We agree much more than you think: a systems view on debates about global change

M. Six Silberman

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Abstract. The recent exchange between natural scientist McPherson and environmental historian Pritchard in this journal raises essential and urgent questions for anyone concerned with global change and the future of the biosphere. McPherson documents his motives and experiences leaving his professorship to go "back to the land"; Pritchard finds his argument unconvincing. While the commitment of both writers to finding workable responses to global change is clear, their exchange is a reminder of the importance and difficulty of building bridges between diverse intellectual traditions and between research discourse and practical action—and of the ease with which avoidable misunderstandings can derail potentially powerful alliances. In this essay I abstract from their writings a simplified view of human responsibilities and options in the face of global change, focusing especially on the models and assumptions beneath each position. I argue that while biophysical conditions constrain responses to global change, the ontic openness of coupled human-environment systems precludes decisive forecasts of what is possible and impossible. Further, a broad range of internally consistent value commitments are available even given a single view of the dynamics and conditions of a particular human-environment system. I draw on systems-theoretic traditions in the natural and social sciences to develop a "systems view" of the debates engendered by these differing models and values. In this view, both biophysical and sociotechnical conditions and dynamics shape and constrain the actions of individuals and the fates of human-environment systems. This is obvious once reiterated, but easy to forget in the heat of debate—and in the natural sciences social structures are not always considered as "real" as more tangible and familiar elements. From this view, I argue that both Pritchard's intellectual work developing an "envirotechnical" view of coupled human-environment systems and McPherson's work developing new, just, and ecologically sustainable ways of life in practice are essential if we are to collectively navigate the perils ahead.

THE RECENT EXCHANGE between Guy McPherson (2011, 2012) and Sara Pritchard (2012a) in the pages of this journal raises deep and practical questions for anyone concerned with global change and the future of the biosphere.

McPherson, a natural scientist by training, documents in his initial editorial (2011) his motives and experience leaving his professorship to go "back to the land." For him, global change poses a moral question: "As an individual, what is each of us going to do about it?" He argues individuals can help "save the living planet for future generations of humans" by opting out of industrial society, which he sees as immoral. He calls on readers to join him in working toward a just and sustainable way of life outside industrial society and inspired by preindustrial arrangements.

While sharing his concerns and agreeing that the matter is moral, not "simply scientific or technical," environmental historian Pritchard (2012a) finds McPherson's approach unconvincing. She cites a broad literature deconstructing "the myth of the 'ecological Indian'," which she sees as undergirding McPherson's claim that preindustrial people lived freely, happily, and close to nature. She agrees with McPherson that the view of humans as distinct from nature is part of "the problem." But she argues that his disavowal of politics and culture reproduces this

error. In her view, McPherson's decision to opt out of industrial society is not really a way "out" but only one political tactic of many possible. She argues that it is a choice open only to a privileged few, and leaves the unprivileged majority of humanity to suffer the consequences of global change. Opting out is thus in her view inadequate and irresponsible. "The entitled," she writes, indicating agreement with McPherson, "have moral obligations to both humans and nonhumans."

In his response, McPherson expresses appreciation for Pritchard's letter but writes that it "offers no solution to our fossil-fuel predicament and implies acceptance of business as usual." He notes that many other approaches exist by which people could reduce their contributions to global environmental destruction; he has simply written about his own. He takes Pritchard's term "privileged" to mean "moneyed," and disputes the position that only the rich can go back to the land. Subsistence living, he writes, is achieved more through hard work and mutual aid than money. He argues that few people in industrial society are interested in leaving it because they occupy positions of privilege within it. Finally, he writes that industrial society is "irredeemably corrupt," calls for its "termination," and again invites readers to join him in leaving it to fashion a new way of life.

The sincerity, urgency, and commitment of both writers to finding workable responses to global change is beyond question, and I found the exchange at once generative, moving, and troubling. It was generative, as discussions between people with different training and experiences often are. It was moving, as discussions between people who care deeply about something often are. And it was troubling, as discussions between people with different backgrounds who care deeply about the same topic often are. The exchange is a poignant reminder of the ease with which misunderstandings can derail potentially powerful alliances, and of the importance and difficulty of the work of building—and maintaining—bridges between diverse intellectual and practical traditions. The exchange presents an opportunity to try to understand the difficulties that arise in this "bridging" work. Where does the disagreement come from? How do the social locations, mental models, value commitments and judgments, and histories of different participants in debates about global change shape those debates? What can be done to bridge seemingly irreconcilable positions and reveal practical courses of action?

In the spirit of trying to understand our collective predicament, I hope that neither McPherson nor Pritchard will begrudge me the following exercise. I abstract from each position a simplified view of human responsibilities and options in the face of global change. I attempt to foreground the models and assumptions underlying each position. One view, which I will call simply View A, evinces an intimate familiarity with the dynamics of natural systems and the risks of global change, but suggests a linear model of social dynamics. The other, which I will call View B, evinces a sophisticated model of social systems but does not extend this model to other parties to the debate.

In View A, the consequences of global change are already visibly grievous and will only worsen. Industrial society cannot be saved: business and government are captured by short-term self-interest and are inherently destructive; social collapse

and rapid decline in human population are imminent and unavoidable. Having reached this conclusion, industrial society appears morally repugnant; the analyst feels compelled to locate herself outside industrial society. From this position, she feels no responsibility to work to alleviate the suffering involved in the imminent collapse of industrial society. Indeed the decimation of the human population is seen as a likely boon both to the biosphere as a whole and to future generations of humans. Having isolated herself morally from the mass of humanity and its corrupt institutions, the analyst sees the individual as the practical locus of both responsibility and agency. An individual's obligations are to the biosphere and to future generations of humans, not to currently living humans (who cannot be saved) or institutions (which are beyond repair). People can fulfill these obligations by leaving industrial society and building new ways of life outside it.

In View B, most people cannot opt out of industrial society; they are bound by social norms, agreements, their own socially constructed ideas about who they are and what their lives are about. They may see the opportunity costs or uncertainties involved in leaving their social contexts to go back to the land as too great, even if they want to. Or they may see themselves as having responsibilities to others within industrial society: for example, they may have children they feel they must raise "normally," or parents they feel they must not disappoint; they may have debts they must repay, or coworkers relying on them to help keep a business afloat so they can meet their own responsibilities. These people may be aware of global change and its risks, but weight local, immediate responsibilities more heavily than their responsibilities to the biosphere or future generations of humans. Indeed in this view the individual who manages to escape these obligations and opt out of industrial society shirks her obligations to the living unprivileged, who will suffer the consequences of global change most (among humans). In this view the individual is not the locus of responsibility or agency: the systems which have brought our current predicament about predate most living humans, and even the most powerful individual can do little now to change them. Collectively, however, we can change existing systems: it may yet be possible to reform industrial society and prevent the worst consequences of global change.

We should resist asking which view is right. On one hand, we should admit that biophysical conditions constrain responses to global change. In the most extreme case, for example, it is possible that the Earth system has already been destabilized so irretrievably that collapse of industrial society and the likely suffering involved for most of its inhabitants is in fact now unavoidable. While this possibility is not widely discussed in the mainstream literature (although see Diamond 2005), a growing body of research, especially work on nonlinear thresholds in human-environment systems, faces it seriously (e.g., Tainter 1988, 1996, 2006; Axtell et al. 2002; Liu et al. 2007; Lenton et al. 2008; Rockström et al. 2009; the 2012 special issue of the *Proceedings of the National Academy of Sciences* Sustainability Science section on "critical perspectives on historical collapse," e.g., Butzer and Endfield 2012; Ehrlich and Ehrlich 2013). Even in this case, however, many moral and practical stances remain open. View A is an internally consistent stance, but it is

not the only one. Consider for example a hypothetical View A', in which the analyst acknowledges the inevitability of collapse and mass premature death and suffering, but chooses to work within the institutions and infrastructures of a collapsing society to minimize that suffering. Such a view could even acknowledge that the decline in human population is likely to yield a healthier biosphere and improved living conditions for survivors and future generations of humans. The analyst adopting this view neither offers a "solution" to global change nor accepts business as usual in the sense of morally endorsing it. Rather he observes that while he may not, as an individual, be able to avert collapse, he can work to ameliorate, in small ways, the suffering it will cause. He finds that suffering unfortunate and works to mitigate it while acknowledging that its origins lie beyond his control. He rejects the notion that one must "take sides" between the future and the present.

On the other hand, we should also admit that we cannot rule out with certainty the possibility that sociotechnical conditions are sufficiently plastic that social collapse, or at least mass premature death and suffering, can be avoided. Social systems, like biophysical systems, undergo nonlinear change and endogenous transformation. Perhaps the most extreme form of this argument was elaborated by "cornucopianist" economists (e.g., Simon 1981) after the publication of *The Limits to Growth* (Meadows et al. 1972). Roughly, this view relied on the claim that human ingenuity could produce substitutes for ecosystem services in the face of arbitrarily severe environmental degradation. This claim proved naïve, but the limits to human societies' ability to reorganize—to adopt different goals and alter processes for resource allocation and decision-making generally—under duress remain unclear. As shown in *The Limits to Growth* itself, this ability is a central factor in the dynamics of global change and will shape long-term outcomes for humans and nonhumans alike. *The Limits to Growth* modeled such changes exogenously as inputs to scenario analysis, but View B raises the question of how such structural change might occur endogenously. A hypothetical View B' might propose that it occurs through the renegotiation of exactly those social norms, agreements, and identities that constitute the structures of society and constrain the individuals within them. Such a view might consider the role of imagination in making such renegotiation possible; if we cannot imagine something, it is hard to do it or propose it. In this view, "opting out" of industrial society is not actually a way "out" of society but an act that increases society's collective ability to reimagine, and thus reinvent, itself.

There are yet broader views possible. Deep ecology, for example, rejects anthropocentrism entirely and proposes that all organisms are of equal inherent value. This claim is controversial but can be elaborated into an internally coherent worldview and guide to practical action (e.g., Næss 1973; Devall and Sessions 1985; Keller 2008). Similarly, the 20th-century poet Robinson Jeffers offered an "inhumanist" philosophy, calling for "a shifting of emphasis from man [sic] to notman; the rejection of human solipsism and recognition of the transhuman magnificence" (Jeffers 1948). Such a view is not "misanthropic [or] pessimist," he argued, "but offers a reasonable detachment [from human fates] as a rule of

conduct, instead of love, hate and envy" (Jeffers 1948). These views consider humanity's place within the broader dynamics of the biosphere. Broader and more radical still is "cosmicism," the philosophy of early 20th-century writer H. P. Lovecraft, which considers humanity within the whole of the cosmos and posits that the universe is utterly indifferent to human affairs and incomprehensible to human beings (e.g., Joshi 1996). Most people in industrial society would reject all three views; perhaps even McPherson's "Neolithic animal" neighbors (2012) would reject cosmicism. Our point is not that such views are admirable or even useful but that they are internally consistent and thus cannot effectively be critiqued on merely logical grounds, without explicit elaboration of a value commitment.

Yet each such view is adopted or elaborated by a specific person who has a specific location in space; time; networks of flows of matter, energy, and information; institutions and infrastructures; patterns of social interaction; and networks of social obligation. Each person has specific biophysical, social, technical, and cognitive capabilities; these last include assumptions, factual knowledge, mental models, and ideas about who they are, what they can and cannot do, and what they should and should not do. These ideas and their capabilities shape each other, and result from long and historically contingent trajectories through a diversity of biophysical and sociotechnical environments. That is, people have little control over who they are, or who they have become. This "systems view" owes much, of course, to "systems theory," "systems thinking," the "systems approach," and their antecedents and descendents, including second-order cybernetics, complex ecology, and complexity theory (e.g., Churchman 1968, 1974; Meadows et al. 1972, 1982; Gall 1975; von Foerster 1979, 2003; Ulanowicz 1990, 1997, 2009; Meadows 1991, 2002, 2008; Levin 1992; Patten and Jørgensen 1994; Axelrod and Cohen 2001; Kauffman 2002; Jørgensen et al. 2007), although some influential interpretations and expositions have omitted crucial features of the approach—perhaps most frequently, the reflexive component, in which the observer is understood as located within the system under study, and in which the observer and indeed all actors "impose a perceptual bias" (Levin 1992). This bias is inherent and thus not an unwanted barrier to a notional objectivity; rather, in complex systems in which the observer is embedded, "the claim for objectivity is non sense!" (von Foerster 1979). I thus see reflexive interpretations of systems theory as allied practically, ethically, and politically, with the "situated perspectives" (the label is owed to Harrison et al. 2007) elaborated within science and technology studies, feminist theory, and political theory, perhaps most famously (although not identically) by Haraway (e.g., 1988), Barad (2003, 2007), and Bennett (2005, 2010). I see this potential alliance as offering hope for a less fractious discourse on just, sustainable responses to global change—indeed as presenting, perhaps, ground on which to build the frameworks integrating environmentalism and social justice for which Pritchard (2012a), following Cronon (1995) and Guha (2008), calls.

In the "systems view," even if I want to opt out of industrial society I may find myself constrained—not merely by finance, but by lack of knowledge or confidence, by (for example) children or other dependents I may feel a sense of obligation to, by

a desire to maintain relationships with others who do not wish to opt out or do not see a way to do so, and so on. Having overcome these invisible but very real constraints is a testament to McPherson's conviction and creativity, but the fact that some people have been able to do it does not imply that everyone else is complacent in their positions of comfortable privilege. Indeed most privileges carry concomitant obligations or other invisible constraints, and these are far from trivial to escape. We are encouraged to see fulfillment of many of them as desirable and worthwhile: being a good parent, a reliable friend, a conscientious teacher, a diligent colleague. While many participants in subsistence communities report forming deep and meaningful social connections, people in industrial society may be unwilling to give up their existing ones. To call such people greedy or weak may satisfy our frustrations but is not likely, ultimately, to bear fruit. People make meaning through relationships, and these relationships—these meanings—are an often-overlooked but important constraint on the pace of sociotechnical change. To "become someone else" lies beyond most people's capabilities. As the philosopher of science Isabelle Stengers wrote so beautifully,

> [The 17th-century German mathematician and philosopher Gottfried] Leibniz wrote that the only general moral advice he could give was 'Dic cur hic' ['Say why this']—say why you chose to say this, or to do that, on this precise occasion. Such advice does not imply that you have the power to define either the situation or your reasons. The whole Leibnizian philosophy denies that you may have this power... The question of responsibility is thus divorced from the definition of truth. Responsibility is not a matter of who is being 'truly' responsible; it is a matter of concern, and, as such, open to technical advice. When you are about to act, do not rely on any general principle that would give you the right to act. But do take the time to open your imagination and consider this particular occasion. You are not responsible for what will follow, as you are not responsible for the limitations of your imagination (Stengers 2005, p. 188).

In the systems view, there is a sort of physics of sociotechnical systems. In saying this we mean not to invoke the determinisms of closed and well-defined (i.e., classical) physical systems but to highlight the fact that the agency of any individual, group, or organization is bounded. There is, to take a term from the complexity literature, an "adjacent possible" (Kauffman 2002) of the current sociotechnical, or "envirotechnical" (Pritchard 2011), configuration. To put it crudely, to reach x+2 from x, one must pass through x+1. And if one can only move one grid square per second, one should not expect to move from x to x+4 in two seconds. In this view it is perfectly possible that industrial society cannot reconfigure itself fast enough to avoid collapse or mass premature death and suffering as a result of global change processes already in motion. Yet at the same time in this view the claim that such an outcome is *inevitable* is far from ironclad. As Kauffman (2002) writes, we cannot fully enumerate the configuration space of a system as complex as a biosphere or a society; we cannot identify the salient variables or dynamics ahead of time. In the terms of systems ecology, societies—that is, human-environment systems—are characterized, like ecosystems, by "ontic openness." That is, their complexity precludes detailed prediction; predictive efforts are constrained to the description of propensities and the expected "directions" of response to disturbance (Jørgensen et al. 2007, pp. 3, 35-57). This is even more the

case in societies than in ecosystems without humans, as one of the key mechanisms for creating variety in societies is the human imagination. Thus while the possibility that industrial society cannot reorganize itself in time to avoid calamity cannot be ruled out, neither can the possibility that it can and will. Of all the crucial factors shaping the dynamics of envirotechnical systems, the imagination may be the least understood.

In this view, I find McPherson's work timely and deeply inspiring. To go back to the land is not easy; many such efforts begun in the 1970s eventually flagged (e.g., Agnew 2004). To grapple with the biophysical, technical, social, ethical, psychological, and indeed political, cultural, and economic challenges of such a life *in practice*—and to document those challenges and efforts (e.g., guymcpherson.com)—is a service to many people in a range of social locations. It creates new options for everyone; it expands the "adjacent possible" (Kauffman 2002) of individuals within society and of society as a whole; it "multipl[ies] possible worlds" (Callon 2007). Yet of course it is not the only tactic to do so; both McPherson's work and his framing of it emerge from his own cultural-historical location; they are contingent, and others must respond to the ethical and practical challenges posed by global change in accord with their own locations and capabilities (cf. Hinrichs 2007, pp. 4-6). To see this requires exactly the sophisticated view of envirotechnical systems developed in Pritchard's work (e.g., Pritchard 2011, 2012b), if not in her reading of McPherson's position (2012a). As Edwards and Gibeau wrote compellingly in another recent editorial in this journal, solving collective problems effectively requires collaboration between people with different views, a willingness to examine alternative framings of "the problem," and surfacing and grappling with interpersonal obstacles *beneath* "the problem"—e.g., "lack of trust, poor relationships, and [uneven distribution of] power" (Edwards and Gibeau 2013, p. 239). To apprehend our predicament and imagine workable collective responses to global change, we require not only deep knowledge of biophysical systems or the ability to imagine sociologically but indeed the ability to imagine envirotechnically. The "envirotechnical imagination" can support the interpersonal habits required to collaborate effectively (see Edwards and Gibeau 2013); it allows us to disagree while understanding that the origins of our disagreement lie in our idiosyncratic pasts, beyond our individual control. Understanding the contingent origins of our own beliefs and opinions will not in itself resolve longstanding disagreements, but it is an important step in developing shared, actionable understandings. Without cultivating these skills and practices, even a hypothetical future retro-Neolithic society, however *ecologically* sustainable, will be fractious, callous, and unjust in its own ways—some new and unique, some as old as humanity itself. To avoid this fate, imaginative practical and intellectual work of all kinds is needed. Alliances must be built that bridge disciplinary traditions and worldviews, and research discourse and action. Building and maintaining such alliances will be difficult, but we need all the allies we can get.

M. Six Silberman is a staff research associate in the Informatics department at the University of California, Irvine and a field interpreter with the Bureau of Systems Interpretation. He contributes to research on the relation between information technology and global change and helps run a web service that helps workers in online piecework markets avoid excessively self-interested employers. In 2010 he left a PhD program to look for more practical ways to contribute to efforts to achieve sustainability; in 2012, he returned, out of money and ideas, to the university. He will re-enter the PhD program this fall. He has an M.S. in engineering from the Arts Computation Engineering program at UC Irvine, through which he first encountered social theory, and a B.S. in applied mathematics from Columbia University, through which he first encountered systems analysis.

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