6 THE IMPERIAL ORGANISM AT WORK

> From all this it follows that the easiest, most natural and obvious way to civilize the African native is to give him decent white employment. White employment is his best school; the gospel of labour is the most salutary gospel for him.
>
> —JAN CHRISTIAN SMUTS, *Africa and Some World Problems* (1930)

Victorian empires were steeped in energy. This is most obvious when energy is taken to signify fuel. The use of fossil fuels was tied up with political domination from its inception, both within Great Britain and globally; Andreas Malm describes how "a clique of white British men employed steam power as a literal weapon against the best part of humankind, from the Niger delta to the Yangzi delta, the Levant to Latin America."[1] Fossil-driven technologies of transportation and communication helped in the creation of new European colonies, as in Africa, as well as in the extension of greater control over already existing regimes, as in India or Southeast Asia. Fossil fuel–driven capitalism required an unjust circulation of materials and bodies; the concentration of wealth in some sites occurred at the expense of other people and things, necessitating authoritarianism in certain sites and moments, a phenomenon that has been exhaustively catalogued by postcolonial theorists and thinkers in the Global South.[2]

The material capacities released by fossil fuels are central to the story of nineteenth- and twentieth-century imperialisms. However, this chapter extends the study of energetic empire beyond a consideration of fuel power. Instead, I continue to approach energy as a historical figuration, asking how energy became a traveling metaphor that reinforced the material and capitalist relations of empire in the period following the birth of thermodynamics. Of course, these two questions, premised upon two facets of energy—as fuel and as a ruling logic—are enmeshed. The larger argument of this book is that energy contributed to a Western master code of work and waste that infected the human relationship with fossil fuels, imbuing the drive toward efficiency and productivity with an aura of natural timelessness. The study of fossil-fueled empire can be enriched by an understanding of how energy contributed to the rapacious productivism that galvanized imperial domination.

In order to discern energy logics at work in fossil-fueled empire, this chapter focuses on exhuming traces of thermodynamics in the discourses and practices of the new imperialist era, stretching from the 1870s to the early decades of the twentieth century. I focus particularly on the case of British new imperialism in Africa, both because of the British-based popularization of the science of energy, and because of the significance of Africa and the racist mythologies of African labor to new imperial logics, especially following the dramatic British loss in the First Boer War (1880–81) and in the aftermath of the abolition of slavery. The next chapter will expand beyond the British Empire to consider how energy appears in the new imperial practices of the U.S. technical education movement of this period, both as a settler colonial state (schools for Native Americans) and a former slave state (industrial schools for enfranchised Black Americans).

The new imperialist era, stretching from the 1870s to the end of World War II, witnessed the emergence of a more information-heavy, administrative approach to imperial governance, one that drew upon the sciences and presaged later notions of global development. I have chosen to focus on the new imperial era because it was the imperial moment most marked by fossil-fueled industrialization, and by the birth of energy as a logic of domination, following its so-called discovery by thermodynamics in the 1840s. However, it is worth emphasizing that European imperial domination preceded fossil-fueled industrialization by centuries. Postcolonial theorists like Sylvia Wynter, Walter Mignolo, and Irene Silverblatt look to the Renaissance, and to the Spanish colonization of the New World in the

sixteenth and seventeenth centuries to understand the early configuration of what Mignolo calls "colonial difference."[3] Only by first defining themselves against the peoples of the New World did Europeans begin to think of themselves as "European," and as the central agents of world history.

While European imperialism did not originate in the nineteenth century, its intensity and style underwent a significant shift in this period. Wynter, for example, analyzes this shift as the invention of a new "genre" of humankind. Genres of humankind contain "descriptive statements" of what it means to be human in that period. In describing humankind, they also inscribe a "space of Otherness," those who fall outside the human genre. The distinction between the human and the Other, according to each era's genre, ordered European notions of justice and sovereignty in its colonies. Wynter locates the first genre shift in the Renaissance-era move from the "True Christian Self" to the "Rational Self of Man," or what she terms Man_1, which was closely connected to Newtonian physics and Enlightenment sciences. The Christian Self had been defined against the infidel or heretic, but Man_1, the European political subject, now required that the Other be transformed from the spiritually damned to the "politically condemned," which would include categories like "the interned Mad, the interned 'Indian,' the enslaved 'Negro.'"[4]

Man_1 inaugurated the modern self, but Wynter notices that its meaning continued to morph over time. In the nineteenth century, social Darwinism and new biological definitions of the human species contributed to the invention of "Man_2."[5] With Man_2, the human now appears primarily as an *economic* subject whose activities, according to the laws of the market, abide by the laws of nature. Drawing on Fanon, Wynter observes that the elite economic subject announced by Man_2, the "Breadwinners and Investors," defined the Other as the "economically damnés," no longer the politically condemned, the Mad, interned, or enslaved, but "the jobless, the homeless, the Poor," and the "underdeveloped," organized along a global color line.[6]

As is evident in Wynter's analysis of Man_2, the importance of biological sciences such as evolution and ecology to the new imperialist mindset is well established,[7] and was also acknowledged at the time, with mixed feelings. In 1906, a French diplomat named Victor Bérard chastised Britain for its misapplication of Darwinism, writing that "the English people are steeped in this doctrine, which they believe to be in strict keeping with the latest discoveries of science, especially with the latest theories of the

great English thinkers, such as Darwin and his followers, which, above all, they feel to be in keeping with the temperament of the race. *It is this doctrine which has really created the Imperialist frame of mind in the nation*" (italics mine).[8]

Energy and its metaphors do not appear as explicitly, nor anywhere near as frequently, as do the biological sciences in the "descriptive statements" of what it meant to be human, nor in the archives of the new imperialism. But while evolution supposedly explained European racial superiority—Westerners had crafted tools that enabled them to better survive their environment—it was the science of energy that specified exactly how civilizational advancement had been achieved. Understood through the logic of energy, Western technological superiority did not arise as a result of better art, truer faith, or liberal government, much as these might have been understood as necessary preconditions. It was by a superior work ethic, imbued with an energetic disposition that sought efficiency and productivity above all other measures of value.

As with older work ethics, this diagnosis had less to do with celebrating European labor than it did with disciplining it. The preoccupation with spreading a gospel of labor reveals the anxieties of a powerful elite in the face of the ever-present recalcitrance of workers. Labor posed a continual problem to those aiming to profit from fossil-enabled power; Malm argues that "fossil fuels necessitate waged or forced labor—the power of some to direct the labor of others—as conditions of their very existence." As a result, Malm traces the origins of fossil economies to the "sphere" of laborers, the contested sites "where biophysical resources pass into the circuits of social metabolism."[9] It is not surprising, then, that energy logics appear most intensely in the governance of laboring bodies and things. The central argument of this chapter is that global struggles over the problem of labor, an omnipresent obsession for European imperial managers, became animated by energetic assumptions. Victorian labor politics are familiar to historians of empire, but I emphasize how thermodynamics contributed to this broader historical development, in particular through an energetic racism that reinforced hierarchies of gender, race, and class.

While energy appears in multiple ways, here I build upon chapter 5, focusing on ecology as a central vector through which thermodynamic metaphors reinforced new imperialist practices. Like energy, ecology was also a child of empire, "[growing] out of the imperial administrative and political culture" of the turn of the twentieth century.[10] And thanks to

ecology's preference for systems-level thinking, for taking the view from above (sometimes literally, as in the frequent use of aerial surveys in the colonial world), ecology was often presented as a master science for imperial administration.[11] Historians of ecological imperialism have largely ignored or minimized the role of energy science. Peder Anker, for example, writes that "the natural sciences such as physics and chemistry played little role in the ecologists' understanding of the natural world, despite their use of mechanistic and chemical terminology."[12] However, as chapter 5 showed, energy did play a significant role in the development of ecological thinking. Even a "terminological" adoption of energy physics could and did have political significance thanks to the seductive nature of energy accounting. Through a reexamination of the operations of ecology as a new imperial science, this chapter makes the case for energy itself as a political rationality that served imperial domination, as providing yet another framework, or "Western code,"[13] with which to organize a world of different, and usually subjugated, people and things.

At the same time, it is important to couch energy in an understanding of empire that is multiple and plural: empire was "shaped by various colonial contexts, and worked on different aspects of British society in multifarious ways," such that "we need to be wary of basing wide generalizations upon limited case studies."[14] Energy and work, too, were practiced and interpreted in multiple ways. However, my aim here is less to explore alternative energy logics—a field that deserves further research—and instead to map the contours of how energy emerged as a Western logic of domination, one that claimed itself to be the only possible epistemology of fuel.[15] I follow a dominant logic of energy that valorized productive work, and that was indebted to the Presbyterian synthesis of early energy scientists, as it assisted in the violent capture and transformation of alternative possibilities of valuing work and relating to fuel.

This was not a case of a smooth transferral of European knowledge from core to periphery, but rather of a struggle over how people should organize their activities and energetic accounts. Dominant energy logics were constituted by their engagement with people and things who resisted the European work project. Indeed, the European work/energy nexus, despite its claim to hegemony, faced significant resistance from soils, forests, waterways, and lifeways, as "the apparent ineluctability of 'nature' gave rise to repeated tensions within the colonial medical, scientific and technical services, or proved, as in the case of agriculture and forestry, that what was standard practice in Europe was neither feasible nor desirable in a

very different African, Asian or Caribbean environment."[16] Intransigent peoples, forests, and animals only intensified desires to control energy, animating an energy zeitgeist that underlies the more familiar imperial tropes of labor, social Darwinism, and ecological metaphors.

The chapter follows energetic metaphors as they emerge in imperial discourse, first showing how the problem of labor was interpreted through the metaphor of the organism. Categorizations of work and waste depended upon thermo-political judgments that assumed that energy fueled the metabolism of the imperial organism. Energy intake allowed for work—and growth—but only if waste could be adequately processed. In order to process waste, it had to be discovered and labeled, and this occurred through hierarchies of race, gender, and class. When thermodynamics is superposed onto these intersecting hierarchies, fossil fuel expansion could be connected to the virtues of work, and pollution to the sin of sloth, connotations that continue to haunt ideologies of global development.

THE NEW IMPERIAL ORGANISM AND ITS PROBLEMS

The British Empire reached the apex of its power in the nineteenth century, during the new imperial moment, when it "forged one of the largest and most powerful empires in the world."[17] Historians offer a number of explanations for the acceleration of empire in the late nineteenth century, including the rise of Germany and the United States as industrial and military competitors, the global depression of the 1870s, the discovery of diamonds in South Africa, the rise of labor unions and socialist parties in Europe (and, by the 1880s, in Great Britain as well), fluctuating resource prices, soaring unemployment, and the humiliating British losses in the 1880–81 Boer War in South Africa. Regardless of the precise cause, the sudden revival of interest in imperialism was remarkably abrupt.[18] Within the space of a decade, the scramble for Africa was launched and the British claimed roughly two million square miles of new territories in Africa. In 1891, Lord Salisbury reportedly quipped of the "sudden emergence of African questions" that "when he left the Foreign Office in 1880, no one thought of Africa. When he returned to it in 1885, the nations of Europe were effervescing with new African interests."[19]

New imperialism differed from its older variants in part because of the proliferation of steam technologies. Fossil fuels exploded a number of constraints of space and time exponentially beyond what sociotechnical

assemblages like the stirrup, sailing ships, or slavery had enabled in the past. The steamships of empire were still constrained by the availability of coal, and the location of coaling stations, but no longer by the much more restrictive vagaries of animal muscle, wind flow, or ocean currents. Fossil fuels are also subterranean, and so transcended the long-standing land constraint of biomass/muscle energy systems that required extensive acreage for forests, grazing, and agriculture. By breaking free from these constraints, Matthew Huber argues that "fossilized time-space compression represents the conditions of possibility for the very ideas of global markets, global civil society, and global states."[20]

However, breaking free from material constraints required a great deal of painful breaking for humans and nonhumans everywhere on the planet.[21] While fossil fuels themselves required less land, land was still necessary to supply the materials for industry, as well as to feed a burgeoning European population with solar-driven agriculture. Much of the new demand for land and material resources was met by extending control over territory outside of Europe, which had to be committed to sustaining European industry and populations. In his 1911 poem "Big Steamers," Rudyard Kipling warns as much, telling the British people that "For the bread that you eat and the biscuits you nibble, / The sweets that you suck and the joints that you carve, / They are brought to you daily by All Us Big Steamers / And if any one hinders our coming you'll starve!"[22] The prospect of industrialization in the Global South was threatening; if the colonies were permitted to industrialize, their land would be needed to feed their own factories, rather than to feed European laborers.[23]

In tandem with colonial land and resources, European industrialization also depended on underpaying colonized peoples. The advancement of productive work, which already governed European industrial life, was an inherently global goal; from the start, British administrators and the public perceived colonial labor as inextricably wound up with British labor and well-being. For some, imperialism, in inciting nationalism among the working class, could also temper the threat of socialist revolution in Europe. Alluding to these difficulties, Charles Sydney Goldman explained in 1905 that "seeing in England an old, crowded, and complex society, with little room for internal development, [the Imperialist creed] sought to open a wider horizon to its view, and to remedy some of the greater evils of the social organism by means of the wide, untried territories at its command."[24]

In order to manage globally distributed lands, things, and bodies, the new imperialist period experimented with new governance styles, shifting from the laissez-faire attitudes of the eighteenth and earlier nineteenth centuries to a more technocratic colonial apparatus in the twentieth century that aimed to "develop" Africa, beginning with the "constructive imperialism" of Joseph Chamberlain, the British secretary of state for the colonies from 1895 to 1903.[25] Britain thus turned from imperial expansion to colonial administration, where "the problem was now one of consolidating British power, of making the Empire more united as well as more efficient."[26] Development by the state produced what historian Thomas Richards calls the world's first information society, in which "much Victorian thought participated in seeing the state as central to human life, and more, in imagining a kind of complete documentary knowledge of human life that would exist solely for the state."[27] Richards documents a host of private-turned-public institutions that arose to process the avalanche of knowledge being collected about the empire, including the museum, the archive, and ecological surveys. The accumulating information about plants, mines, laborers, disease, population, and animals worldwide had to be not only collected but analyzed, and the state increasingly turned to the new fields of modern science to do so. Historian Helen Tilley notes that British colonial administrators "were acutely aware of the complexities involved in holding the empire together in the face of both white settler nationalism and indigenous anticolonial resistance," and they openly called on scientists to assist them.[28]

Ecological science seemed especially well suited to the study of colonial terrain, flora, fauna, and peoples, given its desire to map interrelationships within larger systems. The prominence of ecology is evident in the ubiquity of one of its master metaphors—the organism. As British imperial regimes expanded, and the complexity of governing their diverse parts often bewildered the Colonial Office, new imperialists increasingly came to understand the empire as a living, complex organism. The organic metaphor drew upon older, organic theories of the state, which were of "ancient vintage" in politics, reaching back to Plato and Aristotle.[29] However, alongside the general craze for organic thinking in the Victorian and Edwardian eras, discussed in chapter 5, theories of the organic state likewise experienced a resurgence in the nineteenth century, most influentially in the Romantic-Idealist thought of Hegel and Schelling. For them, the organic theory of society was an alternative response to the

eighteenth-century revolutions, and a rebuke to "the Enlightenment idea that the state was voluntarily produced from a state of nature, mechanistic in its function, and atomistic in its orientation."[30] This rejection of mechanistic approaches, and the preference for more holistic thinking, paved the way for the incorporation of modern sciences like ecology, evolution, and energy into politics, all of which feature prominently in organic theories of new imperialism.

By understanding the empire as an organism, it became easier to make sense of how new imperial governance should relate to its restive colonies. In 1902, British politician R. B. Haldane referred to "a new conception of the Empire as an organic whole, with a common life and end pervading and guiding the action of all its members. No longer do we think of our colonies as governed from Downing Street. Downing Street is but the ganglion in which the stimulus derived from contact in different parts is translated into movement in the interest of the common life."[31]

Given the organism's ultimately unknowable complexity, Haldane concludes that the organism must be governed by elites with scientific knowledge of its inner workings, functioning as the "ganglion" that could accumulate and interpret the data, and then translate messages from one part of the body to the other. Haldane's ganglion mirrors Maxwell's demon, an influential thought experiment proposed by James Clerk Maxwell, a key proponent of classical thermodynamics. The demon was an imaginary, intelligent being who could overcome the second law of thermodynamics, the spontaneous increase of entropy. In his 1871 text *Theory of Heat*, Maxwell imagined a vessel filled with gas, with two sides and a trapdoor between them; the demon sits by the door and observes the passing gas molecules, opening the door to allow only "swifter" molecules to one side. Over time, the demon could therefore raise the temperature of one side of the vessel—and recall that a temperature difference is necessary for work—without doing work. Maxwell's demon had far-reaching implications, especially in later information theory, as Maxwell posited that *information* about the molecules could function as a kind of work. However, Maxwell also notes that such molecular detail is "at present impossible to us," given that we can only know about gas molecules through statistical calculation.[32]

The concept underlying Maxwell's demon resonated with the Victorian shift toward scientific governance. The demon revealed both the promise and the limitations offered by thermodynamics, and by modern science more generally. With more information, one could stem the tide of entro-

pic chaos, and potentially approximate the kind of order that Maxwell's demon achieves. And yet the demonic knowledge of each and every molecule, each and every plant, mine, body, opinion, food calorie, wind vector, ocean current, and the like, ultimately remains forever out of human reach, too massive to perfectly compute. The demon, with its sinister overtones, contrasts with the only other "intelligent being" exempted from the second law—God. Meanwhile, humans are left only with their imperfect approximations of energy knowledge. So just as physicists could only comprehend the behavior of gases, and thus heat, through statistical calculations of amassed data, so too administrators in the imperial ganglion, faced with immensely complex governance problems, must resort increasingly to mathematical methods. Hence, Haldane's reading of Downing Street as less the sovereign ruler from which decrees emerge, and more the centralized information processor trying its best to gather ever more energy data and guard the trapdoor between the swift and the sluggish, the workers and the waste.

Indeed, in governing the organism, it was understood that the very breath, bone, and blood that sustained the organism was labor, while many of the organismic forces of illness and death were likewise to do with problems of labor. Through the metaphor of the organism, sustained by the metabolic exchange of energy (read: work), it thus became possible to explain the relationship of Black labor to the well-being of both Africans and Europeans.[33] Turning African men into wage laborers was not just a civilizing mission, and not just to the advantage of some far-flung mine, but instead was recognized as integral to the health of the empire and of white laborers in Europe. Two parts could be different, as the eye and the leg or the root and the branch, but they could also be harnessed to the same organizational pattern or program, to the life of the organism. In 1905, journalist James Louis Garvin claimed that "our Colonies are no longer 'fruits which cling 'til they ripen,' but banyan-shoots spreading with repeated root from the parent-trunk to strengthen the system they extend."[34] In other words, Britain, perceived to be weakening vis-à-vis Germany and the United States, needed to appreciate its colonies as feeding the health of the British imperial banyan, rather than as fruits that would suck away nutrients and detach themselves. In this metaphor, the imperial administration would serve as banyan gardeners.

This notion—that by promoting and developing the colonies as parts of the whole, the British empire would likewise profit—was widely cited. Jan Smuts, a military leader in the Boer War and eventual prime minister

of the Union of South Africa, was a proponent of the new ecological sciences and argued that "African progress is one whole organic problem and has to be viewed as such."[35] The goal was to govern the organism's parts so that the health of the whole organism was ensured. As Chamberlain declared in a 1903 speech, the empire could be "self-sustaining" with "decent organisation and consolidation," and in turn, "it is absolutely impossible that anything which contributes to the prosperity of the Colonies, which fills up their waste land, which makes them richer, will not react and add to your prosperity also."[36] Or, as Charles Bruce, a prominent imperial administrator, testified in a 1906 essay, "Indeed it may be said with truth of some of the most important industries in the United Kingdom that they have their roots in the labour of the coloured races, while the trunk, branches, flowers and fruits represent the labour and profits of the white man. It is only the low wage-rate of the tropical area of production of the raw material that enables the manufactured article to be turned out at a price that ensures a large market and yet allows an adequate wage for the British workman."[37] Smuts, always a reliable source for unvarnished defenses of imperialism, proclaims that "the easiest, most natural and obvious way to civilize the African native is to give him decent white employment. White employment is his best school; the gospel of labour is the most salutary gospel for him."[38]

In reality, the so-called gospel of labor was difficult to spread. Labor was the lifeblood of the imperial organism, and at the same time its chief problem.[39] Somehow, cheap labor must be extracted in the colonies in a way that could be consistent with the trumpeting of freedom and democracy in Europe. W. E. B. Du Bois exposed the method by which this was achieved, describing how empire depended on exploitative labor across the global color line, a notion that was openly acknowledged in the imperial jingoism that surrounded him.[40] Du Bois went so far as to call labor "the Problem of Problems" for global politics, by which he meant "the problem of allocating work and income in the tremendous and increasingly intricate world-embracing industrial machine which we have built."[41]

For although the British had officially renounced slavery and had joined the global abolition movement earlier in the nineteenth century, they (as well as other European empires) still relied upon, and desired, laborers whom they paid far less than they paid white laborers. A Ghanaian abolition newspaper observed in 1900 that "the old slavery is dead, but a more subtle slavery may take its place. The demand of the capitalist everywhere is for cheap and docile labour." Most importantly, the news-

paper gestured toward labor problems in Europe by noting that low-paid labor was performed by bodies of color so that the capitalist could "rescue himself from the demands of white labor."[42] British imperialists in Africa were thus charged with devising methods to secure cheap Black labor that could pass muster with abolitionists, who largely shared their faith in the virtue of work provided that workers were ostensibly free.[43]

Du Bois encapsulates the imperial puzzle best: "Thus with a democratic face at home modern imperialism turns a visage of stern and unyielding autocracy toward its darker colonies. This double-faced attitude is difficult to maintain and puts hard strain on the national soul that tries it."[44] The hard strain that Du Bois notes, the disjuncture between democratic ideals and forced labor in the colonies, was further exacerbated by widespread African resistance to the venerated gospel of labor, whether through armed resistance, mass migrations, boycotts of European goods, labor strikes and unionization, or refusing to pay colonial taxes. Some of the most well known resistance movements, such as the Nigerian Women's War of 1929, were direct refusals of imperial labor experiments. The intransigence of Black labor is a frequent complaint of European administrators and travelers. As Henry Callaway, a bishop in South Africa, bemoans in an 1859 letter, "There is apparently abundance of *hands*; but to get labour out of them is quite another question. . . . How are 8,000 widely scattered whites to compel 200,000 coloured to labour, against their will?"[45]

In the context of dissent in both Africa and Europe, the new imperialists were left with a crisis of governance.[46] Throughout the period, administrators clamored for scientific knowledge with which to manage Britain and its empire, and many scientists were eager to provide it. As late as 1924, *Nature*, reporting back from the British Empire Exhibition, noted that "the fundamental condition for success [of the commercial development of the colonies] is a systematic investigation, on scientific lines, of the natural resources of the countries concerned," including "the development of a central clearing-house of imperial economic information."[47] This, too, would serve the empire-as-organism, as the journal describes how "each group of cells in this organism performs its particular functions independently, yet all are correlated in the scheme of growth, and their activities affect not alone the vitality of the corporate whole but all other human communities."[48]

The partnership between science and politics, already intimate, solidified considerably in this period. Evolution, ecology, and other modern biological sciences certainly fed this partnership, with fields such as tropical

medicine[49] leading the way and providing a moral justification for the benefits of imperial science.[50] Meanwhile, thermodynamics directly addressed work, the problem of problems for imperialists. It made possible an energy logic that valorized a particular kind of work: productive work, work that increased the metabolic activity of the organism. Productivism was aligned with the desire for constant, unending growth. Productive work was in contrast to much of the work activities performed by humans throughout the history of civilization, which diverted energy toward survival or reproduction. Such work was necessary, of course, but a subsistence style of energy exploitation had not led to civilizational advance, where civilization was understood as an effect of accumulation and growth. Since the advent of fossil-fueled technologies, humans could now radically increase the volume of energy influx through the organism of human civilization. Work that lent itself to this metabolic goal was thus the most prized as an activity of evolutionary superiority.[51] Ted Underwood points out that Victorians had already cherished productivism, but in thermodynamics, which became wildly popular, they found the mathematical equations that "ratified" this economic preference and "proved that economic production and natural force were two names for a single power"—energy.[52] Through thermopolitics, productivism took root in the "economic logic" that motivated British imperialism, where "imperial officials viewed African populations less as prospective political actors and more as potential producers."[53]

Just as energy seemed to ratify productive work, it also constructed waste through a productivist framework. In the energy–work nexus, waste was anything that was not productive, or that harmed productivity. Waste was amenable to measurement and improvement, but ultimately unavoidable, as waste would accumulate as organic throughput increased. As a result, so long as waste was tied up with productive work, it did not signal a failure of industrialization, but rather useless detritus that required constant surveillance and excision so as not to slow the organism's growth. Resistance to work was translated as more data to be governed by the colonial demon at the trapdoor. Maxwell's demon had sorted the swift molecules from the sluggish in order to concentrate energy, and the logic of energy governance similarly aimed to sort the more productive workers from the lazy and indolent. Those who refused work needed to be separated and excised.

Violence and outright theft of land remained popular solutions to the puzzle of putting Africa to work. The pillage of King Leopold and the

Belgians in the Congo provides the most famous, but certainly not an exceptional, example. However, in other sites, new labor policies were invented that seemed to better correspond to the ideals of liberal democracy. For example, through the biopolitical tactic of the census, imperial administrators tallied households, wives, and property in order to impose hut taxes. Taxing households was intended to destabilize subsistence economies by forcing many people, especially those from poorer households, into wage labor in order to raise cash to pay the tax. According to Smuts and other imperialists across the continent (against much evidence to the contrary), Africans cheerfully accepted these hut taxes "as their contribution to good government."[54] Administrators in many regions also required Africans to engage in periods of forced (often unpaid) labor for "public" projects such as railroads, dams, and roads, many of which served the needs of private European industries, though they claimed to be advancing the health of the imperial organism.

Rather than being clear-cut categories, the gradations between forced and free labor lie at the heart of imperial debate, as "the British people had come to believe that maintaining the line between free labor and enslaved labor was fundamental to legitimate commerce and government both at home and abroad. . . . Indeed, in the humanitarian politics of the British Empire, no issue was of greater importance than labor."[55] In other words, new imperial logics of domination needed to operate through the grammar of free labor. The mere existence of a wage, even if unequal, became an indicator in the British public's imagination that demarcated the line between slavery and free labor.

ENERGETIC RACISM

According to the energy logic that we are following, colonized peoples were told that if they wanted to receive equal pay and treatment, and eventually to be deemed fit for self-governance, they must first prove themselves to be efficient, productive workers. This is how abolitionists and purported European defenders of "African rights" could rail against slavery but at the same time subscribe to the industrial mission of putting the world to work. Thermodynamics could be deployed through new modes of scientific racism that effectively delayed equality until the far future, the not-yet.

Historian Jürgen Osterhammel briefly suggests the possibility that energetic distinctions informed racist ideology in his sweeping history of

the nineteenth century, when he observes that there was also an "energetic racism" at work: "the racism of the age did not end with skin color: it classified the human 'races' on a scale of potential physical and mental energy."[56] An energy discourse motivated "young patriots" to "revitalize" their societies, making nationalist and socialist projects in Asia, for example, into "a vehicle of self-energization."[57] Osterhammel records the preference for vitality and dynamism but does not consider how such amorphous values were often described through the metaphor of the organism, and were reinforced by a new energy knowledge that coded it as metabolic input and output. Taking the history of energy into account makes it possible to expand upon the notion of energetic racism as a conflation of physics and Protestantism in the service of European industrial capitalism.

Scientific racism had become a powerful tactic by which imperial labor projects advanced. The ground had been prepared by earlier theologies that had found ways to justify centuries of pillage, slavery, and exploitation in the colonies. As Hortense Spillers observes, such frameworks constitute "a *semiosis* of procedure" that make possible racialized technologies of violence. The violent act is made possible by violent signification, as "the marking, the branding, the whipping—all instruments of a terrorist regime—were more deeply *that* [the semiosis]—to get in somebody's face that way would have to be centuries in the making that would have had little to do, though it is difficult to believe, with the biochemistry of pigmentation, hair texture, lip thickness, and the indicial measure of the nostrils, but everything to do with those 'unacknowledged legislators' of a discursive and an economic discipline."[58]

Social Darwinism famously served as one such legislator, providing a schema through which races could be distinguished and marked hierarchically according to vague justifications of superior "fitness" and survivability on the Earth. Social Darwinism had an ecological interest in "contrasting the extremes of savagery and civilization," where civilized people were conceived of as more independent of their environment.[59] While such judgments of race referred to biological knowledge in order to mark which bodies were deemed human, subhuman, or nonhuman, thermodynamics also played a role in making these distinctions. In other words, racialized subjects were not only "atomized" into body parts and fleshly pieces to be categorized or experimented upon, as in nose widths, cranial shapes, fleshy wounds, infectious status, or organ providers;[60]

they were also atomized quite literally as carriers or digesters of chemical and physical elements, like food, air, and water.

Energy functioned as a master metaphor by which to understand how these elemental flows traveled differently in racialized bodies. Accordingly, the human, or what Wynter calls Man_2, could be described biologically, but also energetically, according to logics of efficiency and productivism. As with biological systems of racism, energetic codes, too, depended upon close observation of the struggles of the Other in the face of colonization, "with this population group's systemic stigmatization, social inferiorization, and dynamically produced material deprivation thereby serving both to 'verify' the overrepresentation of Man as if it were the human, and to legitimate the subordination of the world and well-being of the latter to those of the former."[61]

The European pursuit of work and waste, and its reliance on racist justifications, predated the science of energy, but energy reinforced them by mapping these virtues onto the efficient operations of fossil-fueled machines. The maximization of work and the proper use of the divine gift of energy appealed to ideals of exactitude, progress, novelty, experimentation, measurement, calibration, punctuality, efficiency, and discipline. Consider the way that an energetic engagement with the world functions in the triumphalism of Richard Cobden, a British manufacturer and politician, who wrote in 1854 that "England, with her steam-engine and spinning-frame, has erected the standard of improvement, around which every nation of the world has already prepared to rally. . . . England's industrious classes, through the energy of their commercial enterprise, are, at this moment, influencing the civilization of the whole world, by stimulating the labor, exciting the curiousity, and promoting the taste for refinement, of barbarous communities."[62]

Meanwhile, the category of waste informed Orientalist stereotypes of Africans and Asians as mostly "devoid of energy and initiative,"[63] lazy, stagnant, untimely, and in general unable to either mine their own resources or inventively use them. In his "Occasional Discourse on the Negro Question," for instance, Thomas Carlyle complains that European capitals are taking measures "to get its rich white men set to work; for alas, they also have long sat Negro-like up to the ears in pumpkin, regardless of 'work,' and of a world all going to waste for their idleness!"[64] As these common depictions illustrate, energetic judgments did not always have to be technical to benefit from the new veneer of thermodynamic scientific authority.

Energy's meaning could remain slippery, traveling back and forth between mystical notions of vigor and virtue, and industrial traits of efficiency and fossil-fueled invention.

The civilizing mission was not just about putting the "indolent, tradition-bound, and fatalistic peoples"[65] of the colonies to work; it was also putting the Earth and its forests, terrains, animals, and oceans to work, in order to improve upon the "waste places of the Earth."[66] As Osterhammel observes, "the land-clearing settler, big-game hunter, and river tamer were emblematic figures of this drive to civilize the whole planet. The great opponents to be defeated were chaos, nature, tradition, and the ghosts and phantoms of any kind of superstition."[67] The logic of energy sketched out a method for taming the chaos of nature: the second law of thermodynamics depicted a world of always-increasing entropy, or diffusion of energy, against which hard workers must strive to hack out a little corner of industry.

Energy therefore became one standard by which to assess the vivacity of ecosystems and human civilizations alike. The goal was to yoke other societies to the accelerating fossil energy flows of the West. In more stark terms, energy helped in the moral and sociotechnical organization of good and bad activity, of engine performance and resource extraction, and also of laborers in British factories, of states, of the Earth, and of humans worldwide. The belief that European peoples were technologically advanced, and were better able to conform their bodies to the demands of a work and waste ethos, affected the "allotment of tasks in the global economy," where Europeans supplied the know-how and expertise while the colonies were left to "supply the primary products, cheap labor, and abundant land that could be developed by Western machines, technique, and enterprise."[68] These inequalities contributed to a deepening "global energy gulf" between the Global North and South.[69]

Crossing that gulf required that colonial states imbibe the "valorization of bourgeois traits" and the drive for capital accumulation, "unbound productivity," private land ownership, and environmentally destructive practices, all of which were believed to lie at the heart of Western civilizational advance.[70] Northern Europeans were charged with teaching the way of industrial work to the rest of the world, who were widely figured as culturally and racially indisposed to such toil. Kingsley, for example, observes that although Africans may have "common sense," "they are notably deficient in all mechanical arts: they have never made, unless under

white direction and instruction, a single fourteenth-rate piece of cloth, pottery, a tool or machine, house, road, bridge, picture or statue."[71] Aimé Césaire satirizes the dangerous hypocrisy of industrial missionaries like Kingsley, who, alongside "so many valiant sons of the West, in the semi-darkness of dungeons, are lavishing upon their inferior African brothers, with such tireless attention, those authentic marks of respect for human dignity which are called, in technical terms, 'electricity,' 'the bathtub,' and 'the bottleneck.'"[72]

Césaire is an important foil to the story of a dominant energy logic in that he, too, draws upon organic metaphors to analyze colonialism. However, Césaire rejects the pro-industrial association of health with work; his use of the organism is not in service to the energy–work matrix, and is an example of an alternative imaginary of organic vitality. In his 1955 *Discourse on Colonialism*, Césaire memorably connects the violence of European imperialism to the fascist moment of World War II, arguing that Europeans "tolerated that Nazism before it was inflicted on them, . . . because, until then, it had been applied only to non-European peoples; that they have cultivated that Nazism, that they are responsible for it."[73] The practice of horrific violence and sadism abroad could not help but degrade Europe itself, and be returned to Europe "with a terrific boomerang effect."[74]

In addition to the boomerang metaphor, Césaire makes great use of the metaphor of the organism to understand how imperial practice would sicken Europe. He begins with a more ideal vision of circulation and the "redistribution of energy," one that is not centered on work and profit: "I admit that it is a good thing to place different civilizations in contact with each other; that it is an excellent thing to blend different worlds; that whatever its own particular genius may be, a civilization that withdraws into itself atrophies; that for civilizations, exchange is oxygen; that the great good fortune of Europe is to have been a crossroads, and that because it was the locus of all ideas, the receptacle of all philosophies, the meeting place of all sentiments, it was the best center for the redistribution of energy." Europe did not take advantage of this "great good fortune," of course, but instead proceeded according to domination and profit. While it may have understood itself to be healthy and growing, all the while the imperial organism was putrefying from within. In order to describe imperial decay, Césaire reverses the florid descriptions of the imperial administrators, quoted above, who described colonized labor as

the flowers, fruits, or banyan-shoots attached to the great roots of the imperial core. In place of flowers and fruits, Césaire piles up the eyes put out, heads cut off, and bodies tortured in the name of "proletarianization," each of which becomes "dead weight" upon the organism, as "a gangrene sets in, a center of infection begins to spread; . . . a poison has been instilled into the veins of Europe and, slowly but surely, the continent proceeds toward *savagery*" (italics in the original).[75]

With his emphasis on European hypocrisy, Césaire reminds us that the gospel of labor and the industrial mission were intimately connected to Europe's own labor problems and social inequalities. The racial and gendered tropes of work and idleness were not simply a contrast between the metropolis and the periphery, or bodies classified as black and white. The imperial organism, fed by work and waste according to a dominant energy logic, was a paradigm that related these different sites of work to each other. Instead of only insisting on one distinction between Europe and the colonies, then, the British Empire also worked through a circulation of affinities between workers and waste in the colonies and in Europe. Britain sought to interpret the colonies through the prism of its own troubled society, and in turn, the new British industrial cities, crowded with poor and disaffected workers, were compared with the "dark continent" and people of color.[76] For instance, in the simplified story of Victorian racism, Europe distinguishes itself from its colonies according to the equality of its own society. However, David Cannadine argues that most people in Britain viewed their own domestic society as hierarchical and unequal, especially as industrialization took hold. Cannadine therefore argues that "the British Empire was about the familiar and domestic, as well as the different and the exotic: indeed, it was in large part about the domestication of the exotic—the comprehending and the reordering of the foreign in parallel, analogous, equivalent, resemblant terms."[77]

As Cannadine's more complex interpretation reminds us, there was never one unified approach to imperial governance, nor any single opinion on industrialization, for that matter. The new imperialist period, while it involved an acceleration of land grabs and labor projects in Africa, was characterized by vigorous dissent over imperial policy, ranging from colonial intellectuals who resisted imperial rule to jingoistic triumphalists and abolitionists who railed against the "new slaveries" in Africa.[78] Added to this was a "broad-based anticapitalist and anti-industrial backlash" in Europe that targeted "the ascendancy of a profit- and productivity-obsessed elite of industrialists, financiers, and technicians."[79]

Nevertheless, it is possible to pick out common thematic elements in the metaphors of rule. The central place of energy in these ruling logics is apparent in that, even among the most vociferous opponents to British imperialists, few railed against the virtue of work itself. Missionary and abolitionist John Harris might call upon imperial administrators in a 1927 essay to "eschew" slavery and forced labor, but he still wanted them "to encourage the indigenous producers by means of secure land tenure, education, and instruction in agricultural science, to an ever increasing volume and quality of raw material."[80] Meanwhile, anti-industrialists were proud of British scientific and industrial advances, even if they resisted the commercialism it had birthed.[81] A notable exception was Marx's son-in-law, Paul Lafargue, who wittily eviscerates the "strange delusion" of work and imagines a post-work socialist utopia in his 1880 essay "The Right to Be Lazy."[82] But although Lafargue's text was popular with some socialists, it remained an outlier in the otherwise work-obsessed white European culture—and even among socialists, who preferred to mobilize around the dignity of labor rather than the right to be lazy.

Amid the swirling debate over imperial politics, then, it was widely agreed that the British were a superior race in terms of evolution, and that their fossil-fueled machines were the evidence of that superiority. Whereas the "civilizing mission" discourse had relied more heavily on religious claims in earlier periods, by the latter half of the nineteenth century, Michael Adas notes that most Westerners (and even most critics in the colonies), "shared the conviction that through their scientific discoveries and inventions [they] had gained an understanding of the workings of the physical world and an ability to tap its resources that were vastly superior to anything achieved by other peoples, past or present."[83] Energy neatly connected these two registers of modern science and religious ideology as justifications for imperialism. Some of the leading scientists of energy, after all, had already managed to stitch together Scottish Presbyterianism with fossil fuel use. In many ways, thermodynamics was a far more comfortable synthesis for imperial ideologies than was the science of evolution, which seriously challenged Christianity and so could not logically reconcile industrialism to older arguments about religious proselytizing.

Technological achievement thus became a measure of civilizational superiority. Typical were the observations of imperial travelers like Kingsley, who wrote in 1899 that "when I come back from a spell in Africa, the thing that makes me proud of being one of the English is not the manners or customs up here, certainly not the houses or the climate;

but it is the thing embodied in a great railway engine."[84] This pride was also evident in the first world exhibition, held in 1851 in London's newly constructed Crystal Palace, which functioned as a space of imperial spectacle.[85] The theme was "the Industry of All Nations," and it featured a Hall of Machines with engines, presses, and other technological wizardry, as well as an exhibit with dioramas of primitive peoples. Ensuing world exhibitions popularized the notion that the fruits of technical knowledge provided evidence of superiority, as well as of God's grace, conveniently ignoring, and erasing, the technological innovations and scientific advances made by non-Europeans across world history. Anne McClintock argues that the exhibition "embodied the hope that all the world's cultures could be gathered under one roof—the global progress of history represented as the commodity progress of the Family of Man," but that it was implicit that "only the west had the technical skill and innovative spirit to render the historical pedigree of the Family of Man in such perfect, technical form."[86]

A sketch from the 1888 Glasgow Exhibition (figure 6.1) captures this spirit with a biblical verse emblazoned across its arches, from Proverbs 24:4, "And by knowledge shall the chambers be filled with all precious and pleasant riches," and another barely discernible, likely from Psalm 104:24, "O Lord, how manifold are thy works! In wisdom hast thou made them all; The earth is full of thy riches."

In Glasgow's triumphalist exhibition, the missionary zeal of earlier colonization is translated for the industrial age, where Europeans are not simply more virtuous because they believed, but were also more virtuous because of the artifacts wrought from their "knowledge," here interpreted as industrial-technical know-how. Similarly, the inclusion of supposedly primitive cultures in the world fairs was proffered as evidence of European superiority, based on a contrast between the machine halls and non-industrial ways of life. Exhibits of colonized peoples also functioned as a visible reminder of what awaited those Europeans who failed to secure waged work: they would be condemned to the fate of those cultures who were imagined to suffer the Promethean drudgery of mere survival, having failed to use knowledge to reap God's gifts. In other words, they would be consigned to the dissipative natural world of the second law, a Nature that was "fallen," and whose rescue could come only by means of productive work, a goal marvelously eased by coal and oil. Those who could not be saved must be dealt with as waste.

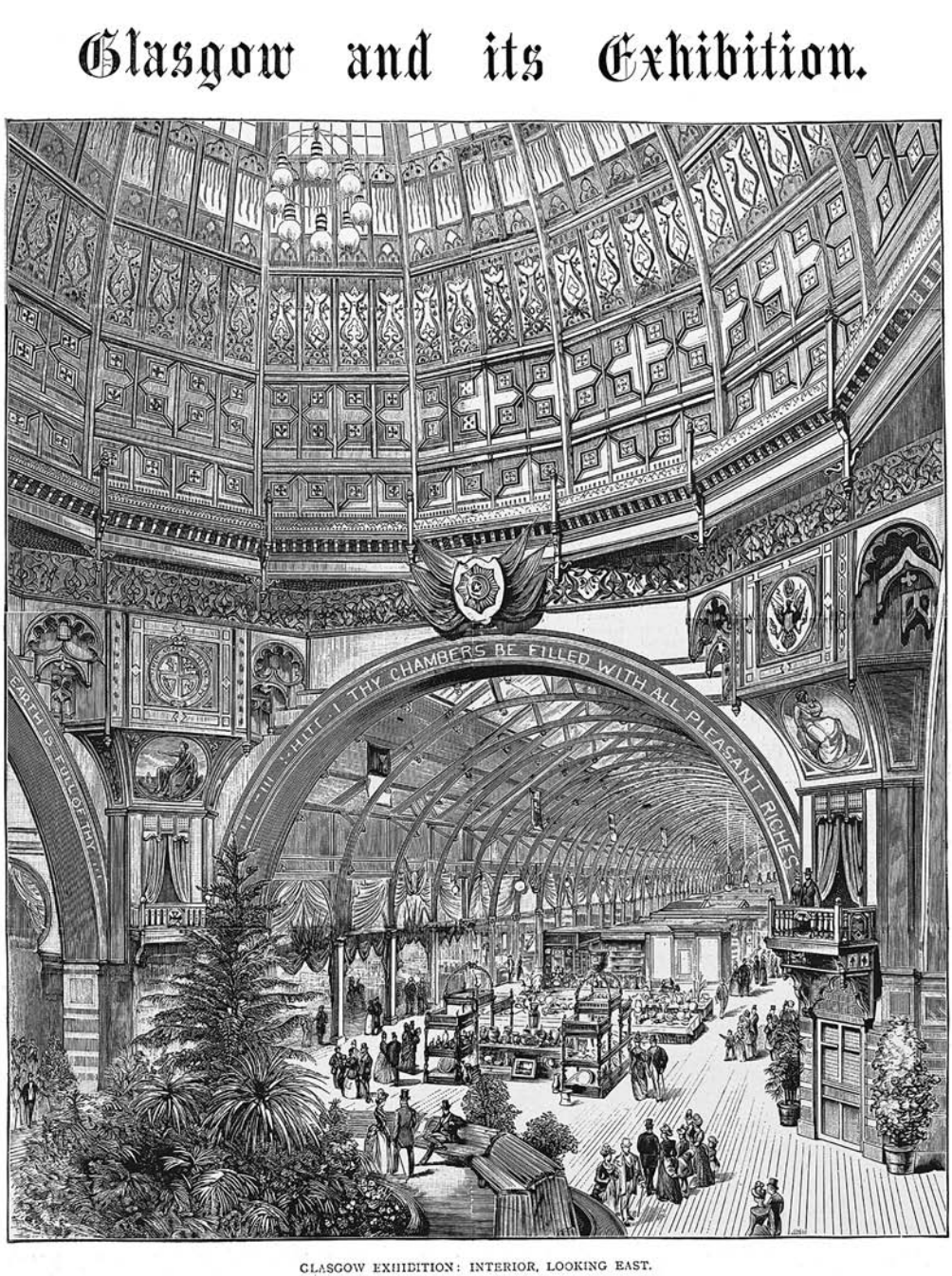

FIGURE 6.1. An interior view of the 1888 Glasgow Exhibition. Credit: Sketch from *The Pictorial World*, June 7, 1888, Bound in International Exhibition 1888, "Graphic" Supplements, GC f606.4 (1888). © CSG CIC Glasgow Museums and Libraries Collection: The Mitchell Library, Special Collections.

According to an energetic rationality, waste was controllable, something that could be concealed, an approach that proved more seductive than the depressing and apocalyptic visions that characterized environmental criticism of the period. Thermodynamics suggested its own environmental apocalypse—heat death, the impossibility of work, and the ultimate triumph of waste—but a geo-theological approach to energy had couched it in the Protestant-tinged promise that hard work could secure a temporary respite for humankind. According to this energy logic, waste is the shadow of work, in much the same way that sin shadows grace. The only way that the imperial balance sheet could be optimized was by concealing or excising those bodies and things that weighed against the benefit of work. The British empire thus perfected the double maneuver—the acceleration of work and the concealment of waste—upon which industrial governance still depends.

According to the organic metaphor, in order for an organism to grow, waste had to be continually filtered and excreted. Recall that Spencer, the popular philosopher of energy, argued that "all action implies waste; blood brings the material for repair; and before there can be growth, the quantity of blood supplied must be more than is requisite for repair. In a society it is the same."[87] For Spencer, the emergence of vascular systems parallels the rise of the middle class, which distributes goods across society; the blood vessels are akin to roads and railroads; the nutrients delivered by the blood are "consumable commodities," and the "blood disks" or corpuscles that circulated are money.[88] Societies lacking such things as roads, money, and a middle class are "lower societies," just as hydrozoa are "lower creatures."[89] The demand for labor was thus always partnered with the need to process the accruing residuum of bodies and forces, to separate them—as the kidneys filter the blood—so that they would not hamper the growth of the organism, which was achieved through work. And rather than see waste as evidence of industrial failure, Victorians treated waste bodies as "irredeemable outcasts who had turned their backs on progress . . . because of an organic degeneration of mind and body."[90]

Victorian Britain urgently set about producing and delineating waste, relying increasingly on state intervention to manage it. To govern waste, the state relied upon what McClintock calls an "unholy alliance" between evolution and "the allure of numbers, the amassing of measurements and the science of statistics,"[91] which, as I argued in chapter 3, was also

reflected in the emergence of thermodynamics and statistical mechanics. The urgency was partly a result of the visible accumulation of industrialism's woes, from pollution to unemployment and urban disease, all of which were interpreted through a sieve of racial, gendered, and class distinctions.

However, the urgency surrounding waste stemmed not just from the woes of waste, but also from the woes of work. As industrial labor spread in the nineteenth century, the notion that work delivered independence and democracy clashed with the reality of grueling, dependent, wage labor, which was remaking European life. Whether there were not enough jobs in Europe, or not enough Africans willing to toil in mines for low wages, the promise of work—virtue, industrialization, health, wealth—had proven empty for many. Waste threatened to overwhelm European projects at every turn. It represented all that was lost to entropy and could not be made into work, and it could manifest as smog, polluted rivers, denuded landscapes, tropical climates, outdated machines, urban disease, unruly crowds, crime, indolent (read: resistant) Africans, hysterical women—anything that clogged the arteries of industry and slowed productive work. In addition, the more work done through the exponential powers of fossil fuel, the more waste created, and the more total metabolic activity to be managed in order to bend as much as possible back toward productive work.

Historians of race and labor have observed how white workers responded to these anxieties by ever more feverishly policing the line between slavery and free labor, relying on slavery and Black labor to operate as reminders of the relative good fortune of "free" white labor. For Lionel Phillips, a one-time president of the Chamber of Mines in the Transvaal, racial differences are so necessary that they require a distinction in duties and wages: "the disparity between the scale of payment to the white and coloured workers [in the South Africa mining industry] is so great, and the planes upon which they live so widely different, that the employment of the former in work that, of necessity, would command lower wages than the skilled artisans and overseers receive today, would create a class of 'poor whites' looked down on by, and degraded in the eyes of, the Kaffirs."[92]

A similar phenomenon occurred in the industrializing United States, where the growing white labor class sought to distinguish themselves from Black laborers. As David Roediger reflects in his classic study of nineteenth-century U.S. labor politics, *The Wages of Whiteness*, "the white

working class, disciplined and made anxious by fear of dependency, began during its formation to construct an image of the Black population as 'other'—as embodying the preindustrial, erotic, careless style of life the white worker hated and longed for."[93] The racial division of laborers was necessary as part of the uncomfortable adaptation of republican government to capitalism, and Roediger writes that "increasingly adopting an ethos that attacked holidays, spurned contact with nature, saved time, bridled sexuality, separated work from the rest of life and postponed gratification, profit-minded Englishmen and Americans cast Blacks as their former selves."[94]

This role for Blacks, as the "former selves" of Europe, was not just a social role but also a biological status, thanks to both evolution and thermodynamics. Energy provided yet another framework by which to parse waste and justify the virtue of (European) fossil-fueled work, helping to solidify these racial and gendered categorizations of waste as supported by modern science. In this sense, waste was not only accumulating through the faulty engines, inefficient factories, smog, sewage, or scraps left over after the work was done. It was actively produced as an invented, social category that helped to ameliorate the crises of industrialism for the supposedly virtuous (white, Western, straight male) workers, who could at least console themselves with their position as thermodynamic enthusiasts atop the evolutionary ladder.

The elevation of fossil fuels, engines, corporations, and white workers thus required the subordination of waste through what McClintock refers to as the Victorian "invention of idleness."[95] While McClintock focuses on idleness as a human category intersecting with race and gender, energy adds another dimension to the story: idleness also functioned as a category for the Earth and its nonhuman forces and things, which likewise intersected with race and gender. Activities of humans and nonhumans like sex, reproduction, eating, leisure, beauty, weather patterns, forest growth, rainfall, and topography must either be reordered and carefully managed to serve industrial production (organic growth), or else denigrated as wasteful. Not just humans, but nature, too, could be rescued from dissipation. Refusing wage labor that would support the steam economy meant refusing to be rescued from nature, a plight that had long been associated with women, people of color, and indigenous groups.

With the fiction of middle-class Victorian women of leisure as the ideal counterpart to white "economic man," McClintock traces how those who operated outside of the fiction of the "domestic woman/economic

man" partnership—working women (especially sex workers, miners, or domestic servants), Jews, gay men, Africans, the Irish, the poor, urban crowds, and so on, both in Europe and in the Global South—were racialized, feminized, and socially ranked in keeping with their supposed indolence, degeneracy, or deviance from the white work ethic.[96] The imperial state set about managing deviant money, sexuality, and race, all of which "threaten[ed] the fiscal and libidinal economy of the imperial state," where deviance was often interpreted through the terminology of idleness or laziness.[97] In inventing idleness, British imperialists were appealing to the remnants of a 300-year-old discourse that associated poverty with sloth, and that had functioned in Europe "to sanction and enforce social discipline, to legitimize land plunder and to alter habits of labor."[98]

The zombified work ethic resonated with imperialists in Africa as well. Indeed, the laziness of Black men is one of the most common tropes in the imperial archive, as well as in the complaints of American slave owners. In a characteristic observation, James Bryce, a British traveler to South Africa, writes of the "Bechuana" men that "the main impression which they leave on a stranger is one of laziness. Of the many whom we saw hanging about in the sun, hardly one seemed to be doing any kind of work. Nor do they. . . . [H]aving few wants and no ambition, they have practically no industries, and spend their lives in sleeping, loafing, and talking."[99]

As is evident in Bryce's description, the British attributed this laziness to a combination of climate ("hanging about in the sun") and innate temperament ("few wants and no ambition"). In this way, energy dovetailed with a related theory of human civilization that circulated in this period: climate as a central factor in explaining which regions progressed and which languished. Climate connected temperature, humidity, rainfall, and wind to human and agricultural health. Extreme climates would hamper civilizational advance. For instance, hot climates hosted more infectious diseases, and it was also inferred that heat tended to induce torpor and passivity.[100] Here again, the logic of energy, and its privileging of dynamism, intersects with metabolic and organic metaphors that relate humans to their surroundings.

More generous imperialists objected to these stereotypes about "natives" and their capacity for industriousness. Some insisted that Africans *could* work hard if only they had proper white management. John Harris attests that "It may be true that he has periods of idleness—he is not alone in that!—it may be true, probably is so, that he labours intermittently. But what is equally true, is, that in spite of the fact that the African race is

only now emerging from barbarism, is only now attempting to cross, in a decade, the bridge of centuries, the whole race is not only working, but is working hardest where the hand of a considerate administrator beckons onwards to a higher rate of progress."[101] The considerate administrators of the late nineteenth century institutionalized this poverty–sloth connection with reference to evolution and thermodynamics. Evolution seemed to illustrate the broad contours of the ladder of progress, while the logic of energy could guide those attempting to accelerate across an evolutionary "bridge of centuries."

From our perspective in the late Anthropocene, what is of special interest was the extent to which the invention of idleness relied on concealment. It was sometimes less about bringing torpor and other modes of waste "to light," in order to cure them through work, and more about hiding those threatening economies and ecologies, just as subterranean oil pipelines, refineries sited in poor, industrial zones, and opaque gas pumps help to conceal our sensory awareness of the ubiquity of oil.[102] In the Victorian era, for instance, McClintock asserts that Victorian women were not actually idle, despite the popularity of proclaiming this feminine ideal. Instead, women faced the unprecedented demand that they conceal their labor; thus the erection of immaculate front parlors, the rise of soap as a global commodity, and the obsession with white linens and cleanliness.[103] The goal was to discredit the importance of women's labor, which was ironically increased to meet the demands for cleanliness, such that what mattered was not the "spectacle of leisure," but rather "the undervaluing of women's work that the spectacle achieved."[104] This maneuver—hiding waste, hiding the work of women, of sex workers, and of the most dangerous and dirty jobs, throwing things away, subterranean pipelines, globally dispersed commodity chains—remains central to the practices of global capitalism today.

Likewise, the discourse on African idleness was not about leisure, but "more properly speaking, a discourse on work—used to distinguish between desirable and undesirable systems of organizing labor. Pressure to work was, more accurately, pressure to alter traditional habits of work."[105] Du Bois, in fact, extols Black labor as emblematic of an alternative work ethic to the "mechanical draft-horse" of white capitalism, wherein

> the black slave brought into common labor certain new spiritual values not yet fully realized. As a tropical product with a sensuous receptivity to the beauty of the world, he was not as easily reduced

> to be the mechanical draft-horse which the northern European laborer became. He was not easily brought to recognize any ethical sanctions in work as such, but tended to work as the results pleased him, and refused to work or sought to refuse when he did not find the spiritual returns adequate; thus he was easily accused of laziness and driven as a slave when in truth, he brought to modern manual labor a renewed valuation of life.[106]

Idleness glossed over what was, more accurately, resistance to European work schemes, and attempted to erase alternative economies and work ethics.

The metaphor of the organism, which was laced through with thermodynamic imagery, helps to better explain how all this concealment was achieved. While scholars like McClintock, Roediger, Du Bois, and others note the social function of concealment—to elevate and discipline white workers, to disparage those that might compete with or resist the new economic order—concealment also served a tangible, material function. Because an organism cannot grow without processing its waste, likewise the governance of industrial work must be paired with the active concealment of waste. The contradictions of industrialism could not hope to be so widely embraced without the active removal of its destructive consequences from the sensory experience of middle-class Europe and America. McClintock highlights these maneuvers as the "double-ness" of the Victorian empire, where the ideal of economic man/idle woman depended on making the "deadly labor" of others, which was necessary to production, invisible. Likewise, the Victorian obsession with white aprons, shiny mirrors, and other new commodities of cleanliness sought to erase "the fetid effluvia of the slums, the belching smoke of industry, social agitation, economic upheaval, imperial competition and anticolonial resistance."[107]

Here the theme of double-ness returns. The double-ness of British imperial politics is another materialization of the contradictions to which the two laws of thermodynamics were responding. With energy, the doubled nature of industrialism—how technical marvels rise from belching smoke—reflected the contradictions of life in the cosmos—energy was conserved, and yet entropy continually increased, making life so rare, and such a struggle. A dominant energy logic of work and waste helped to naturalize industrialization, but also its pollution, both of which were only intensifications of already existing physical processes of energy exchange and dissipation. Energy also naturalized the imperial circulation of power,

which sacrificed people and things to the project of work, just as coal was sacrificed to the engine. To become a citizen in a carbon democracy was to become a waged worker, a valorized subject-position formed through fossil fuel assemblages.[108] The drive for equitable inclusion in the waged work system would catalyze many citizen movements in the nineteenth and twentieth centuries, including civil rights and women's movements. According to this political logic, a loss of energy, as a threat to jobs, would pose a threat to democracy itself.

CONCLUSION

Work and waste as social categories helped to organize the global circulation of commodities, bodies, and technologies in the period of new imperialism. As waste spewed forth from smokestacks and urban hovels, its grime and depravity had ambivalent consequences: industrial waste catalyzed early environmental and labor movements, but it also served as a visceral threat to be avoided by getting and keeping waged work. Evolution has been duly evaluated for its role in the formation of scientific racism and imperial labor policy, but it was thermodynamics and the fundamental role of energy as a unit of metabolism that reinforced these connections between environmental and socioeconomic categories of waste, between faulty engines and hysterical women, hot climates and indolence, or chaotic entropy and urban crowds.

The drive to put the world to work was certainly founded on the expansion of capitalism and its need for new markets and resources to fuel profit. However, it also reflected a modern understanding of life on Earth wrought by evolution and thermodynamics, and their synthesis in the nascent science of ecology and the metaphor of the social organism. The human exploitation of fossil fuels, and the global injustices that stemmed from it, was therefore weighted with the metaphysical, and often spiritual, meanings connected to work and waste. All the while, the chaotic and unfriendly Earth was a constant goad, haunting industrialism as a specter that could be guarded against only by erecting a fossil-fueled civilization that ceaselessly uprooted energy gifts wherever they appeared. As Donald Worster quips, after Darwin's insights, it was beyond question that nature was fearsome and "an enemy that fully deserved to be routed and enchained."[109]

Industrialism set in motion a dangerous feedback loop; its increasingly visible and disgusting waste in many ways only further confirmed the need

to keep conquering nature and to escape its smells, poisons, and unpredictable effluvia through the promise of productive work and the sparkling cleanliness of new global commodities (whether soap in the nineteenth century or the clean, white lines of the newest iPhone in the twenty-first). The violence, grime, and exploitation required to produce these commodities remain successfully concealed. As the first self-aware Anthropocene society, it was Victorian Britain that forged these thermodynamic connections, where waste as human indolence or leisure shared inflections with waste as pollution, both of which deserved scientific management and minimization.

To put the world to work, while properly weeding out waste, required, in Césaire's words, "relations of domination and submission which turn the colonizing man into a classroom monitor, an army sergeant, a prison guard, a slave driver, and the indigenous man into an instrument of production."[110] Instead of talk of progress, or better standards of living, he points to those who have been robbed of their lands and lives, and "millions of men in whom fear has been instilled, who have been taught to have an inferiority complex, to tremble, kneel, despair, and behave like flunkeys," in a "parody of education."[111] Chapter 7 considers how energy logics permeated the parody of education set up by white imperialists, who set about converting students into docile, low-paid wage laborers. Energy appears most glaringly in its moments of failure, when students dragged their feet, shirked their duties, or refused to give up familial relationships or supposedly loftier ambitions. The rationality of work, as with the engine, emerges out of its confrontation with that which it dismisses as waste.