

Toward a Peak Everything Postanarchism and a Technology Evaluation Schema for Communities in Crisis¹

Ben Brucato

Abstract: Communities everywhere are already in crisis as a result of the twin threats of peak everything and climate change. These threats will pressure all future organisations of the technological base. This presents opportunities for careful and intelligent intervention. Though some forms of environmental crises are certain, the timing and severity of these remain unclear and will likely provide unique challenges to varying climate and socio-economic contexts. A variety of probable environmental scenarios will constrain the range of potential political interventions. In this article different orientations to the interacting crises, with focus toward possible reorganisation of the technological base, are considered. Through a brief discussion of environmentally-oriented anarchist politics, postanarchism, and radically democratic politics of technology, I find new directions for an anarchist politics of technology prepared for the short- and long-term responses to the crises. I demonstrate these politics through a set of practicable evaluative questions for assessing new and existing artefacts and systems. In doing so, I provide not only the beginnings of an analytic theory of technology, but also an evaluation-oriented experimental schema.

Keywords: *politics of technology, technology assessment, anarchism, peak everything, scarcity*

THE PEAK EVERYTHING SITUATION

In 1982, William Catton elucidated a conception of carrying capacity in his book *Overshoot*.² In a tradition of environmental commentary over the prior decade,³ Catton warned that ecosystems and the Earth as a whole had capacities partially based on available resources that were being exceeded by human use. Human production and consumption were overshooting far beyond the carrying capacity of their

ecosystems, and Catton recommended significant decreases in productive and consumptive activity. This was an ecological basis for a revolutionary reorganisation of modern society. Additionally, this approach shifted the discussion away from overpopulation, *per se*, and toward the issue of overproduction and overconsumption.

Despite a long history and more recent work which challenges essentialising approaches to scarcity,⁴ underneath the political contingencies of unequal distribution exist very real shortages of materials upon which most human communities now depend. Holmgren acknowledges that climate change and resource scarcity are ‘caused by collective human behavior and potentially can be ameliorated by human behavior’, but also that they ‘arise from geological and climatic limits *beyond human control*’.⁵ Three decades later Catton wrote a sequel, *Bottleneck*,⁶ in which he effectively argued that perhaps had warnings from three decades prior been taken seriously and drastic measures employed at the time, a now-inevitable catastrophe might have been avoided. Being too late for this crisis to be averted, all the world’s inhabitants will need to prepare for a certain material shortfalls and the devastating social consequences thereof. Bill McKibben makes similar arguments with more concern focused on the impacts of climate change. McKibben contends that humanity is not ‘going to get back the planet we used to have, the one on which our civilization developed’.⁷

This catastrophe has created the material basis for a struggle that transcends the contingencies of state formations and economic relationships to global capital. While these crises differently impact those at variously intersecting subject positions, everyone will be forced to respond to them in particular ways for survival. Indeed, tasks specific to our varying social and geographic positions will differ, yet all life on this planet – human and otherwise – is deeply touched by this constellation of ecological shifts. While those in different industrialised and informatised countries will face challenges unique to their technical infrastructures and culture, especially when compared against the ‘underdeveloped’ world, it is likely few will be immune to the challenges this new scarcity will pose over the rest of this century and beyond.

In *Peak Everything*,⁸ Richard Heinberg considers the confluence of multiple resource shortages. To his past work on peak oil,⁹ Heinberg now adds attention to peaking production of coal, natural gas, water, grains, minerals, ores and more, as it collides with rising populations and global temperatures. Heinberg demonstrates that many of these resources will not be available in useable quantities for even a fraction of the population of current users by the end of the current century. He cites a report that ‘analyzed 57 non-renewable natural resources (NRRs) in terms of production levels and price’, which concludes that those in civilisation ‘are not about to “run out” of any NNR; we are about to run “critically short” of many’.¹⁰ These depletions

leave little opportunity to reach quality-of-life improvements through more equitable distribution. Instead, he refers to Ivan Illich, who in *Energy and Equity* wrote that inequality is encouraged by *increasing* energy flows.¹¹ A limit – whether derived by ecological limits or via radically democratic means – on total energy use from a given source is historically more consistent with equality among human populations. Heinberg and Illich make particular reference to gift economies, which compared with market and money economies are both energy intensive and produce increasingly wider gaps of inequality by any conceivable measure.

The peak everything condition is a particularly inhospitable part of the material and political legacy that the world's population inherits. Its future is not certain, but a range of probable scenarios will guide most political and economic activity ahead of us. Rather than develop an apocalyptic resignation, we should see in these prognostications the necessity of thoughtful rearrangements of production and communities which may indeed have the added benefit of challenging the authority of the state, capital, scientific experts, large-scale technics and so on. More importantly, since significant changes to the technological base will become a matter of necessity as a result of these resource shortfalls, assessing new technologies from an anti-authoritarian position will enable the building of a new base that is more valenced toward non-authoritarian relations among people and our environment.

PROBABLE ENVIRONMENTAL SCENARIOS

While Heinberg and others have provided significant quantitative data and analysis that project material shortfalls, the complex variables in play would be best confronted by acknowledging uncertainty. In this and the next section, I emphasise the importance of uncertainty through the use of sources who apply scenario-based analysis. David Holmgren, a founder of the permaculture movement, described four probable scenarios determined by the speed of oil decline and the degree of destructiveness of climate change experienced. These narratives place society and environment in interaction in an uncertain future, in which somewhat unpredictable rates of resource depletion and climate change will strictly confine the range of options for sociopolitical responses. According to Holmgren, these 'descent scenarios' are 'plausible and internally consistent stories about the future that help organisations and individuals to achieve a broad and open-ended adaptability to inherent unpredictability'.¹² As such, the rate of oil decline and the severity of impacts of climate change will prefigure the available options for social responses, discussed below.

Table 1

	Slow Oil Decline	Fast Oil Decline
Destructive Global Warming	Brown Tech	Lifeboats
Benign Global Warming	Green Tech	Earth Stewards

The *brown tech scenario* is what Holmgren would predict if oil had recently peaked, and declined at roughly 2 per cent per year along with a ‘subsequent peak and decline in natural gas’ coinciding with ‘the severity of global warming symptoms ... at the extreme end of current mainstream scientific predictions. In this scenario strong, even aggressive, national policies and actions prevail to address both the threats and the opportunities from energy peak and climate change’.¹³ The result, given present political conditions, would be the centralisation of political organisation to resolve climate-initiated disasters, and continued reliance on non-renewable energy due to the slower decline in resources and technological lag. Politically, “top-down constriction” summarises the essence of this scenario in that national power constricts consumption and focuses resources to maintain the nation-state in the face of deteriorating climate and reduced energy and food supply’.¹⁴

In the *green tech scenario*, the ‘adverse climate changes are at the low end of projections’, non-renewable energy resource production declines slowly, and thus ‘the sense of chaos and crisis is more muted [than the brown tech scenario] without major economic collapse or conflict’. This ‘most benign’ scenario presented by Holmgren seems the worst-case scenario ever acknowledged in popular political discourse. In the green tech scenario, resources ‘flow to a greater diversity of responses at the global, national, city, community, and individual level’. Holmgren predicts in such a situation a ‘resurgence of rural and regional economies on the back of sustained and growing prices for all natural commodities including feed-stock and biofuels’.¹⁵ This scenario would eventually evolve toward the earth steward variety discussed below, as non-renewable resources dwindled. “Distributed powerdown” summarizes this scenario by emphasizing both the distributed nature of resources and power, and the planned contraction involved’.¹⁶ The initial mobilisation of expertise and resources to transform regions into high-tech sustainable

modes of production would challenge any strongly democratic processes to respond to such a situation.

In the *earth steward scenario*, rapid drops in energy resources cause catastrophic economic collapses that first result in considerable social upheaval leading to a 'bottom-up rebuild'. This scenario results from 'the extreme end of predictions by peak oil modellers (10-15 per cent decline per annum)' and 'an even faster decline in gas production plus a simultaneous peak in coal production'.¹⁷ Economic depression would be certain, existing resource wars would escalate, and new conflicts would emerge over resources that have been historically secure. 'This economic collapse and these political stresses, more than the actual shortage of resources, prevent the development of more expensive and large-scale nonrenewable resources that characterize the brown-tech scenario or the renewable resources and infrastructure of the green-tech'.¹⁸

The *lifeboat scenario* is one of 'civilization triage'. In this scenario, predictions of catastrophic climate change like those by the Climate Action Centre prove true,¹⁹ while a drastic decline in energy resources combines to force a total global civilisation collapse. Widespread wars, famine, and disease ravage most communities. For Holmgren, the lifeboat scenario would see 'the retention of cultural knowledge of the past combined with a moderately habitable environment', possibly allowing 'new civilizations to emerge that build on at least some knowledge and lessons from ours'.²⁰ This cyclical determinism, reminiscent of Oswald Spengler, is problematic; surely, we can imagine a range of possible outcomes, a plurality of which would be likely dependent upon regional and cultural differences that would probably emerge. The seemingly intractable apocalypticism in the lifeboat narrative holds little liberatory potential, except in the likely rare instances of durable communities that are capable of maintaining both material and political security in light of the instability surrounding them. As Holmgren acknowledges, this would be a fiercely hostile environment that would be most fitting for 'warrior cults'.

These possible scenarios consider the probable social changes resultant from climate change and resource shortages. These convey a particular ontology and relationship of human communities to their environments. The material world operates beyond the meaning and discourses given to it by human actors, whose range of possible activities is constrained by it. While this article is not the most appropriate place to engage this conception, we are best served to call attention to this, plainly.

POSSIBLE SOCIO-POLITICAL ADAPTATIONS

Shaun Chamberlin, connected to the transition movement, developed four narrative frames that address responses to the confluence of resource depletion and climate change. In these cognitive and discursive responses, the mobilisation of resources

and ideologies are behind the exertion of human agencies that are not as tightly constrained as by the material determinations in Holmgren's model. In Chamberlin's narratives, he considers changes in production ('business as usual' on one end, and 'cultural shift' on the other) and approaches to evidence of resource depletion and climate change (ranging from ignorance to acknowledgement). Chamberlin assumes the appropriate social preparations and responses to ecological problems – the transition vision discussed at length in his book – will determine outcomes for humans. This is a very anthropocentric approach, and possesses the hope that there is yet time to make adaptations – Holmgren's lifeboats scenario will only come if we dwell in denial.

Table 2

	Ignoring Evidence	Acknowledging Challenges
Business As Usual	Denial	Hitting The Wall
Cultural Shift	The Impossible Dream	The Transition Vision

The first of these narratives, *denial*, signifies the refusal of a body of evidence regarding resource depletion and climate change, and advocacy for the continued pursuit of the status quo. In the second, the *hitting the wall* narrative, there is a realisation of the problems, yet radical change is prevented; this is 'what happens when "politically realistic" actions and scientific reality collide'.²¹ Chamberlin assigns this view to those who harbour a 'realism' about whether fundamental change in society is achievable' and in turn 'leads to widespread despair and inaction'.²² This narrative includes those apocalyptic environmentalists who resign to a nihilistic disengagement from the presumption of an imminent and inevitable collapse. But it also includes those who obsess on political feasibility in confronting the existing institutions while recognising that those institutions are unlikely to alter significantly enough to avert crisis.

The *impossible dream* narrative is a result of decades of environmental politics that have been embedded in much of Western culture, challenging 'business as usual' by 'taking deep satisfaction in repairing earlier mistakes, and a responsible focus on

ensuring a long-term resilient future. Nonetheless, in this vision we fail to acknowledge the scale of our energy and climate challenges ...²³ This is the *shorter showers and a Prius* version of environmentalism, in which the scale of challenges are ignored and the plasticity of existing technologies is presumed.

Finally, the *transition vision* recognises the urgency for deep socio-political change and is poised to take on these challenges by orienting toward a radical reorganisation of communities toward local production that balances autonomy, self-sufficiently and interdependence. This vision entails a major scaling back of production, and a shift to more hands-on, human-scaled work. Rather than depending on technological fixes for resource declines and reducing carbon emissions, the transition vision looks toward social solutions.

The final narrative is ripe for synthesis with anarchist principles. However, Chamberlin's view is overly anthropocentric, and does not give appropriate consideration to the political alterations that would be necessary to generate more transition-oriented thinking and possibilities. Since capitalism and the state are not problematised in his analysis, we are left only to speculate about what the transition vision might entail for anarchist politics – but that is precisely from what, I believe, anarchists today would greatly benefit. Holmgren's approach remains centred on the determining effects of ecology, but does not consider the ways in which communities can alter their paths forward against difficult odds. How might environmental changes and resource depletion open up new opportunities and provide new challenges for shaping the kinds of communities we want to foster? The prior discussions of resource depletion and the narrative responses to them provide us with an opportunity to discuss the role of technology, and how a post-anarchist politics of technology might orient toward building new communities in light of the bleak yet uncertain peak everything future. The earth stewards and transition vision narratives provide some terms by which to consider a thoughtful reorganisation of communities that extend far beyond the demand for the elimination of the state and capitalist exploitation. Rather than placing at their core technology's ability to relieve humanity of necessity (as is the case in post-scarcity anarchism),²⁴ these peak everything responses are grounded in social organisations that would replace complex technologies and face necessity more squarely.

OPPORTUNITIES FOR POSTANARCHIST POLITICS

Based on the possible scenarios, and given the range of socio-political responses to these, anarchists today possess at least two opportunities in practicing an antiauthoritarian politics of technology. The first we ought to consider with lament. A human population of 7 billion now faces (to differing degrees) the combined ecological

threats of massive resource depletion and exacerbated climate change. An important reason to open this discussion is that the climate catastrophe and peak everything create an unavoidable condition whereby the technological base of any social formations that emerge from the so-called developed world is certain to be altered significantly by these interacting crises, both in terms of those forced by environmental catastrophes and any range of socio-political adaptations to avert or react to them. Writing of this in the future tense in many ways betrays the reality of the situation: these changes are occurring now, and have been for some time.

The peak everything world is presently upon us, and we may either resign or thoughtfully intervene in ways that will steer developments in the technological base for our future communities. To defer these issues until 'after the revolution' is not an option, nor is it desirable. States have responded to material shortfalls through austerity measures, and corporations are responding with megatechnics that will remain resistant to radically democratic control. New directions in theory and activism must be forged with a keen eye to the role of technological assessment.

A second opportunity anarchists possess comes from recent developments in 'new anarchist' or postanarchist theory that, among many other endeavours, challenge the reductionism and essentialism rife within classic anarchist thought.²⁵ Postanarchism is a contested term that has been variously defined over the past decades. It is not necessary to attempt a definitive account of postanarchism here;²⁶ however, any use of the term requires some operationalisation. By consequence of the small space, this will require a somewhat incomplete and reductive account.

In using the term, I do not simply mean the conjunction of anarchism and poststructuralism,²⁷ yet the antiauthoritarian aspects of poststructuralism may be apparent in my analysis below.²⁸ I use the term here to denote a particular variety of anarchism that disavows essentialism and universalism, is oriented toward practice and experimentation, and poses situation-specific interventions as an alternative to grand narratives that explain causes and consequences of prevailing orders of power. This postanarchism is oriented more toward prefigurative politics than the epistemological concerns that receive a considerable focus by postanarchist theorists. Moreover, the postanarchism at work in my thinking on peak everything is an anarchist variant of post-development theory,²⁹ a critical theory of global development and capitalism that combines postcolonialist theory, poststructuralism and voices of subaltern grassroots activists.

If anything characterises contemporary anarchist praxis, it is the focus on prefigurative politics, which is premised on the idea that 'a transformative social movement must necessarily anticipate the ways and means of the hoped for new society'.³⁰ Practising prefigurative politics not only means engaging with our communities in ways that are consistent with our antiauthoritarianism, but also that we reconstruct

the material relations of our communities as embryonic forms. This notion of prefiguration is not entirely new. Gustav Landauer wrote a century ago, ‘The state is a social relationship; a certain way of people relating to one another. It can be destroyed by creating new social relationships; i.e., by people relating to one another differently.’³¹ As Gordon writes, ‘for social change to be successful, the modes of organization that will replace capitalism, the state, gendered divisions of labor and so on need to be prepared alongside the attack on present institutions ...’³²

Landauer was here expanding the concept of the state far beyond the traditional conception as the bureaucracies that control territories and populations through force. Here, the state includes all forms of routinely reinforced performances of domination. This re-conceptualisation of the state and the strategies for its overthrow are consistent with the vision of postanarchism that I am employing here. This postanarchism sees the opposition to the state in these broader terms, as the conflict against institutionalised domination. Such institutions are those cultural objects that produce systems and enable organisations through recurring performances.³³

While the above quotation from Landauer receives considerable circulation, what might not be as quickly remembered are the sentences that appear directly before those: ‘A table can be overturned and a window can be smashed’, wrote Landauer. ‘However, those who believe that the state is also a thing or a fetish that can be overturned or smashed are sophists and believers in the Word’.³⁴ While he helps to expand our understanding of the state in productive ways, this conventional view of technology as mere fetish is precisely what I aim to confront. Technologies are here considered as forms of life, as *possessing* and *performing* politics. They are not merely materials that are only given meaning within human contexts. Indeed, a window may be smashed, but *windows* will remain. Windows are both social objects – objects with a range of meanings particular to their history – but are also material objects that are not fully malleable to human (re)appropriation and (re)organisation.

The ways in which anarchists and our allies combat authority in our midst and the kinds of communities we will build require an analytical and evaluative politics of technology that place social justice, participation, and popular expertise at their core. Additionally, we are presented with new possibilities for advancing a politics of technology that opens up when new concerns over scarcity are injected into recent discussions over postanarchism. This latter point is largely unique to our present condition; the image of the post-scarcity society is a relic with traces only in discourses sharply divorced from the material reality shared by all of this planet’s 7 billion human inhabitants.

Finally, I take postanarchism to refer to a particularly experimental form of prefigurative politics that eschews appeals to *a priori* and transcendental princi-

ples. One such instance of this is the notion of humanity as naturally good and corrupted by the state.³⁵ That position suffers at least two critical flaws. First, it discourages prefigurative politics, because ‘humankind’s true nature’ cannot be revealed until the state and capitalism are overthrown. Second, it avoids a post-revolutionary praxis that would respond to the likely event that human beings are not indeed all saintly creatures. The more intelligent responses to these crises of peak everything and climate change will be interventions that not only aim toward resilience, but also a reduction in authority and domination through challenges to material relationships that instil them in built form. The crises the world’s populations face are filled with uncertainty, and anarchist responses should be informed by a politics of technology that reflects the new developments we have seen elsewhere in postanarchist theory.

ORIENTING TECHNOLOGICAL POLITICS

In presenting my proposal for a postanarchist politics of technology, I will situate it among four positions. Following the scenarios discussed above, I will position these in relation to one another along two axes. This gives us the analytic advantage of counter-posing these positions relative to one another based on two primary sites of controversy. These four categories are used as *ideal types* in the Weberian sense. They are not perfect, all-encompassing definitions. The placement of any example in the categories provides neither a sufficient definition of the category nor of the example. Instead, the examples are used here to animate the categories and to compare the examples across these sites of controversy.

Table 3

	Technology Constrained to Human Politics	Technology an Intrinsically Ecological Question
Plasticity / Neutrality of Technology	Classical Anarchism	Social Ecology
Technology as Affordances	Early Politics of Technology (STS)	Primitivism / Anti-Civilisation

The vertical axis plots the positions on the question of the determining attributes of the technological base. On one side, technology is seen as neutral and subject to the largely wholesale redefinition and redeployment to serve different ends. Individual artefacts, systems, and the aggregated technological base are infinitely plastic, malleable to the economic and political conditions that determine their economic function and social significance. If any reconfiguration is needed, it could be left – and perhaps must wait – until ‘after the revolution’.³⁶ This is not inconsistent with some classical anarchist positions.³⁷ For social ecologists like Bookchin, entire systems of technology that have heretofore functioned to assist in the domination of humans and environmental materials may allow for their total liberation by only changing their political economic context. Technologies are the servants of their human creators and subject to wholesale redefinition based on their political economic context.

On the other side of the vertical axis, technology is seen as determining the parameters within which political and economic activity takes place,³⁸ or as having *affordances*.³⁹ These positions do not necessarily indicate technology as beyond intervention and change, and neither does it mean that the technological base is the only driver of human activity. Nonetheless the range of possible activity is afforded and constrained by existing technics and material environments that cannot simply be symbolically or ideologically redefined. Changing technology, from this perspective, often additionally requires some material alteration in order to open up new possibilities, whether this means adding, removing or reconfiguring physical components of artefacts or systems. Technological artefacts or systems might seem out-of-control when, in order to persist, their reproduction and maintenance requires certain social organisations and an orientation to the material environment as mere resources. This position is represented by early politics of technology articulated by Lewis Mumford and Jacques Ellul, and later by the Science and Technology Studies (STS) theorists Langdon Winner and Richard Sclove.⁴⁰ Derrick Jensen’s anti-civilisation politics and John Zerzan’s anarcho-primitivism both represent a distinctly ecological version of this view of technology as granting affordances.

Important differences among those on the vertical axis are demonstrated on the horizontal axis. On one side, technology is seen as the product of human activity and thus fully predicated upon its political and social direction. While these positions might consider the ecological impacts of technologies, from what these technologies are fashioned and upon what they depend upon is rarely a consideration. From that perspective, humans are separate from and act upon nature. On the other side of the horizontal axis, technology is intrinsically ecological. Here, technology is almost always a mediating object among humans or between humans and their environments. The materials from which artefacts are fashioned and the relationship such

fashioning forges between humans and their surroundings are always problematic. These differences identify key points of departure among classical anarchists and social ecologists, for instance. This is also a reason why for social ecologists, primitivists, and anti-civilisationalists the question of technology is perennial: from such positions, one simply cannot address politics or ecology without reference to technology.

A POSTANARCHIST POLITICS OF TECHNOLOGY

The following argument for a new politics of technology begins with critical comments on some predominating anarchist positions. This is not in an effort to 'make room' for my own position, or to argue for its superiority. Rather, these critiques identify key points of divergence in order to demonstrate the contrasting kinds of perspectives and practices the new politics will call upon.

In classical anarchist theory, the problems of technology are attributed to its place in a capitalist, statist society; remove the state, redistribute capital, and the existing technologies would be managed and reshaped by the workers to serve radical new means and ends. This requires a naïve presumption that technologies are incredibly plastic. Most technologies rely on already scarce materials. Some anarchists seem to imagine the commodity chains required for individual artefacts will be magically transformed after the revolution.⁴¹ Further, those who live in civilisation depend upon for their survival technologies that require resources already used at unsustainable levels. As such, the availability, scarcity and processes to procure and distribute the materials upon which these technologies depend are not fully tied to their political and economic context. Given this, and additionally that most people in the world are unable to meet basic needs on a reliable basis, the problem of scarcity and the related question of justice in the distribution of resources both pose major problems for any political theory of technology. It is especially problematic for anarchists who wish to retain a semblance of concern for egalitarianism at the centre of their efforts.

As a result of automation and cybernetic technologies that were already emerging in the 1960s, Bookchin 'argued that they were rendering material scarcity obsolete'.⁴² He saw in those technologies 'the possibilities of abundance, not only for erotic liberation but for social and political revolution', as they 'held the potential, for the first time in human history, to abolish scarcity and want on a worldwide basis and usher in a life of plenty for all'.⁴³ Technology, Bookchin argued, holds the promise of a free society and undermines the rationale for the authority of the state and the capitalist economy when all can share in universal abundance without any toil. From such a position, the technological base makes liberation possible and the political order merely stands in its way. Anarchism's impossible dreams are drawn from a shallow

well dug by Murray Bookchin.⁴⁴ The peak everything condition confronts the post-scarcity perspective directly, calling into question its ability to adequately respond to the demand for resource-based distributive justice.

Turning to the primitivists and anti-civilisation thought, we frequently see a narrative form that relies upon an idealised and universalised primitive past as a binary opposed to the dystopian civilisation of the present.⁴⁵ This might be important as a mythic rhetorical device to situate ideological tendencies and inspire action. If the myth is believed to correspond to some actual historic past, this becomes subject to a range of criticism from the critique against historicism,⁴⁶ to the empirical falsification based on the anthropological record. If it is merely a rhetorical device, anarchists might be concerned that this signals an authoritarian tendency to place ends before means, using selective readings of anthropological or cultural records to manipulate political activity. Either way, these grand narratives and tendencies toward essentialism serve to distract from actual engagement with the technological base. It encourages a linear model of progression or regression. Instead of reinforcing it, we need to build new directions. There is not merely a *forward* or *backward*. 'At work here is a quaint, two-dimensional, road-like image that almost everyone (including this writer) falls into as easily as sneezing', writes Langdon Winner. 'Never does one move upward and to the right or off into the distance at, say, at a thirty-four degree angle. No; it is forward or backward in a straight line.'⁴⁷

For this and other reasons, Michael Truscello's recent post-anarchist critique of Bookchin deserves some reflection.⁴⁸ To Truscello, Bookchin's liberatory technology 'smacked of techno-utopian delusion'.⁴⁹ He faults Bookchin for taking up the Marxist obsession with escaping necessity – 'the problem of want and work' – through technology that would 'replace the realm of necessity with the realm of freedom'.⁵⁰ Truscello instead puts forward the concept of 'imperfect necessity' that 'recognizes that life in industrial societies is so profoundly mediated by technology ... that the existence of most individuals depends on it, and as a result, to oppose the total phenomenon, as anarcho-primitivists do, carries with it an almost suicidal or genocidal tendency ...'.⁵¹ He likewise recognises – presumably in criticism of Bookchin and the social ecologists – that 'to endorse the total phenomenon [of technological civilisation] without qualification is equally insane'.⁵²

While Truscello rejects a wholesale adoption of anarcho-primitivism, he supports 'a post-anarchist politics of technology, with elements of the anarcho-primitivist critique ...'. This version would correct oversights in Bookchin and anarcho-primitivism with its own articulation of 'a distinctly historical, socio-technical and anti-humanist model of technological development'.⁵³ He finds myriad theoretical developments in post-anarchism poised to develop a new politics of technology that go beyond the primitivists and Bookchin. Truscello finds that 'the

technicity of everyday life, the naturalization of complex technological systems, the *total phenomenon* of technological society' is 'the primary, though not singular, barrier to real anti-authoritarian opposition in the West'.⁵⁴ But this 'cannot be critiqued and dismantled from a single position of insurrection, but must instead be confronted from multiple, disparate nodes in a network of communicative and strategic orientation'.⁵⁵

Truscello recalls Uri Gordon's anarchist politics of technology,⁵⁶ which likewise consider anarcho-primitivism as a starting point, but are firmly situated within Langdon Winner's discussion of autonomous technology.⁵⁷ Gordon acknowledges that since Winner, Science and Technology Studies (STS) has discarded the idea that technology is neutral because 'it disregards how the technical or from-design structure of people's surroundings delimits their forms of conduct and relation'.⁵⁸ For Winner, 'technologies are not mere aids to human activity, but also powerful forces acting to reshape that activity and its meaning'.⁵⁹ Winner considers mainly the *political* process by which technological society is reproduced and its technical power (over humans and the rest of nature) enhanced. He asks the critical question as an alternative to 'Who governs?', by additionally asking '*What* governs?'.⁶⁰ In the case of modern industrial technology, critics of technology see that we have overcome our 'bondage to economic necessity only by submitting to bondage of a different, but equally powerful sort. The conquest of nature is achieved at a considerable price – an even more thorough conquest of all human and all social possibilities'.⁶¹ This is the total phenomenon of technological society that will not be resolved by a mere political and economic shift; what is needed is a re-evaluation of the artificial environment and its technics from a radically democratic position. To these criteria I add those concerns over resource-based distributive and social justice, sustainability, and ecological restoration.

Gordon finds a 'widespread anarchist attraction to innovative sustainability applications' that have 'an explicit or implicit anarchist' component.⁶² These applications include permaculture, organic farming, eco-architecture, solar and wind energy, as well as building eco-villages, community gardens, and other urban projects. How widespread they are is a yet-unfounded empirical claim that may likely prove dubious if we expect that their politics be explicitly anarchist. However, this recognition by Gordon points to an impetus toward the transition vision or earth-steward scenarios addressed above.

Reconsidering the narratives discussed above in this new light, the fantasy of liberation through technology escapes us; we cannot fall back on the impossible dream. The multiple points of insurrection demanded by some post-anarchists suggest possibilities for an anti-authoritarian transition vision. We should recognise, as do Winner and Sclove, that technologies have the potential of reducing freedom

and autonomy if not carefully controlled and limited. It is through qualitatively and quantitatively different participation in popular governance that technology may be better paced and steered. We ought to consider also that Winner and Sclove agree that without a representative system of some sort, most technological systems would either be unwieldy (and thus overpower popular controls), or would need to be dramatically scaled back, completely redesigned, or scrapped altogether. Where they might permit such representative control in order to preserve some of these, anarchists may need to either dispense with certain technologies or with their commitments to an anti-statist society.

Along with automation, Bookchin depended upon a sharp reduction of wants and a reconsideration of needs that would lessen both use and dependence upon technologies. This only gets us so far. Given this brief discussion of the complex ecological relationships in which technologies are intrinsically connected and upon which they depend, anarchists find ourselves in a bind. A just distribution of rapidly declining materials and assurance of sustainable usage poses significant implications for an anti-authoritarian politics of technology. But we see here something only exacerbated by increasing human populations. More complex technologies, which depend upon expertise in design, specialisation in manufacturing and maintenance, and upon scarce materials require some mechanism to allocate access to knowledge, training, and resources. Most revolutionary techno-utopians have chosen to jettison any concerns with abolishing the division of labour⁶³ by appealing to the state, elaborate and unwieldy councils, or corporate bureaucracies for management. A thoughtful anarchist politics of technology must place these ecological considerations at their core. Further, these politics must participate in honing and mobilising evaluative criteria to both understand and resolve the problematic of just distribution in ways which will not impose the direct authority of gate-keeping or the indirect authority of inappropriate expertise and unjust distribution of resources upon which the community depends. This leaves us with more problems than answers. Truscello broached the subject with a critical evaluation of existing anarchist theories of technology from a postanarchist perspective. However, directions from which we might move forward in practice are still needed.

A TECHNOLOGY EVALUATION SCHEMA

In order to provide some direction for pursuing these practices, I adapt for a peak everything world and from a postanarchist perspective Langdon Winner's principles in the closing of *Autonomous Technology* and Richard Sclove's design criteria in *Democracy & Technology*. Neither are anarchists, but Winner's participatory democratic politics and Sclove's advocacy for strong democracy motivate

their politics of technology, and are thus aligned with similar radically democratic intentions.

Richard Sclove finds that ‘many technologies, although presently designed or deployed in an authoritarian fashion, harbor latent democratic potentialities’,⁶⁴ and describes a multitude of evaluative criteria for engaging these technologies. Even Sclove’s criteria would significantly restrict much of existing technology for their requirements for authority, but he also permits ‘legitimate hierarchical power relations’ that anarchists would find problematic. The communities anarchists will (re) build in confronting not only the state and capitalism, but also peak everything and climate change, will be poised and challenged to make these determinations with even stricter criteria than Sclove’s. However, I find in his work and Winner’s much to synergise with the postanarchist advocacy for experimentalism and prefiguration. The evaluative questions below pose new opportunities for multiple points of insurrection,⁶⁵ and the actual political processes of technology evaluation will provide the affinity organisations that typify the ‘newest social movements’ with possibilities in confronting climate change and peak everything.⁶⁶ The principles touched on later are designed to arm those who will engage in such conversations – and social action – from similar points of entry.

My approach operationalises technology as *the governed mobilisation of scarce materials and expertise used to manipulate the material world* (including human bodies). Here, governance is construed broadly as any social method of control or articulation of power. These materials are considered as those ‘natural resources’ which not every member of the community can access equally or by which is equally empowered. Expertise is those sets of utilitarian knowledge that are not uniformly shared by all members of a community or where they are not equally empowered by their accumulated expertise. Like materials, expertise is not infinitely available to any individual both as a result of differing degrees of access to and opportunities for learning, and also by her or his total cognitive and physical capacities. Simply: no one can know everything.⁶⁷ Finally, in terms of manipulating the material world, I am generally referring to those interventions in nature – both human and their environment – beyond necessity to meet material needs. These needs are not only considered in terms of those required for survival but also for full integration into the community so as to personally benefit to the same extent as any other member.⁶⁸

An overarching goal with the following criteria is to reach a general mix of technologies integrated into a community that would balance those that (1) help to establish or facilitate participation to the extent that equalises empowerment of individuals within the community and between interacting communities; (2) ‘are used under conditions and for purposes that individuals have substantial liberty to determine for themselves’, but do not generate propensity for disparities of empower-

ment within the community; (3) help establish or maintain mutually empowering, egalitarian, and convivial social relationships;⁶⁹ and (4) seek to rehabilitate ecosystems from past exploitation and assure future generations are not deprived as a result of the current and past generations' excesses. The community would deploy *very few* technologies that are likely to depend on an expert elite or would mediate interaction through mechanisms not under the full control of those engaging in the interaction. Finally, the community would avoid technologies that establish or maintain authoritarian social relations.

In pursuing this overall strategy, and borrowing at times from Sclove⁷⁰ and Winner,⁷¹ we should consider the following:

- (1) *Maximise fair distribution of materials in use and the devices fashioned from them.* Is the artefact or system of technologies 'physically available' to those it is likely to affect? Do differing degrees of access confer different privileges or levels of authority?
- (2) *Produce equitable outcomes from material artefacts.* In ensuring equitable or fair distribution and diffusion, will the artefact or system have propensity to provide for similar degrees and qualities of meaning, integration into and participation within social and political life for all users? Will some who have access to the technology be unduly more personally enriched or empowered?
- (3) *Make fully transparent and maximise common understanding of most sciences and technologies in use.* Does the artefact or system of technologies have a scale and structure immediately intelligible to all members of the community? Will it be 'intellectually available' to all it affects? Will it require or have a propensity to develop expertise?
- (4) *Ensure technical flexibility and innocuous integration into social life.* Will the technology have 'a high degree of flexibility and mutability'? Can the community avoid circumstances in which the technological system imposes 'a permanent, rigid, and irreversible imprint on the lives of the populace'?⁷²
- (5) *Maximise independence and autonomy.* Will adopting a technology leave a community to function autonomously if the device or system were to fail or its use discontinued with little or no preparation? Will it foster dependency for any individuals, groups or the community as a whole? What would this dependency entail?
- (6) *Reduce as close to zero as possible the dependence upon imported materials, and use local materials sustainably.* Will the technology depend upon locally available materials in sustainable quantities? Who or what will be potentially deprived if those resources are taken for the purposes of building or

- maintaining the technology? Would non-local resource dependence deprive the community of local autonomy?
- (7) *Define ends broadly, to include, for instance, the needs of the ecosystem and future generations.* Is the technology working toward more broadly shared community and ecosystemic goals? Will accessing the requisite materials constitute a violent intervention in the ecosystem, or irreversibly alter it such that other species or future generations incur undue harm?
 - (8) *Utilise means and approach ends appropriately.* Is the community adopting the technology with a ‘fully informed sense of *what is appropriate*’?⁷³ The definition of ‘appropriate technology’ would be expanded to reference suitability for aiding the minimisation rather than the expansion of authority in the community.
 - (9) *Consider technologies systemically, with a full consideration of all they depend upon to exist, function and persist.* Will the technology integrate into the overall technological infrastructure of the community so as to meet the overall goal of achieving a desirable balance of those desirable varieties? Will it depend upon other technologies that fail to sufficiently meet these or other criteria, thus further entrenching those problematic technologies?
 - (10) *Consider technologies in scenarios, emphasising uncertainty.* Is the object under consideration likely to increase or decrease uncertainty with regard to social, economic, or ecological considerations? What are the ranges of possible outcomes across the above and other reasonable criteria?

These criteria are not exhaustive, and should be adapted to local conditions, modified through utilisation, and subjected to popular critique. They could be interpreted in at least two ways: as either an analytic or a practicable schema. First, they serve as heuristics. While I am largely synthesising ideas from existent politics of technology, this particular synthesis begins to reconcile a deficit in anarchist praxis. The operationalisation of technology provided above is explicitly political, and places concerns regarding authority, scarcity and distribution at the centre. The criteria allow us to engage in the politics of technology so as to better know the ways in which authority is embedded within a given artefact’s or system’s material structures and techniques. One might provide an example of a technology that is not explained by the operational definition or these criteria, but these ought not be considered as a closed set. It would be in such a situation that this schema might require expansion or addition. However, these could point in a direction where those who engage in evaluative technological politics could gain better understanding of an artefact or system, and would be better prepared to examine the ways technologies might not only be inscribed by authority, but also reproduce it.⁷⁴

Frank Harrison wrote that ‘the state itself is an example of technology ...’⁷⁵ Anarchists would benefit in recognising that technology functions as legislative acts do. ‘Technological processes in contemporary society have become the equivalent of a form of law’, writes James Carroll, ‘that is, an authoritative or binding expression of social norms and values from which the individual or a group may have no immediate recourse’.⁷⁶ If anarchists want a society or community that is absent the authority of the state and law, then we ought to critique and challenge other pervasive forms and structures of governance.⁷⁷

These criteria can function as a practicable set when a community engages in appraising a given artefact, technique, organisation or system with the intent to determine whether this technology ought to be subject to radical reconstruction or deliberate destruction in order to render null or minimise the authority it produces. These could also identify those technologies that will be retained but are likely to continue producing hierarchy as a result of intractable features. In such cases, the result would be to alter the technology’s structures to minimise those tendencies, and apply some form of careful popular control to mitigate its effects. We should recognise here that anarchists find ourselves in a unique position that other political orientations can rectify more simply by assigning representatives or bureaucracies to manage these problematic technologies. We ought to be particularly careful of maintaining so many authoritarian technologies that popular control becomes unduly burdensome or impossible. I strongly maintain that under such a situation material conditions are antithetical to anarchist politics. This is where difficult choices begin to present themselves that few others than the primitivists have begun to truly take to heart.

Where authority is recognised, anarchists should greet it with some form of assault. More agitators, organisers and community-builders who possess a desire to combat authority both qualitatively and quantitatively should integrate into their practical endeavours some of these concerns and find ways to utilise these evaluative terms as guides. I assert that such an approach is a fundamental component of an anarchist politics true to its name; anarchists should combat authoritarian technics as fundamentally as they do the organs of capitalism and the state, both analytically and practically.

CONCLUSION

The looming peak everything condition has opened up of the issue of scarcity in new ways. This has allowed us to recognise that the role of scarcity is almost always central to technology. Not only are we confronted with the need to respond thoughtfully and sustainably to the twin crises of material scarcity and climate change, but we are

challenged to find solutions that do not invite technological authority with technoutopian fantasies that undermine in principle and material relations the challenge to institutionalised hierarchy. The further development of a peak everything postanarchist politics of technology not only provides new directions for theory, but unique opportunities to undermine the authority of the state, competitive markets, and technological domination.

Email: ben@benbrucato.com

Ben Brucato is a PhD student at Rensselaer Polytechnic Institute in Troy, NY. He studies surveillance in the United States. His current research investigates the intersection of cell phone video cameras as a technology of ubiquitous sousveillance with policing, particularly police brutality.

NOTES

- 1 Thank you to Langdon Winner, Mike Fortun, an anonymous reviewer and the co-editors of this issue for help with earlier drafts of this article.
- 2 William Catton, *Overshoot* (University of Illinois Press, 1982).
- 3 See Donella Meadows, *Limits To Growth* (Signet, 1972); and statements issued surrounding the first U.N. Environmental Programme meeting from Stockholm, available at <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=97>.
- 4 See, for instance, Amartya Sen, *Development as Freedom* (Anchor, 2000); *The Limits To Scarcity*, edited by Lyla Mehta (Routledge, 2010).
- 5 David Holmgren, *Future Scenarios: How Communities Can Adapt to Peak Oil and Climate Change* (Chelsea Green Publishing, 2009) p. 57, emphasis added.
- 6 William Catton, *Bottleneck* (Xlibris, 2009).
- 7 Bill McKibben, *Eaarth*, (St. Martin's Griffin, 2010) p. 16.
- 8 Richard Heinberg, *Peak Everything*, (New Society Publishers, 2010).
- 9 Richard Heinberg, *The Party's Over* (New Society Publishers, 2005); *The Oil Depletion Protocol* (New Society Publishers, 2006).
- 10 In Heinberg, 2010, pp. xviii-xix.
- 11 Ivan Illich, *Energy and Equity* (Calder & Boyars, 1974).
- 12 Holmgren, p. 56.
- 13 Ibid., p. 61.
- 14 Ibid., p. 68.
- 15 Ibid., p. 69.
- 16 Ibid., p. 74.

- 17 Ibid., p. 74.
- 18 Ibid., p. 75.
- 19 See <http://www.climateactioncentre.org/carbon-equity>.
- 20 Holmgren, p. 86.
- 21 Chamberlin, p. 23.
- 22 Ibid., p. 27.
- 23 Ibid., p. 23.
- 24 Murray Bookchin, *Post-Scarcity Anarchism* (Ramparts Press, 1971).
- 25 For an overview, see Süreyyya Evren's introduction to *Postanarchism: A Reader*, (Pluto Press, 2011).
- 26 The term itself is contested and such a definitive account at this stage in the theoretical development of postanarchism may prove impossible – and certainly undesirable.
- 27 For a discussion of this, see Duane Rousselle, *After Post-Anarchism*, (Repartee, 2012).
- 28 These connections are variously explored in Duane Rousselle and Süreyyya Evren (eds.) *Post-Anarchism: A Reader*, (Pluto Press, 2011).
- 29 Particularly influenced by Gustavo Esteva and Madhu Prakash, *Grassroots Postmodernism*, (Zed Books, 1998). See also Arturo Escobar, *Encountering Development: The Making and Unmaking of the Third World*, (Princeton University Press, 1995); Serge Latouche, *The Westernization of the World: Significance, Scope and Limits of the Drive Towards Global Uniformity*, (Polity, 1996); Majid Rahnema and Victoria Bawtree (eds.) *The Post-Development Reader* (Zed Books, 1997); and Gilbert Rist, *The History of Development: From Western Origins to Global Faith* (Zed Books, 2008).
- 30 Tokar, cited in Uri Gordon, *Anarchy Alive!: Anti-Authoritarian Politics from Practice to Theory*, (NY, 2008) pp. 34.
- 31 Gustav Landauer, *Revolution and Other Writings: A Political Reader*, edited and translated by Gabriel Kuhn (PM Press, 2010).
- 32 Gordon, p. 38.
- 33 This is a sociological definition of institutions, see Jepperson, 'Institutions, Institutional Effects, and Institutionalism', in *The New Institutionalism in Organizational Analysis*, edited by Powell and DiMaggio (University of Chicago Press, 1991, pp. 143-63).
- 34 Landauer, p. 214.
- 35 For example, take David Graeber's 'elementary assumption' that he claims forms the basis of anarchist politics: 'human beings are, under ordinary circumstances, about as reasonable and decent as they are allowed to be, and can organize themselves and their communities without needing to be told how'. From 'Are You An Anarchist? The Answer May Surprise You!' *The Anarchist Library*, accessed December 22, 2012 at <http://theanarchistlibrary.org/library/david-graeber-are-you-an-anarchist-the-answer-may-surprise-you>.

- 36 Graeber suggests, with allusion to Kropotkin, that ‘to even begin to think about human possibilities’, the ‘after the revolution’ thought experiment should be used. This is a helpful counter-position to prefigurative politics. See David Graeber, *Fragments of an Anarchist Anthropology*, (Prickly Paradigm Press, 2004) p. 81-2.
- 37 These are contested characterisations, again, used as ideal types.
- 38 I use this term not in its theological sense, but in the Marxist sense as ‘setting limits, exerting pressures’. See Raymond Williams, *Culture and Materialism* (Verso, 2005) pp. 31-32.
- 39 The term ‘affordance’ originated with James Gibson, see i.e. his ‘The Concept of Affordances’. In *Perceiving, Acting, and Knowing*, edited by Shaw and Bransford (Lawrence Erlbaum Associates, 1977) pp. 67-82. The term was first applied to technologies by Donald Norman in his *The Design of Everyday Things*, (Basic Books, 1988).
- 40 See, i.e., Lewis Mumford, *Technics and Civilization*, (University of Chicago Press, 2010); Jacques Ellul, *The Technological Society*, (Vintage, 1964); Langdon Winner, *Autonomous Technology*, (The MIT Press, 1977); and Richard Sclove, *Democracy and Technology*, (The Guilford Press, 1995). There are important differences among these authors, but they are again here used to represent an ideal type.
- 41 This matter is complicated not only by the environmental impacts of these commodity chains, which will not be wholly erased by a political economic reconfiguration. The problems of the division of labour also remain in large-scale commodity chains that are predicated upon specialisations that require many years of intensive and expert training. Graeber dismisses this issue as a fallacy. But, it is not merely a question of ‘who will do the dirty jobs?’ Graeber claims that ‘all the world’s top scientists and engineers would have to do them too...’ (op. cit., p. 82). This presumes that such specialist positions will be preserved in a post-revolutionary anarchist society. We need not only be concerned only with whether nanoscientists will be in the mine pits. Will the miners be doing nanotechnology?
- 42 Janet Biehl, *The Murray Bookchin Reader* (Cassell, 1997) p. 100.
- 43 Ibid. I have to quote this characterisation from his long-time confidant and collaborator, because such a reduction would seem unfavourable if I offered it as a critic. While brief and lacking nuance, this is indeed the crux of Bookchin’s argument for post-scarcity.
- 44 For a lengthy discussion, see David Watson, *Beyond Bookchin* (Autonomedia, 1997). One need not share Watson’s own politics of technology, and certainly not his entire philosophy, in order to recognise the cogency and validity of his thorough refutation of Bookchin’s liberatory technology. *Beyond Bookchin* deserves revisiting with a perspective critical of its essentialising tendencies but sympathetic to his important inclusion of early literature in technology studies (including, i.e. Lewis Mumford, Jacques Ellul, Langdon Winner).

- 45 For a critique of these narratives in anarcho-primitivism, see Theodore Kaczynski, 'The Truth About Primitive Life: A Critique of Anarcho-Primitivism', in *Technological Slavery*, edited by David Skrbina (Feral House, 2010) pp. 126-89. For a critique of the 'original affluent society' narrative many primitivists rely upon, see David Kaplan, 'The Darker Side of the "Original Affluent Society"' *Journal of Anthropological Research*, 56, 3, pp. 301-24. My citation of these is not an endorsement of the criticisms, wholesale.
- 46 A more interesting one is that of Walter Benjamin's in 'Theses on the Philosophy of History' in *Illuminations: Essays and Reflections* (Schoken Books, 1969) pp. 253-64.
- 47 Langdon Winner, *Autonomous Technology* (MIT Press, 1977) p. 240.
- 48 Michael Truscello, 'Imperfect Necessity and the Mechanical Continuation of Everyday Life: A Post-Anarchist Politics of Technology', in *Post Anarchism: A Reader*, edited by Duane Rousselle and Süreyyya Evren, (Pluto Press, 2011) pp. 250-59.
- 49 Ibid., p. 253.
- 50 Bookchin, cited in Truscello, p. 251.
- 51 Truscello, p. 251.
- 52 Ibid.
- 53 Ibid., p. 256. Truscello merely points toward a path and provides some conceptual tools, but does not provide many specifics. In this article, I do no more, but add some additional conceptual tools by demanding a focus toward scarcity and resource-based distributive justice.
- 54 Ibid., p. 257.
- 55 Ibid., p. 257
- 56 Gordon, 2011.
- 57 Winner, 1977; and Langdon Winner, *The Whale and the Reactor*, (University of Chicago Press, 1986).
- 58 Uri Gordon, 2008, p. 115.
- 59 Gordon, 2008, p. 115.
- 60 Winner, 1977, p. 173.
- 61 Ibid., p. 187.
- 62 Uri Gordon, 'Anarchism and the Politics of Technology', *Anarchy Alive*, October 2009, accessed at: <http://anarchyalive.com/2009/10/302/anarchism-and-the-politics-of-technology/>
- 63 It seems that in post-industrial society, everyone from Marcuse to Bookchin have abandoned this most central principle of anti-capitalist revolutionary thought.
- 64 Richard Sclove, *Democracy and Technology* (Guilford Press, 1995) p. 81.
- 65 See *Post-Anarchism: A Reader*; Saul Newman, *The Politics of Postanarchism* (Edinburgh University Press, 2010).
- 66 See Richard Day, *Gramsci Is Dead* (Pluto Press, 2005).

- 67 Consider here Marx's well-rounded individual who hunts, fishes, grazes cattle and critiques. This figure is an example of the post-revolutionary individual in communist society, absent of the division of labour. If we were to imagine the postmodern equivalent, we might get one who assembles 3D printers in the morning, codes in Ruby at noon, synthesises carbon nano-tubes in the afternoon, and criticises new media art in the evening. No amount of *access* to such specialisation would enable a human being to competently engage all these activities. Such an appropriately well-rounded individual for a world with a postmodern, 'advanced' technological infrastructure simply cannot exist.
- 68 I'm admittedly giving short shrift to fully articulating a vision of social justice or equality here.
- 69 These are influenced by Richard Scloves 'Design Criterion A', where 1 is a modification of his 'transcommunity technologies'; 2 is a modification of his 'individualized technologies'; and 3 is a modification of his 'communitarian/cooperative technologies'. See *Democracy and Technology*, p. 62.
- 70 See Sclove, 1995, p. 98 for a brief explanation of his criteria with reference to further explanations available elsewhere in the text.
- 71 See Winner, 1977, pp. 326-7.
- 72 Ibid., p. 326.
- 73 Ibid.
- 74 Authority here is considered broadly, to include the domination over another species or another generation. If there is any one thing the discourse of sustainability has brought forward from which anarchists should benefit, it is the idea that communities who extend beyond the capacities of their ecosystem exact a form of domination over that ecosystem, surrounding communities and ecosystems, as well as future generations of humans, other species, and their environs.
- 75 Frank Harrison, 'Anarchism and Technology', in *Democratic Theory and Technological Society*, edited by Richard B. Day, Ronald Beiner, and Joseph Masciulli, (M.E. Sharpe, 1990).
- 76 In Sclove, 1995, p. 11. This is considered at length by Langdon Winner in *The Whale and the Reactor*, particularly in section I of the text.
- 77 The important influence of Foucault (i.e. that from the 'Method' section in *The History of Sexuality, Vol. 1*, [Vintage Books, 1990]) in recent postanarchist developments punctuates this point.