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Editors

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Sustainability

Sustainability and Its Discontents: The View from the Nineteenth Century

Deanna K. Kreisel

Fear lurks behind the proliferating, sanitized term “sustainability.”
—Alaimo (2012, 559)

In a recent essay, literary scholar Stacy Alaimo highlights the dangers of the panacea of environmental sustainability and suggests that the concept “may be serving a psychological function in the social consciousness” (559) by allowing the ecologically minded to sidestep difficult questions about economic justice and biodiversity. Alaimo notes that humanities scholars, who “challenge reliance upon the authority of ‘nature’ or ‘science’ in order to address problems that in their origin and solution are primarily social and cultural,” have a crucial role to play in developing more ethically responsive models of sustainability (Kitch, Adamson, et al.; qtd. in Alaimo, 560).

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That is, of course, assuming environmental and economic “sustainability” is a realistic, desirable, or even coherent goal. Even in its most anodyne formulations, sustainability is haunted by unanswerable questions. The seemingly straightforward definition given in the Brundtland Report (officially entitled *Our Common Future*), published by the United Nations World Commission on Environment and Development in 1987, defines sustainability as development which meets “the needs of the present without compromising the ability of future generations to meet their own needs” (1987, n.p.). The new-materialist critic will immediately demand: generations of what? Even if we assume that “future generations” means human beings—already a deeply controversial exclusion—crucial questions still remain. *All* human beings? How many? At what standard of existence? And for how long? (And this is not even considering how such a state of affairs is to be brought about and maintained.)

As the Brundtland definition implies, sustainability and conservation discourse has long been, and continues to be, dominated by the imperative to maintain human life and civilization under conditions similar to those that we now enjoy. This focus on the needs of human beings—rather than the needs of other-than-human creatures, biospheres, or ecosystems—also tends, through its emphasis on maintenance of the status quo, to favor relatively privileged human beings of the global north. As Alaimo notes, sustainability discourse tends to “render the lively world a storehouse of supplies for the elite” (558). When framed in such anthropocentric terms, environmental stewardship comes to resemble simply ideological cover for an instrumentalist orientation toward nature. As Nathaniel Wolloch has pointed out, “the history of economic considerations of nature was one of consistent development of one main theme—the emphasis on the ineluctable need to maximize the use of natural resources and thus further human development.... This is a history of continuity rather than change” (2017, x).

This chapter will proceed with the following two assumptions: (1) In order to take up Alaimo’s call for a humanities-driven reassessment of the sustainability idea, we should begin with the origins of the concept in nineteenth-century discourses of population and resource management. (2) Such a history will underscore the inconsistency, untenability, and perhaps even bad faith of our contemporary focus on sustainability. The concept itself is the legacy of nineteenth-century political economy and its uptake in Victorian popular consciousness—for sustainability is essentially an economic concept. The questions of population and resource management, sustainability’s central areas of concern, are ones with which political

economy (and later, economics) have long wrestled.¹ By tracing the economic roots of sustainability in the nineteenth century this chapter will help reveal its inherent complexities and contradictions.

POPULATION ACCORDING TO MALTHUS

While the word “sustainable” did not come to refer specifically to the reduction of environmental impact until 1976, the concept has a much older history.² Proto-sustainability practices in the form of environmental stewardship can be traced to the development of forestry management and other conservationist agricultural practices in the middle ages. According to Paul Warde, the German concept of *Nachhaltigkeit*, or “lasting-ness,” is usually dated to Hans Carl von Carlowitz’s *Sylvicultura oeconomica* of 1713, yet can be found as early as the 1650s (2011, 153). Ulrich Grober explains that after the Thirty Years’ War, “the economists and foresters of the German mini-states developed a vision: the possibility of providing a long-term, secure and steady supply of wood from *der ewige Wald* (the eternal forest). Out of this vision emerged the concept of *Nachhaltigkeit*, sustainability” (2012, 75).³

The concept of sustainability as currently understood began to have real traction only after the 1798 publication of The Reverend Thomas Malthus’s *Essay on the Principles of Population*. Malthus’s argument is simple yet devastating: population increases geometrically (exponentially) yet food supply increases arithmetically (linearly); eventually the sharper upward curve of population growth meets the shallower upward curve of food production at a crisis point, where famine becomes unavoidable and population growth will inevitably be “checked.” Malthus’s influential thesis on the limits to growth make his work a natural starting point for a history of sustainability—which is one compelling reason to turn to the nineteenth century more generally as the intellectual and economic crucible of the concept. (Other reasons include the increase in carbon production occasioned by the industrial revolution, and the birth of political economy as a professional discipline in the early decades of the century.) As Margaret Schabas notes, “the main contribution of the *Essay* was to bring attention to bear on the problem of scarcity, not only of land, but also of capital” (2005, 105).

For literary critics, particularly of the Victorian period, Catherine Gallagher’s reading of Malthus remains most influential. She argues that the paradox at the heart of Malthus’s thesis is that the very vitality and fecundity of human bodies become the undoing of the social body:

“Malthus simultaneously sees the unleashed power of population, the reproducing body, as that which will eventually destroy the very prosperity that made it fecund, replacing health and innocence with misery and vice.... Hence, no state of health can be socially reassuring” (2006, 39). What is most important about Gallagher’s analysis for a history of sustainability is her insight that the Malthusian thesis refocuses economic discourse on the horizon of *system*: “[Malthus’s] essay starts another durable plot line of classical political economy, in which the gross organic entity is less a metaphorical individual, such as ‘the nation’ or ‘the population,’ than what we now call an ‘ecosystem’” (43). In Malthus we first see, in a theory of political economy, the consistently developed rhetoric of interconnectedness that we now associate with an ecological sensibility.

As John MacNeill Miller argues in a recent discussion of the “ecological plots” of Harriet Martineau and Charles Dickens, which he shows were strongly influenced by Malthus’s *Essay*, our “focus on Malthus as a theorist of scarcity has emphasized his contributions to the theory of natural selection ... [but] the *Essay*’s understanding of interconnection made it central not only to Darwin’s development of modern biology, but to his ecological insights as well” (forthcoming, n.p.). Both Gallagher and Miller ground their discussions on a famous passage in the *Essay* in which Malthus suggests that cattle may “eat” human beings as much as the reverse:

When the price of butcher’s meat was very low, cattle were reared chiefly upon waste lands ... but the present price will not only pay for fattening cattle on the very best land, but will even allow of the rearing many, on land that would bear good crops of corn. The same number of cattle, or even the same weight of cattle at the different periods when killed, will have consumed (if I may be allowed the expression) very different quantities of human subsistence.... The present system of grazing, undoubtedly tends more than the former system to diminish the quantity of human subsistence in the country, in proportion to the general fertility of the land. (Malthus 2015, 133–134)

As Miller glosses, “all of human society depends on the geographically specific patterns of the apportioning of soil and sunlight among plants. Our material entanglements ensure that the fates of humans and nonhumans are never fully extricable from one another.” What is important about Malthus’s image is the way it reimagines the food system as an *ecosystem* in which the fates of different species are enmeshed. The coy

parenthesis that follows the phrase “will have consumed,” “(if I may be allowed the expression),” prepares us to read the clause that follows as a Swiftian “quantities of human *beings*.” Malthus’s imaginative (re)configuration—along with, as we shall see shortly, its attendant contradictions—is an important precursor to contemporary discourses of sustainability, particularly in the way it presages recent discourse about the environmental costs and social inequities of meat production and consumption.⁴

While most commentators, both contemporary to Malthus and in our own day, have focused on the relentless pessimism of his thesis, it also depended on the fundamental predictability of natural laws, as Schabas points out: “he maintains that it would be impossible to develop a ‘human science’ if nature were ‘fickle and inconstant’” (2005, 106). In Malthus’s own words, “The constancy of the laws of nature, and of effects and causes, is the foundation of all human knowledge” (73). Herein lies another crucial paradox of the Malthusian thesis, one which continues to bedevil contemporary sustainability discourse. Immediately after the passage about cattle eating men quoted by Gallagher, Malthus goes on to blunt the implications of this radical vision of ecological interconnectedness—that is, the implications of the kind that modern-day ecocritics draw about the decentering of the human—by returning the question to one of human agency:

I would not by any means be understood to say, that the former system either could, or ought, to have continued. The increasing price of butcher’s meat, is a natural and inevitable consequence of the general progress of cultivation; but I cannot help thinking, that the present great demand for butcher’s meat of the best quality, and the quantity of good land that is in consequence annually employed to produce it, together with the great number of horses at present kept for pleasure, are the chief causes, that have prevented the quantity of human food in the country, from keeping pace with the generally increased fertility of the soil; and *a change of custom in these respects*, would, I have little doubt, have a very sensible effect on the quantity of subsistence in the country, and consequently on its population. (134–135)

For Malthus, at least in the early editions of the *Essay*, the description of the problem is a preamble to a discussion of how it might be addressed through the altering of human behavior. As Gallagher notes, “In two sections of the *Essay*’s first edition that were later heavily revised or altogether scrapped, he shifted his focus from inevitable biological constraints to

alterable market forces.... And once reconceived in this way, the problem of population pressure, although always an impediment to perfect happiness, appears at least partially responsive to human will” (2006, 43–44).

Malthus’s location of the problem—and solution—at the level of “custom” also anticipates the way the majority of popular sustainability discourse is framed: as a question of consumer choice and responsibility.⁵ Yet human agency (in the form of foresight and self-control) is a vexed concept. For Malthus, nature is the consistent and predictable expression of divine providence, yet human sexual passions are also part of nature and cannot be circumvented. Indeed, a central motive in Malthus’s hasty scribbling of the 1798 pamphlet was his desire to refute William Godwin’s utopianist prediction (in *An Enquiry Concerning Political Justice* [1793]) that human sexual passion will eventually be extinguished under a rationalist system of social and economic equality. Malthus objects:

Mr Godwin considers man too much in the light of a being merely intellectual....

The voluntary actions of men may originate in their opinions; but these opinions will be very differently modified in creatures compounded of a rational faculty and corporal propensities, from what they would be, in beings wholly intellectual. (108)

Yet it is crucial to note that sexual restraint in the form of abstinence and late marriage were the *only* morally acceptable preventive checks to population that Malthus proposed (as opposed to the “positive” checks of famine, disease, and war). According to Malthus, a “slow progress in population cannot be traced to a decay of the passion between the sexes. We have sufficient reason to think that this natural propensity exists still in undiminished vigour” (35). And here is another central paradox of Malthus’s thesis: sexual passion is as vigorous as it has ever been, and surely will continue to be so, and the only acceptable check against the misery of inevitable famine is rational restraint of that passion from creatures “compounded of a rational faculty and corporal propensities” (109).

In this disguised appeal to an attenuated human agency that is feared unequal to the task, surely we recognize from its very beginnings the melancholic resignation that characterizes so much recent sustainability discourse? Even when not explicitly tethered to humanity’s inability to curtail its base passions (sexual desire *qua* reproduction for Malthus, selfish consumerism *qua* carbon production for us), most treatments of the

sustainability concept are marked by a sense of futility, even impossibility. In a beautifully argued meditation on the conundrum of sustainability, Allan Stoekl characterizes this sense of futility as a problem of representation: “How do we represent this future in order to calculate the appropriate level of our resource consumption?... Should their world resemble ours?” Even on a more practical level, as soon as we attempt to calculate all possible external costs of any environmental impact we are quickly confronted with, in Stoekl’s phrase, the “sublime of externalities”: “We suspect that the impossibility of calculating externalities [economic costs or benefits accruing to a party who did not choose them] is akin to the withdrawal of God: if we really could calculate externalities all would be possible, foreseeable; without it, we walk through the desert, yearning for the moment of deliverance” (2013, 44).

WILLIAM LLOYD’S EXTENSIONS TO MALTHUS

Malthus was not the only population theorist writing in the early decades of the nineteenth century. A central figure in the discussion was William Forster Lloyd, whose *Two Lectures on the Checks to Population* (1833) expanded and developed the implications of Malthus’s thesis in important ways. The lectures more fully explore the operational “checks” to population that Malthus had outlined, which he had divided into the “positive,” which increase the number of premature deaths, and the “preventive,” which curtail the number of births. For Malthus, the latter category is essentially equivalent to checks due to human activity (or lack thereof): what he terms “moral restraint,” or abstinence and late marriage. (While Malthus alludes throughout his work to “vice” as a potential preventive check to be avoided, Lloyd instead refers without overt moralism to “promiscuous intercourse” [by which he means all sexual activity without a reproductive aim] that “beyond a certain degree, prevents the birth of children” [1980, 474]). Malthus essentially brackets positive checks due to any causes other than restraint, such as lowered fertility due to malnutrition or disease; his two categories of checks, then, break down into those that are a result of human agency and those that lie (largely) outside its purview.

Lloyd alters Malthus’s schema by dividing checks along a different axis:

Suppose that the cases, in which prudential restraint arises from the fear of a want of sustenance, were clearly distinguishable, by some manifest token,

from those in which it depends on other motives.... Then the view of the subject would be comparatively simple, and we might draw a hard line of distinction between the different checks, separating them into two classes, and placing on one side of the line all those motives, and all those diseases and other causes, which diminish fecundity or destroy life, and which arise from a scarcity of the means of subsistence; and on the other, all causes productive of the same effect, but originating in moral and physical circumstances totally independent of this scarcity. (476)

In other words, rather than dividing checks into categories based on which end of the population equation they affect (births or deaths), or those due to human agency versus natural forces, Lloyd proposes dividing them according to whether or not they are caused by a shortage of food. He thus reorients Malthus's model by making the central, driving engine of population the quantity of available sustenance. This may indeed be the way most simplistic versions of the model view its operations—food is turned into human bodies, and when the food runs out the bodies will be reduced in number—yet, as we have already seen, Malthus himself does not present the question in such organicist terms.

The reason Lloyd effects this thought experiment is ultimately in order to argue for the natural benefits of private property. He argues that “systems of equality, with a community of labour and of goods, are highly unfavourable” to the preventive check or moral restraint (478). Where property is held in common, the interest in one's own labor becomes “so small as to elude perception” and “the motive for economy entirely vanishes.” In this case, Lloyd argues, “the future is struck out of the reckoning” because “the constitution of the society is such as to diffuse the effects of individual acts throughout the community at large, instead of appropriating them to the individuals, by whom they are respectively committed” (479).

Lloyd uses these fairly commonplace Lockean apologetics not for their own sake, but to further an argument about population growth with a particular emphasis on affective relations to futurity. Without regard for the future, men will marry early and have children they cannot support, since

in a community of goods, where the children are maintained at public tables, or where each family takes according to its necessities out of the common stock, these difficulties are removed from the individual. They spread

themselves, and overflow the whole surface of society, and press equally on every part. All may determine their conduct by the consideration of the present only. All are at liberty to follow the bent of their inclinations in an early marriage. But, as we have already seen, it is impossible to provide an adequate supply of food for all who can be born.... [T]he shares of subsistence are continually diminishing, until all are reduced to extreme distress. (480)

The organicism of Lloyd's vision of the social field is striking: Society is a "whole" with a "surface," around and against which the importunities of sustenance "press" with greater and greater exigency. Although in Lloyd's metaphor it is the "difficulties" of maintaining children that spread and overflow the surface of society, the reader is invited to imagine the hordes of surplus children themselves "pressing" against the metaphorical breast of the commonwealth.

The scenario Lloyd describes is now referred to as the "tragedy of the commons."⁶ Lloyd's illustration of the phenomenon, as in the earlier example from Malthus, also has recourse to the relative health of cows and grazing land: "Why are the cattle on a common so puny and stunted? Why is the common itself so bare-worn, and cropped so indifferently from the adjoining inclosures?" (482). The answer is that each individual herdsman, acting purely from self-interest, will continue to graze more and more heads of cattle as long as he reaps all the benefits of their sale but shares their costs (in the form of the common stock of grass) with the other herdsmen.

Lloyd's cattle thus "eat" men, but in a more indirect manner than Malthus's. Whereas in the earlier example, cattle and human beings were in a sense competing for the same sustenance (land diverted to cattle grazing is land that is not being used to grow food directly for human consumption), in Lloyd's scenario, the intervening structure of a "system of equality" is necessary to draw out the interconnectedness of bovine and human welfare. In the logic of Lloyd's text, the scenario of land held in common is imposed upon an imaginary pre-existing state of "natural" self-interest: "I do not profess to be here considering generally the merits of systems of equality, and, therefore, I shall not stop to inquire, whether any, and what substitute, for the motive of private interest, can be suggested, to stimulate exertion, to prevent waste, and to check the undue increase of population" (480). It is only in the case of a frankly bizarre combination of perfect self-interest and zero regulation with commonly

held property that the tragedy of the commons as Lloyd describes it would pertain.⁷

Lloyd ultimately concludes, at the end of his second lecture, that the theory of population thus supports the already established “common reasons” for private land ownership, “since the earth can never maintain all who can offer themselves for maintenance” (495). The institution of private property is thus naturalized in Lloyd’s scenario, and consequently, so are the concomitant checks to population.

MALTHUS AND HIS DISCONTENTS

Both Malthus and Lloyd (and other nineteenth-century Malthusians and neo-Malthusians, including evolutionary theorists Charles Darwin and Alfred Russel Wallace) thus directly contravene the older mercantilist claim that growing population is not just a sign, but also a driver, of economic prosperity. While Malthus’s thesis largely prevailed in Victorian England (with some important exceptions), elsewhere the iron law of population was challenged, blunted, or outright rejected in political-economic and popular discourse. Possibly the thesis did not have much purchase in areas with large tracts of land perceived to be “waste” and small settler populations. For example, as American writer Charles M. DuPuy argues, “The earth teems with raw material, awaiting the magic of labor and capital to mould and fashion into usefulness.... The world is not over-populated, and certainly its crude products are not all utilized. Properly organized, there should be ample room for the exercise of all grades of faculties” (1875, 1–2). Just as the concept of *terra nullius*—the claim that unimproved land, unmixed with labor, is “waste” and therefore unowned—has underpinned justifications for European colonialism for half a millennium, so settler colonies saw a high birth rate as crucial not only to the “improvement” of such land, but also to the subduing (i.e., genocide) of indigenous populations.⁸ The frankly extirpative logic of the *critique* of Malthusianism anticipates, in interesting ways, leftist criticisms levied *against* Malthusianism in recent decades, a question to which I will return.

There were other, more politically palatable, critiques of the Malthusian thesis in the nineteenth century.⁹ One of the most important—and scathing—critics of Malthusianism was, of course, Karl Marx. For Marx and Engels, Malthus’s thesis was erroneously ahistorical; he ascribed to organic laws of nature a putatively inevitable situation that is instead

historically contingent on capitalist means of production. Piers J. Hale describes a significant countertradition to Malthusianism in nineteenth-century evolutionary discourse, complicating received notions of Darwin's indebtedness to Malthus in formulating the concept of natural selection (2016). There was also a rich tradition of socialist anti-Malthusianism extending from Marx through to Morris and Kropotkin. As Hale notes in his analysis, the anti-Malthusianism of the Romantic radicals such as Godwin, Southey, and Coleridge (discussed in detail by Gallagher) did not simply go away, but continued to be an important part of socialist thought throughout the century, "a tradition [of] anti-Malthusian evolutionist politics that ran through into British socialism, [and] was rejuvenated in the London radical clubs in the 1880s" (Hale 2016, 198).

It is, finally, worth mentioning that Malthus himself becomes a critic of reductive Malthusianism, in a sense. While it is a commonplace to note that there are two substantially different versions of the *Essay*—the pamphlet of 1798 and the subsequently expanded and more thoroughly researched editions¹⁰—few critics outside the discipline of history of economic thought wade deeper into the contradictory morass of theories represented by Malthus's magnum opus, *The Principles of Political Economy* (1820). In this later work, Malthus is much more concerned about insufficient effective demand, the threat of gluts and stagnation, and refuting the reassurances of Say's Law underpinning Ricardian political economy, than worrying about over-population. (On the contrary, population *growth*—along with opening up colonial markets—is one suggested solution to the problem of effective demand.)

Anti-Malthusian arguments thus cluster around three central themes: (1) The population conundrum is a result of capitalism and is thus not inevitable or "natural," (2) the finitude of resources can be addressed through cooperation and regulation, and (3) technological development (usually driven by capitalist speculation) will continue to increase food production and the exploitation of other resources, theoretically forever. Earlier critiques of Malthusianism are the intellectual antecedents of the intensive debate surrounding population growth and control that continues today. While this chapter cannot do full justice to the complexity of these arguments, three key themes are important to note. First, since the late nineteenth century, population control has become associated, particularly amongst leftist and feminist critics, with racist eugenics. Second, most traditional economists, because of their presumptions about continuous economic growth, have concluded that Malthusian anxieties are

unwarranted, and that the population problem has been “solved.” And third, environmentalists and ecocritics are much less sanguine about population and recently have begun to sound the alarm about the possibility that we might be approaching the carrying capacity of the planet. (Indeed, the morality of childbearing was a topic already explored by Thomas Hardy in *Jude the Obscure* (1895), and less overtly in his earlier novels as well. See Matz 2014.)

In a recent polemic, Donna Haraway tackles head-on the longstanding association of population control with misogynist and racist practices, urging feminists and others concerned with environmental and social justice to revisit the question of human numbers: “The super-peopling of the earth with both humans and industrial and pathogenic nonhumans is a worlding practice premised on the commitment to endless growth and vastly unequal wellbeing” (2018, 71–72); and even more stringently: “anti-racist feminist avoidance of thinking and acting in public about the pressing urgencies of human and nonhuman global populations is akin to the denial of anthropogenic climate change” (87). While Malthusianism might have seemed, for a time, a quaint idea whose applicability had long since expired, environmental crisis has brought Malthus’s insights back to the forefront of ecocritical consciousness. As Alan Macfarlane has argued, “as resources reach their limits and the external costs of the massive use of carbon energy become apparent in pollution and global warming, it appears that the ghost of Malthus has arisen again” (2008, 573).

RESOURCE EXHAUSTION

The second foundational pillar of sustainability is resource management. While Malthus of course dealt with both of these questions in the *Essay*—it is the relationship between numbers of people and resources in the form of human sustenance that is, after all, his central concern—the resources side of proto-sustainability discourse grew more complex later in the century as economic thinkers started worrying about the depletion of wood, coal, and other fossil fuel resources. Both debates concern photosynthesis, energy, feedback loops, and the maintenance of human bodies, but anxieties over coal reserves abstract and complicate the brute energy-life calculus on which Malthus’s thesis was focused.

Several decades after Malthus and Lloyd, England was gripped by a sustainability panic due not to fears of over-population, but rather to anxieties over the eventual exhaustion of coal reserves. In a sense, this concern

was a continuation of the early-modern discourse of forest management, with the crucial difference that the later theorists were also grappling with a post-Lyellian understanding of the vast time scales involved in the replenishment of fossil fuel resources, as opposed to wood. (Charles Lyell's *Principles of Geology* [1830–1833] was published precisely contemporaneously with the later editions of Malthus's *Essay* and Lloyd's lectures on population). Of course, this is a radically anthropocentric view of the matter—as is conceptualizing parts of nature as “resources” for human use in the first place. In theory, coal is every bit as renewable as Scotch fir, but the time periods involved in its replenishment render it, practically speaking, non-renewable from the perspective of human beings.¹¹

There were two distinct waves of anxiety over coal exhaustion, as Nuno Luis Madureira (2012) has helpfully outlined. In the earlier decades of the century, Britons' sense of the size of their coal reserves was characterized by “geological pessimism,” due to the fact that surveys had taken place primarily in coalfields that were already undergoing depletion: “Given the lack of up-to-date knowledge on the stock of British solid fossil fuels, isolated cases of depletion which statistically held little current relevance were perceived as on the verge of snowballing into a frightening future” (2012, 400). However, the results of the British Geological Survey in 1861, as reported by its director, geologist Edward Hull, at least temporarily laid those fears to rest: “the above supply of coal will last for about 1000 years.... [F]or many generations to come, the mineral resources of England are capable of bearing any drain to which they can possibly be subjected either for home or foreign consumption” (1861, 139).

Hull's estimate quelled anxieties over coal depletion for a time; however, equanimity on the question lasted only a couple of years. In 1863, William George Armstrong sounded the alarm again:

The phase of the earth's existence suitable for the extensive formation of coal appears to have passed away for ever; but the quantity of that invaluable mineral which has been stored up throughout the globe for our benefit is sufficient (if used discreetly) to serve the purposes of the human race for many thousands of years.... Turning, however, to our own particular country, and contemplating the rate at which we are expending those seams of coal which yield the best quality of fuel, and can be worked at the least expense, we shall find much cause for anxiety. (1864, liii)

The problem, according to Armstrong, is that Hull's report did not take into account increasing demand for coal. Extrapolating from current consumption patterns, Britons could expect their coal reserves to be exhausted in 212 years, and for true abundance (and hence British economic superiority) to last closer to 100 years. As Madureira argues, Armstrong's address represents a shift from a purely geological view of the question to a more properly economic one (2012, 405). It also chimed with a national panic that had only very recently been quieted, and thus readily found a believing public ear.

Shortly after Armstrong revived public anxiety over coal exhaustion, William Stanley Jevons sharpened and developed the economic view in his highly influential study *The Coal Question* (1866). The crucial insight of this work has since been dubbed the "Jevons Paradox" and continues to affect discussions of resource conservation to this day. The paradox essentially states that as technological development increases the efficiency with which a resource is used, prices will be driven down and demand will thus increase, creating a "rebound" effect which ultimately leads to greater overall consumption. Jevons's estimate for the time frame for coal exhaustion was 100 years, as opposed to Armstrong's 212. (Armstrong had predicted the end of *abundance* in 100 years, and *exhaustion* in just over 200.)

It is important to note that by "exhaustion," Jevons meant the point of practical impossibility of extraction, as he clarified in his second edition:

Many persons perhaps entertain a vague notion that some day our coal seams will be found emptied to the bottom, and swept clean like a coal-cellar. Our fires and furnaces, they think, will then be suddenly extinguished, and cold and darkness will be left to reign over a depopulated country [note that Jevons implies population is not an independent variable!]. It is almost needless to say, however, that our mines are literally inexhaustible. We cannot get to the bottom of them; and though we may some day have to pay dear for fuel, it will never be positively wanting. (1866, v-vi)

Jevons thus refocused the problem of resource depletion away from the abundance of "nature" and toward the human problems of consumption patterns and technology.¹² While he may have drastically underestimated the amount of accessible coal, his emphasis on human behavior and economic laws (rather than divine providence or static natural reserves) as crucial factors determining long-term resource supply turned the debate into something more closely resembling a "sustainability" discussion. In

our current moment, when the limited environmental resource of utmost concern is carbon sinks rather than fossil fuel reserves,¹³ these are the factors—human behavior and economic laws—around which sustainability discourse again circles, in the form of price caps, carbon offsets, clean(er) energy development, and usage reduction.¹⁴

Another striking similarity between the Victorians' anxieties over resource depletion and our own is the way a vigorous public discussion marked by pessimism and fear co-exists with a popular discourse of chirpy optimism. That latter discourse, in Victorian-era writings, can be divided into three types: reassurances about the inexhaustibility of coal reserves, justifications for the human use of those reserves, and, as Benjamin Morgan has recently discussed, an attempt to resolve the tension between incommensurable time scales.¹⁵ These imperatives, as one would expect, often co-exist in the same texts.

In "The Coal Question," a short anonymous piece published precisely in the brief period between Armstrong's and Jevons's analyses (Anonymous 1863), the author spends paragraphs rehearsing the various resource catastrophes that possibly await Britain, helpfully reminding the reader that coal is not the only resource that can be depleted: "it is highly curious that the fright about fuel has not been pushed home, beyond the coal question. There is reason to believe that even before coal is exhausted wood will be exhausted" (226). After raising the various dire scenarios that might ensue were wood and coal both to be exhausted, perhaps even simultaneously—"Imagine the British Isles ... without fuel, or with only a scanty supply at an enormous price. Before such a consummation, the population would have dwindled in proportion to the decline of fuel"—the author abruptly shifts registers to close on a bizarrely optimistic note. Interestingly, his prediction is the precise *opposite* of the Jevons Paradox, which was to have such an enormous impact two years later: "We do not believe, however, that the calamity we are imagining will ever come to pass, for we have faith in science and invention, and cannot suppose that the present barbarous, wasteful means of obtaining heat will last for another century or two. As soon as the price of fuel rises with diminished supply for an increased population, ingenuity will full surely be at work to meet the deficiency, or furnish a substitute" (227). This belief in the salutary benefit of technological advances in extraction and development are, of course, still with us—and are still subject to the same objection from the point of view of Jevons's Paradox (see, e.g., Alcott 2005). The coexistence of a pervasive anxiety about over-population in the wake of Malthus's

Essay and a vigorous, reassuring discourse about the inexhaustible bounty of nature strike a modern reader as irresponsible or bizarre—or would, anyway, if it were not so familiar to us in our own historical moment.

THE FUTURE

If we take the foundations of sustainability discourse to be population growth and resource allocation, the continuities between the preoccupations of nineteenth-century writers and those of the present day are striking. Both anxieties and assurances continue to take remarkably similar forms—an insight with the potential to be somewhat depressing. (We still haven't figured these things out?) Yet the repetitions and revisitings are also understandable: The problem of sustainability is essentially one of futurity.¹⁶ Sustainability discourse, no matter how it is defined or framed, demands that social and economic structures be organized not only in the most efficient and fair manner for the people, creatures, and earth of today—a difficult enough question to address—but that they also be so organized for *tomorrow*.¹⁷

For this reason among others, the sustainability concept has been the subject of important recent critiques. Stacy Alaimo, Leerom Medovoi, Allan Stoekl, and Jeremy Davies, for example, have pointed out the deep problems inherent in the concept. As Davies notes, “to talk of sustainability and steady-state economics is to deal in abstractions that would be equally applicable at any time; it is to engage in a romance of stasis” (2016, 199). That is, sustainability discourse attends to spatial constraints (resources, population, the carrying capacity of the planet) while fantasizing that temporal constraints can be overcome—that the current state of affairs can go on nearly forever.

There are also fundamental philosophical premises that sustainability discourse tends simply to take for granted: First and foremost, that those alive today do, or should, care about those alive in the future. What are our bases for this assumption? Are they the same or different than they were for the Victorians? If the latter, what has changed and why? While the technical requirements of true sustainability (however defined) are central to the difficulty of its implementation, we should not discount the possibility that its philosophical muddledness is also a crucial factor. The fact that for the Victorians, as well as us, sustainability discourse tends to swing wildly between extremes of optimism and pessimism—that it mobilizes an affective economy that is also out of scale—seems to indicate a perhaps

irresolvable tension inherent in the concept. Before we can determine *how* to go about achieving sustainability, perhaps we first need to figure out *whether* and justify *why*—a task that Victorian sustainability discourse set out for us, and left unanswered.

NOTES

1. Climate change is a more recent addition to this constellation of problems.
2. Recent treatments of sustainability by Allen MacDuffie and Leerom Medovoi have traced tensions in the word's etymological history that imply its inherent incoherence or untenability (MacDuffie 2014; Medovoi 2010).
3. While Grober's aim is to emphasize the ancient roots of the sustainability concept in order to lament our post-lapsarian state, the thesis of Warde's study is the relatively recent *invention* of sustainability (Warde 2018, 4).
4. See Pickles (2017), Greenwood (2018), and Carrington (2018).
5. There has been recent pushback against "consumer responsibility" discourse and an attempt to re-frame the problem of climate change as due largely to corporate greed. See Darby (2018).
6. The term comes from ecologist Garrett Hardin, who coined the phrase after rediscovering Lloyd's pamphlet in 1968 (Hardin 1968).
7. Similar critiques have been levied at Hardin's employment of the concept. See the special issue of *Environmental Science & Policy* entitled "Interrogating the Commons," particularly Araral (2014).
8. See Bashford and Chaplin (2016). For an indispensable overview of *terra nullius* that traces the concept much farther back than the origin in John Locke that is usually cited, see Pateman (2007).
9. See Wiltgen (1998) and Charbit (2009).
10. Although, as Yves Charbit argues, "there is a strong theoretical and doctrinal continuity between the successive versions" (2009, 10). For an excellent discussion of the tensions and contradictions across Malthus's body of work, and a convincing attempt to reconcile them, see Chap. 2 of his book. See also Chapter One of Kreisel (2012) for discussion and bibliography.
11. For an excellent overview of the Victorian conception of time scales, see Jonsson (2018).
12. *The Coal Question* fanned the flames of coal panic for a time, but over the next two decades, further geological surveys assuaged British anxieties by substantially re-evaluating the size of available coal reserves. See Clapp (1994), Wrigley (2010, 2016).

13. Carbon sinks are reservoirs—either natural (such as trees, oceans, and soil) or human-made—that remove carbon dioxide from the atmosphere and store it for an indefinite period of time.
14. “It is worth noticing that if Jevons is right, then encouraging energy-efficiency as a means of reducing carbon emissions would be a counterproductive policy” (Madureira 2012, 409).
15. Elizabeth Carolyn Miller’s recent work has also considered the narrative formations attendant upon these resolutions in the work of William Morris, George Eliot, Joseph Conrad, and others (E. C. Miller 2015, 2017).
16. One of the central concerns of queer ecology, an important new direction in ecocritical thought, is the question of our affective relations to futurity; this work has drawn from foundational queer theory on “the antisocial thesis” by Leo Bersani, Lee Edelman, Jack Halberstam, Elizabeth Freeman, and José Esteban Muñoz, among others. See, for example, Mortimer-Sandilands (2010), Seymour (2013), and Kreisel (2018).
17. The conceptual synthesis of long-term population and resource management is the steady-state economy. Adam Smith and David Ricardo feared the stationary state as the inevitable future of capitalism (Marx referred to it as the “bourgeois ‘Twilight-of-the-Gods’”), while later thinkers such as J. S. Mill and John Ruskin welcomed the stationary state (Marx 1952; Mill n.d.; see also Parham 2017). Recent versions of zero- (or even negative-) growth economies in response to ongoing environmental crisis have been championed by ecological economists, most prominently Herman Daly (1991, 1996).

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