic Studies, Tufts University, https://sites.tufts.edu/css/mip-research/#_edn4.
- Mills, C. Wright. 1951. *White Collar: The American Middle Classes*. Oxford: Oxford University Press.
- Montrie, Chad. 2011. *A People's History of Environmentalism in the United States*. New York: Continuum.
- Moore, Jason W. 2000a. "Sugar and the Expansion of the Early Modern World-Economy: Commodity Frontiers, Ecological Transformation, and Industrialization." *Review: A Journal of the Fernand Braudel Center* 23: 409-433.
- Moore, Jason W. 2000b. "Marx and the Historical Ecology of Capital Accumulation on a World Scale: A Critique of Hornborg." *Journal of World-Systems Research* 6(1): 134-139.
- Moore, Jason W. 2003a. "Nature and the Transition from Feudalism to Capitalism." *Review: A Journal of the Fernand Braudel Center* 26(2): 97-172
- Moore, Jason W. 2003b. "The Modern World-System as Environmental History? Ecology and the Rise of Capitalism." *Theory & Society* 32(3): 307-377.
- Moore, Jason W. 2007. *Ecology and the Rise of Capitalism*. PhD dissertation, Department of Geography, University of California, Berkeley.
- Moore, Jason W. 2009. "Madeira, Sugar and the Conquest Of Nature in the 'First' Sixteenth Century, Part I: From 'Island Of Timber' to Sugar Revolution, 1420-1506." *Review: A Journal of the Fernand Braudel Center* 35(4): 345-90.

- Moore, Jason W. 2010a. "'Amsterdam is Standing on Norway' Part I: The Alchemy Of Capital, Empire, and Nature in the Diaspora Of Silver, 1545-1648." *Journal of Agrarian Change* 10(1): 33-68.
- Moore, Jason W. 2010b. "'Amsterdam is Standing on Norway' Part II: The Global North Atlantic in the Ecological Revolution of the Long Seventeenth Century." *Journal of Agrarian Change* 10(2): 188-227.
- Moore, Jason W. 2010c. "Madeira, Sugar and the Conquest Of Nature in the 'First' Sixteenth Century, Part II: From Local Crisis to Commodity Frontier, 1506-1530." *Review: A Journal of the Fernand Braudel Center* 33(1): 1-24.
- Moore, Jason W. 2010d. "'This Lofty Mountain of Silver Could Conquer the Whole World': Potosí in the World-Ecological Revolution of the Long Seventeenth Century." *Journal of Philosophical Economics* 4(1): 58-103.
- Moore, Jason W. 2010e. "The End of the Road? Agricultural Revolutions in the Capitalist World-Ecology, 1450-2010." *Journal of Agrarian Change* 10(3): 389-413.
- Moore, Jason W. 2011. "Transcending the Metabolic Rift: A Theory of Crises in the Capitalist World-Ecology." *The Journal of Peasant Studies* 38(1): 1-46.
- Moore, Jason W. 2014. "The End of Cheap Nature, or, How I learned to Stop Worrying about 'the' Environment and Love the Crisis of Capitalism." In *Structures of the World Political Economy and the Future of Global Conflict and Cooperation*, eds. Christian Suter and Christopher Chase-Dunn, 285-314. Berlin: LIT.
- Moore, Jason W. 2015a. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. London: Verso.
- Moore, Jason W. 2015b. "Cheap Food & Bad Climate: From Surplus Value to Negative Value in the Capitalist World-Ecology." *Critical Historical Studies* 2(1): 1-42.
- Moore, Jason W., ed. 2016. *Anthropocene or Capitalocene? Nature, History and the Crisis of Capitalism* (Oakland, CA: PM Press).
- Moore, Jason W. 2017a. "Confronting the Popular Anthropocene: Toward an Ecology of Hope." *New Geographies* 9: 186-191.
- Moore, Jason W. 2017b. "World Accumulation and Planetary Life, or, Why Capitalism Will Not Survive Until the 'Last Tree is Cut.'" *IPPR Progressive Review* 24: 176-204.

- Moore, Jason W. 2017c. "The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis." *The Journal of Peasant Studies* 44: 594-630.
- Moore, Jason W. 2017d. "Metabolic Rift or Metabolic Shift? Dialectics, Nature, and the World-Historical Method." *Theory & Society* 46(4): 285-318.
- Moore, Jason W. 2017e. "The Value of Everything: Work, Capital, and Historical Natures in the Capitalist World-Ecology." *Review: A Journal of the Fernand Braudel Center* 37(3-4): 245-292
- Moore, Jason W. 2018. "The Capitalocene, Part II: Accumulation by Appropriation and the Centrality of Unpaid Work/Energy." *The Journal of Peasant Studies* 45: 237-279.
- Moore, Jason W. 2019. "The Capitalocene and Planetary Justice." *Maize* 6: 49-54.
- Moore, Jason W. 2021a. "The Opiates of the Environmentalists? Anthropocene Illusions, Planetary Management and The Capitalocene Alternative," *Abstrakt* (November), <https://www.polenekoloji.org/>.
- Moore, Jason W. 2021b. "Del Gran Abaratamiento a la Gran Implosión." *Relaciones Internacionales* 47: 11-52.
- Moore, Jason W. 2021c. "Empire, Class & The Origins Of Planetary Crisis: The Transition Debate in the Web of Life." *Esboços* 28: 740-763.
- Moore, Jason W. 2021d. "[Das Planetare Proletariat im Planetaren Inferno.](#)" *LfB: Literaturforum im Brecht-Haus* 7: 4-11
- Moore, Jason W. 2022a. "Beyond Climate Justice." In *The Way Out of...*, eds. Ekaterina Degot and David Riff, 105-130. Berlin: Hatje Cantz Verlag.
- Moore, Jason W. 2022b. "How to Read *Capitalism in the Web of Life*: Towards a World-Historical Materialism in the Web of Life," *Journal of World-Systems Research* 21(1): 153-168.
- Moore, Jason W. 2022c. "Power, Profit and Prometheanism, Part I: Method, Ideology and the Violence of the Civilizing Project," *Journal of World-Systems Research* 21: 415-426.
- Moore, Jason W. 2022d. "Anthropocene, Capitalocene & the Flight from World History: Dialectical Universalism and the Geographies of Class Power in the Capitalist World-Ecology, 1492-2022." *Nordia* 51: 123-146.

- Moore, Jason W. 2022e. "Global Capitalism in the Great Implosion." In *Can Global Capitalism Endure?*, William I. Robinson, ix-xxiv. Atlanta: Clarity Press.
- Moore, Jason W. 2022f. "[El hombre, la naturaleza y el ambientalismo de los ricos.](#)" In *Pensar la Ciencia de Otro Modo*, eds. Herrera, F.F., Lew, D. and Caruci, Nerliny, 55-82. Caracas: Mincyt.
- Moore, Jason W. 2023a. "Our Capitalogenic World: Climate Crises, Class Politics and the Civilizing Project," *Studia Poetica* (in press).
- Moore, Jason W. 2023b. "Imperialism, With and Without Cheap Nature" [in German]. *Das Argument* (in press).
- Moore, Jason W., and Avallone, Gennaro. 2022. "[El mundo como capo de batalla: La larga historia de las crisis climáticas y la naturaleza barata en el sistema Westfaliano.](#)" In *El medioambiente en las Relaciones Internacionales*, Yoan Molinero Gerbeau, 9-21. Madrid: Editorial Síntesis.
- Nash, Roderick Fraser. 2014 [1967 original]. *Wilderness and the American Mind*. Fifth edition. New Haven, CT: Yale University Press.
- Nixon, Rob. 2011. *Slow Violence and the Environmentalism of the Poor*. Cambridge, MA: Harvard University Press.
- O'Connor, James. 1998. *Natural Causes: Essays in Ecological Socialism*. New York: Guilford.
- Orr, David W. 2004. *Earth in Mind: On Education, Environment, and the Human Prospect*. San Francisco: Island Press.
- Paige, Jeffrey. 1975. *Agrarian Revolution: Social Movements and Export Agriculture in the Underdeveloped World*. New York: Free Press.
- Parenti, Christian. 2012. "'The Limits to Growth': A Book that Launched a Movement." *The Nation* (24-31 December).
- Park, L.S. and Pellow, David N. 2013. *The Slums of Aspen*. New York: New York University Press,
- Parker, Geoffrey. 2013. *Global Crisis: Global Crisis: War, Climate Change, and Catastrophe in the Seventeenth Century*. New Haven, CT: Yale University Press.
- Pellow, David N. 2004. *Garbage Wars* (Cambridge, MA: MIT Press).

- Platt, Desmond Christopher Martin. 1968. "Economic Factors in British Policy during the 'New Imperialism'." *Past & Present* 39: 120-138
- Reno, Joshua O. 2015. "Waste and Waste Management," *Annual Review of Anthropology* 44: 557-572.
- Reno, Joshua O. 2016. *Waste Away*. Berkeley: University of California Press.
- Retort. 2005. *Afflicted Powers*. London: Verso.
- Robertson, Nan. 1970. "Earth's Day, Like Mother's, Pulls Capital Together." *The New York Times* (April 23): 30.
- Robertson, Thomas R. 2012. *The Malthusian Moment*. New Brunswick, NJ: Rutgers University Press.
- Georgescu-Roegen, N. 1971. "Energy and Economic Myths." *Southern Economic Journal* 41(3): 347-81
- Rome, Adam. 2013. *The Genius of Earth Day: How A 1970 Teach-In Made the First Green Generation*. New York: Hill and Wang.
- Romero, Adam. 2022. *Economic Poisoning: Industrial Waste and the Chemicalization of American Agriculture*. Berkeley: University of California Press.
- Ross, Eric. B. 1998. *The Malthus Factor: Population, Poverty and Politics in Capitalist Development*. London: Zed.
- Sabin, Paul. 2013. *The Bet: Paul Ehrlich, Julian Simon, and our Gamble over Earth's Future*. New Haven, CT: Yale University Press.
- Said, Edward. 1978. *Orientalism*. New York: Pantheon.
- Sale, Kirkpatrick. 1973. *SDS*. New York: Vintage.
- Sale, Kirkpatrick. 1993. *The Green Revolution: The American Environmental Movement 1962-1992*. New York: Hill and Wang.
- The Salvage Collective. 2021. *Tragedy of the Worker: Towards the Proletarocene*. London: Verso.
- Schindler, Seth and Demaria, Federico. 2020. "'Garbage is Gold': Waste-based Commodity Frontiers, Modes of Valorization and Ecological Distribution Conflicts." *Capitalism Nature Socialism* 31: 52-59.
- Scranton, W.W., chair. 1970. *The Report of the President's Commission on Campus Unrest*. Washington, D.C.: US Government Printing Office.

- Schrecker, Ellen. 2019. "The Disciplines and the Left: The Radical Caucus Movement." *Radical Teacher* 114: 8-11
- Selcer, Perrin. 2018. *The Postwar Origins of the Global Environment: How the United Nations built Spaceship Earth*. New York: Columbia University Press.
- Shabecoff, Philip. 2003. *A Fierce Green Fire: The American Environmental Movement*. Washington, D.C.: Island Press.
- Smith, Neil. 2004. *American Empire: Roosevelt's Geographer and the Prelude to Globalization*. Berkeley: University of California Press.
- Solty, Ingar. 2022. "No, We Can't Afford €100 Billion for Rearmament," *Jacobin* (25 June), <https://jacobin.com/2022/06/german-rearmament-defense-budget-ukraine-olaf-scholz>.
- Stevenson II, Adlai. 1965. "Strengthening the International Development Institutions." Speech before the United Nations Economic and Social Council, Geneva, Switzerland (9 July), http://www.adlaitoday.org/articles/connect2_geneva_07-09-65.pdf.
- Crutzen, Paul J., and Stoermer, Eugene F. 2000. "The Anthropocene." *IGBP Newsletter* 41: 17-18.
- Swann, S.H. with S. Colino, S. 2021. *Count Down: How Our Modern World Is Threatening Sperm Counts, Altering Male and Female Reproductive Development, and Imperiling the Future of the Human Race*. New York: Simon and Schuster.
- Sweezy, Paul M. 1946. *The Theory of Capitalist Development*. London: Dobson Books.
- Swyngedouw, Erik. 2011. "Depoliticized Environments: The End of Nature, Climate Change and the Post-Political Condition," *Royal Institute of Philosophy Supplements* 69: 253-274.
- Thompson, E.P., ed., 1970. *Warwick University Ltd: Industry, Management and the Universities*. Harmondsworth: Penguin, 1970
- Time Staff. 2015. "Here's Donald Trump's Presidential Announcement Speech," *Time* (16 June), <https://time.com/3923128/donald-trump-announcement-speech/>.
- Torreón, B. Salazar. 2017. "Instances of Use of United States Armed Forces Abroad, 1798-2017." *Congressional Research Service* (12 October).
- Wackernagel, Mathis and Rees, William. 1998. *Our Ecological Footprint*. Gabriola Island, BC: New Society Publishers.

- Wallace-Wells, David. 2019. *The Uninhabited Earth*. New York: Penguin.
- Walker, Pat. 1979. *Between Labor and Capital*. Boston: South End Press.
- Wallerstein, Immanuel. 1983. *Historical Capitalism*. London: Verso.
- Wallerstein, Immanuel. 1974. *The Modern World-System I*. New York: Academic Press.
- Wanner, H., Pfister, C. and Neukom, R. 2022. "The Variable European Little Ice Age." *Quaternary Science Reviews* 287: 107531.
- Ward, Barbara. 1966. *Spaceship Earth*. New York: Columbia University Press.
- Ward, Barbara and Dubois, Renee. 1972. *Only One Earth* New York: W.W. Norton.
- Weber, Max. 1951. *The Religion of China*. Glencoe, IL: Free Press.
- Williams, Raymond. 1980. "Ideas of Nature." In *Culture and Materialism*, Raymond Williams, 67-85. London: Verso.
- Witt, Matthew T. 2022. "From Greta to the Great Reset: Making Emergencies Work." *American Journal of Economics and Sociology* 81(2): 381-406.
- Wolford, Wendy. 2021. "The Plantationocene: A Lusotropical Contribution to the Theory." *Annals of the American Association of Geographers* 111(6): 1622-1639.
- Yates, Michelle. 2011. "The Human-As-Waste, the Labor Theory of Value and Disposability in Contemporary Capitalism." *Antipode* 43: 1679-1695.
- Zimmerman, Erich. 1951. *World Resources and Industries*, 2nd revised ed. New York: Harper & Brothers.