

## Democratic Technology, Population, and Environmental Change

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T. C. Boyle's *A Friend of the Earth* (2001), tells the story of Tyrone Tierwater, a one time monkeywrencher and environmental avenger for "E. F.!" (Earth Forever!) who we first meet in 2025 in his mid-seventies. Tierwater is now working for a character based on Michael Jackson, who in his semi-retirement has employed the elder eco-warrior to help save some of the last remnants of a few dying species – warthogs, peccaries, hyenas, jackals, lions and what is likely the last Patagonian fox. The not too distant environmental future painted by Boyle is a disaster. Global warming has finally caught up to us with a vengeance and even the secure shores of the U.S. are wracked by unmitigated cycles of flooding and drought seriously degrading most semblances of life as we know it.

To be sure, though, people, and some versions of progress, go on. While most affordable food and drink is limited to some combination of catfish and sake (very little else having survived decades of disastrous weather and a series of crop blights), and there are constant threats of new strains of life-threatening and highly contagious diseases, suburban development continues and new humans come into existence with the promise, at least in the developed world, of longer life spans. But Boyle does not give us anything like the overly optimistic views expressed by some conservative columnists who dismiss the need for global climate treaties; this is not an environmental future that is only felt with difficulty in the underdeveloped south requiring simpler economic readjustments for Americans without a substantial shift in lifestyle. The world

has changed in this story for the worse and it is felt by everyone regardless of place or class.

While we follow what appears to be the last major transition in Tierwater's life, we learn the major events of his past through a series of interspersed chapters set in the late 1980s and early 1990s. In these parts of the book Boyle fictionalizes *Earth First!* into *Earth Forever!*, and satirizes what has so far counted as the heyday of radical environmentalism along with its fictional roots in the works of writers like Ed Abbey. The portrait however of the radical environmentalist as a somewhat young man is not unsympathetic. We are given ample descriptions of situations which explain how someone could go from living a mild-mannered suburban domestic existence to becoming a saboteur ready to create property damage to extractive industries and utilities whenever possible. Boyle also throws in some nice details to those with even a passing understanding of current environmental history, turning Tierwater's daughter into a version of Julia Butterfly Hill, acclaimed tree-sitter. But unlike Hill, Sierra Tierwater does not survive her multi-year stint in a giant redwood to write a best selling book. After three years in the late 1990s, and many close calls with a forest company intent on dislodging her, she slips and falls while talking to her father on a cell phone. The tragedy leads to a depression resulting in Tierwater's most ambitious and certainly inhumane attempt at ecoterrorism described in the book.

It's called the "Cachuma Incident," a plan by Tierwater to poison the water supply of Santa Barbara with tetrodotoxin, "twelve hundred and fifty times more deadly than cyanide . . . mutated in the lab to adapt itself to fresh water" (277). While Tierwater describes it as his darkest moment, in the end he doesn't go through with the plan. But in describing why he doesn't do it we are offered a caricature of what many believe to be the classic dilemma of the

committed environmentalist: “Though I’d steeled myself, though I seethed and hated and reminded myself that *to be a friend of the earth you have to be an enemy of the people*, . . . though this was the final solution and I the man chosen to administer it, when it came right down to it, I faltered. I did. Believe me. Give me that much at least” (Ibid., my emphasis).

Must one be an enemy of the people to be a friend of the earth? The annals of environmentalism are certainly littered with misanthropy in various forms and guises. But we do well to wonder whether it is necessary or helpful for the sake of the future of the planet to take such positions. By the end of this story we are given no easy answers. Tierwater, when confronted, admits that the sabotage he did manage didn’t do much to prevent the disastrous state of the world at 2025. Would more monkeywrenching have made things different? Would the poisoning of a major metropolitan water supply or any other effort to substantially decrease the human population have made any difference? Would even a quicker transition to more sustainable technologies – which we do see happening in this story out of sheer necessity – change the outcome? Boyle’s answer seems to be no. He may be right. On that score we’ll have to wait and see.

I start with this summary of *A Friend of the Earth* in part because I think it helps us to remember that all environmental writers engage in different forms of fiction, and by this I don’t just mean novelists like Boyle and Abbey. Like so many issues involving advocacy, the articulation of an environmentalism often involves a form of prediction where we try to warn our fellows of a possible future, painting a picture of how we can get there if it is good, or how to avoid it if it is bad. While among environmental scientists, sociologists, historians, economists, philosophers and the like, it is not so much a literary imagination that is employed in this task, it still involves the creation of a fictional future,

even where that future is based on empirical evidence or rational explanation. Because most environmental writers are fundamentally normative in their outlook – not content to just describe some bit of the world but also to try to improve it – much environmental writing, academic or not, takes on the character of a morality tale. While most of us are not as creative as Boyle is in *A Friend of the Earth*, we still tell stories about possible futures which either will redeem humans or damn us personally or collectively.

In chapter three of *Questioning Technology* (1999) Andrew Feenberg takes up one of the central morality tales of the environmental movement and it comes surprisingly close to the question the Cachuma incident asks us to consider: Must one be an enemy of the people to be a friend of the earth? Specifically, Feenberg takes up one of more famous incidents in the environmental literature where the veracity of this question was at issue, focusing on an analysis of Paul Ehrlich's conservative environmental politics and his debate with the progressive Barry Commoner. Ehrlich's political program, responding to what he saw as the devastating environmental effects of population growth, assumes, according to Feenberg, a stagnant model of technological evolution in the face of environmental problems and, in effect, an affirmative answer to the question raised above. Though certainly Ehrlich would never advocate something like the Cachuma Incident he did see numbers of people as the root of our environmental problems. In contrast, Feenberg presents Commoner's form of progressive environmental socialism as a precursor of the current claim increasingly found in environmental circles that certain forms of modernization are compatible with environmental sustainability. But while Feenberg lauds Commoner's broader views of the possibilities of technological reform he critiques Commoner's solutions to environmental problems. Commoner sought a basis for the resolution of environmental issues in labor solidarity, arguing that

environmentalism was in the best interests of workers. The convergence of labor and environmental interests in new movements against globalization notwithstanding, an environmental labor movement has not emerged. Instead Feenberg imagines environmental issues more appropriately as an impetus for a democratic reform of technology. Environmental problems create pressures on consumers and citizens which can help to motivate a new technological politics. In turn, the ends of technological reform will be an environmentally sound technology.

I will first examine the differences suggested by Feenberg between the positions represented by Ehrlich and Commoner, tease out the role that the Ehrlich-Commoner debate played in the current configuration of environmental politics, and its relation to the misanthropic narrative I have illustrated above, and then examine the broader place of environmental politics in Feenberg's theory of the democratic reform of technology. At the end I will briefly offer my own views on how to resolve tensions between ecology, technology, and democratic theory. Feenberg embraces a process of democratic rationalization aimed at helping to reform technology around issues such as environmental concern. For me the prior question is not how environmental issues can motivate the reform of technology but instead first, what sort of practices will motivate concern for the environment. Because I think there is a preference in Feenberg's analysis for democratic forms of environmental management, I'm hopeful that my own way of looking at this cluster of concepts is ultimately compatible with his.

### **Commoner vs. Ehrlich**

Feenberg claims that the debate in the 1970s between Paul Ehrlich and Barry Commoner was critical for environmentalists since it was one of the first illustrations of key disagreements which would later shape the various sides of the environmental movement over the possibility of the reform of technology. In assessing this claim I want to first look at the focus in this debate on population issues and then the broader implications of this exchange on the reform of technology, which is Feenberg's stronger claim in the chapter. Again, Ehrlich's position famously focused on population issues, leading him to a preference for at least a kind of "lifestyle politics" which may have put to the side substantive critiques of the political and economic systems which may perpetuate environmental problems. At worst, depending on one's views on such matters, his position may require the creation of coercive policies designed to achieve desired population goals. Commoner disagreed with this approach, seeing the road to solving environmental problems instead in a democratic process of reform of social, economic, and political structures. "It's the economy stupid!" we can imagine Commoner saying, in response to Ehrlich's campaigns for individual responsibility in limiting what he believed to be the key factor in environmental problems.

Feenberg sees a repetition of this debate in the later differences evinced between Earth First! (more like Ehrlich), and the environmental policies championed by the Oil, Chemical, and Atomic Workers union (more like Commoner), as well as the debate between the "Fundis" and "Realos" in the German Green Party (47). He is certainly correct that calls for an undemocratic form of population control has shaped some poles in the movement. Feenberg cites for example the famous letter from "Miss Ann Thropy" to the Earth First! newspaper claiming that AIDS was a natural self-regulating mechanism on exploding populations in Africa.

But it is arguably the case that even a casual mapping of the terms of the debate between Ehrlich and Commoner on population control onto other important debates in the last few years does not quite work, or at least does not do justice to the complexities of these issues in the environmental movement. Mark Dowie provides a more thorough chronicle of the issue of population in his recent work on the history of environmentalism and confirms that indeed population concerns have been at the forefront of some splits in the movement (Dowie 1996, 161). Even so, Dowie also tells us that most mainstream organizations such as the National Audubon Society, the Natural Resources Defense Council, and the Wilderness Society, do not endorse anything like a Malthusian approach to population growth (Ibid., 162). Most of these groups would have to be characterized as embracing a position in-between Ehrlich and Commoner entailing a combination of concern over both population pressures and economic and political structures that encourage over-consumption.

It is fair to say however that the Sierra Club has been plagued with this issue for much of its recent history. But as Dowie reports, debates in that organization have not been about population control *per se* (at least not on individual responsibility for birth rates) but rather about immigration (Ibid., 165-166). Prominent activists in the Sierra Club have been heavily involved with the Federation for American Immigration Reform (FAIR), a group that tries to make anti-immigration sentiments “palatable by forming coalitions with environmental organizations” (Ibid., 163). Frank Orem, an active member of FAIR was also chair of the Sierra Club’s national population committee and managed, with the help of others, to get the issue on the table by both the national organization and local chapters. This process led to a disastrous tainting of the Club as plagued by racists. Several highly visible referenda by the club over proposed endorsements of immigration restrictions in California have

been very embarrassing for the membership. But at least as Feenberg represents the Ehrlich-Commoner debate, the issue between them was not national borders so much as international population policies. Still, we can read the Ehrlich-Commoner debate as presaging this divide.

Do such arguments go beyond the Sierra Club? Feenberg is correct that Earth First! and other radical environmentalists have said embarrassing things about population and immigration in the past, but it is a mistake to define these groups in terms of the occasional ramblings of some of their members. We should remember that Murray Bookchin has made an additional career for himself by exaggerating the importance of the Miss Ann Thropy articles and similar regressive claims by Dave Foreman, one time Earth First! leader, and Abbey. But his criticisms, even when they provide helpful cautions against misanthropy in environmental circles, sound like the construction of absurd straw men when they are focused on these examples (see Light 1998, especially introduction). When it got right down to it, the anti-humanist elements of Earth First! lost their struggle for the soul of the organization (as they do in Boyle's narrative as well) which is now more oriented toward issues that appear to be lifted from the pages of Commoner and Bookchin himself. And when Bookchin finally got around to confronting Foreman face-to-face on these questions, rather than generalizing from a few lines here and there, he came across as more conciliatory toward Foreman than anything else.

When it gets right down to it we shouldn't define the environmental movement by reference to the history of radical environmentalism. I made this mistake in my earlier work - seeing the debate between social ecologists and deep ecologists as definitive for understanding environmental politics - a mistake which I have tried to overcome. Bookchin's organization in this divide, the Left Green Network, is now practically defunct with remnants mainly at the

Institute for Social Ecology. Earth First! made a lot of noise but wound up having less impact in the long run than promised, though the U.S. government played a role in its retrenchment. Even if population issues were at the center of debates between Earth First! and its opponents, this really doesn't amount to very much on the larger environmental scene. The more radical groups in that arena now, such as the Animal Liberation Front and the Earth Liberation Front, while probably seeing population as important do not orient their direct action campaigns along these lines. Even though population has surely divided environmentalists in a variety of guises, by and large the range of mainstream environmental organizations see population control as a part, but only a part, of broader environmental initiatives, and certainly not the most important aspect of those initiatives in terms of their policy agendas. Much more important are the sorts of concerns which require large-scale economic changes such as support of a comprehensive agreement on greenhouse gas emissions.

Remember though that for Feenberg the issue is not just population as such but more accurately what the debate about population between Commoner and Ehrlich has to say about the possibility of the social control of technology. According to Feenberg:

Fundamentalist environmentalism emphasizes control of growth because it can conceive of no change in the industrial order that would render it ecologically compatible. Technological determinism thus leads straight to a Malthusian position for which environmental and economic values must be traded off against each other. This is Ehrlich's position. Commoner's contrary views depend on a non-determinist philosophy of technology which admits the possibility of rational technical transformation. Only on this condition can growth and the environment be reconciled (47).

Conceived as such, Ehrlich's views are closer to the old determinism of Jacques Ellul and Martin Heidegger and Commoner's position is closer to Feenberg's own views (absent the prediction of class solidarity on this issue). Feenberg goes on to argue that for Ehrlich technology was a "naturalized process" (54) producing one kind of thing without serious consideration given to alternative technologies which could ease the environmental burden of increased populations.

This mapping of a direct relationship between conceptions of the possible reform of technology and political responses to environmental problems is extremely helpful. Feenberg's contribution here goes furthest in helping us to understand the larger environmental implications of different philosophies of technology (a point I will return to briefly below). But as an indication of the terrain up for grabs in the environmental movement, this conceptualization needs some reworking as well.

If we take Feenberg's suggestion at the opening of this chapter that Ehrlich's position emerges later in the politics of Earth First! and the German Fundis in the Green Party, a problem arises for his later explanation of the relationship between technology and the politics of population control. By and large, Earth First!, the Fundis and most of the groups who have endorsed some form of population control, are supporters of alternative technology not simply as a lifestyle choice but as a larger critique of industrial society. It's good to keep in mind that the FBI sting operation that finally hobbled Earth First! involved an alleged sabotage of a power generation plant. It would be hard to imagine Ehrlich endorsing that particular move. Neo-luddism is often mistakenly lumped with the alternative technology movement in the pages of radical environmental journals, but the later certainly endorses a view that substantive

changes in technological culture are possible which belies a kind of technological meliorism rather than a determinism.

If we want to find environmentalists who seem to accept Ehrlich's notion of a value-free technology, we have to look to the so called "third-wave" environmental groups which emerged in the Reagan era (such as the Environmental Defense Fund (EDF) and the National Wildlife Federation (NWF)), who have cozied up to business interests. Dowie argues that figures such as Jay Hair at the NWF, in embracing an American corporate ideology as a way of trying to get corporations to buy into environmentalism, have discouraged "the participation of their members and the public at large in the assessment of the environmental impacts of new technologies" (Dowie 1996, 116). But the NWF does not embrace the lifestyle politics of Ehrlich and has more in common with Commoner in terms of its assessment that the root solutions to environmental problems must come out of the economic sector. While certainly their conclusion on how to use the economic system differs from Commoner's (though it should be noted that Feenberg points out that Commoner's more recent work accepts the market as one tool among others for achieving sustainability) the structure of the assessment is the same as Commoner's, and different from Ehrlich's.

It may be helpful here to employ a distinction I used some years ago to understand the differences between deep ecology and social ecology. If we are to look beyond the particular debates between Bookchin and deep ecology founder Arne Naess to see the larger picture of the philosophical positions at odds here, it helps to think of the deep ecology-social ecology debate as being a form of the larger disagreement between two groups I called "thin" environmental materialists (because their materialism does not necessarily imply an ontology) and environmental ontologists (Light 1998, chapter eleven). Environmental

materialists argue that the appropriate human response to environmental problems must primarily involve an analysis of the causes of those problems in the organization of human society through the material conditions of capitalist (or state capitalist) economies, and the social and political systems which sustain those societies. Material conditions, such as who owns and controls the technological processes that are used to stimulate economic growth, expand markets and consume natural resources, are for these thinkers the starting points for unpacking the complex web of environmental problems. In contrast, “environmental ontologists” see more potential in diagnosing environmental problems as primarily involving individual human attitudes toward nature. For environmental ontologists, social, political, and material problems are the symptom of a larger crisis involving the relation of the self with nature, not the root cause. The primary cause of environmental problems involves some assessment of our disconnection from nature, spiritual or otherwise. As such, the principle location of solutions to environmental problems for ontologists is to be found in changing the “consciousness” (for lack of a better term) of individual humans in relation to the non-human natural world.

Seen through this distinction, Commoner, Bookchin, and the EDF count as environmental materialists and Naess and Ehrlich count as environmental ontologists. Of course, there will be differences between theorists within these two camps. Ehrlich has nothing like the full blown philosophical ontology we find in Naess, but still, as Feenberg points out, he did argue for something like a new set of “spiritual values” as a priority over economic and political reform that resonates with my description of an environmental ontology. Unfortunately for Feenberg’s argument, the view of technology as a naturalized process is found here across the divide between Ehrlich and the EDF. Counterfactually, we can easily imagine the EDF in more or less the same form as it is today, without this

emerging commitment to the neutrality of technology. In fact, other third wave environmental groups, as Dowie reports, do not share this view on technology. While certainly there is more than one way to parse out different environmental views from each other, here we have an indication that when it comes to the role of technology in environmental questions we have something like three or four groupings and not two. Between the “naturalized” technology of Ehrlich and the non-determinist substantivism of Commoner there are the bulk of environmentalists who endorse a non-determinist substantivism even if they are not always as democratically inclined as Commoner.

Finally, there is also a minor quibble that could be raised with using the differing views of Ehrlich and Commoner on technology as a benchmark for assessing the environmental consequences of future developments in philosophy of technology (a point, as I said above, that I see as a more promising outcome of Feenberg’s analysis here). In a response to a variety of critics, Albert Borgmann (2000), who Feenberg groups with Ellul and Heidegger as a determinist and criticizes in a later chapter, clearly embraces the alternative environmental technologies endorsed by critics such as Gordon Brittan and Jesse Tatum. Borgmann’s admiration, for example, for Brittan’s particular embrace of wind power as an alternative energy technology is predicated on its affinity with Borgmann’s notion of focal things (Brittan’s windmills are better incorporated into the local landscape and culture than the massive windmill projects in California). Still, we have with Borgmann a nascent attempt to consider larger societal changes more consonant with Commoner’s views than we might have predicted from Feenberg’s analysis.

This is by no means a devastating critique for the role of the Ehrlich-Commoner debate in the picture that Feenberg paints. Feenberg admits that the debate has almost been forgotten today. And yet, viewed as a precursor to the

later important debates in the environmental movement, it seems to me more rife with exceptions than with rules; less a guidebook to future debates in the movement than Feenberg might like. What we do have here is a good critique of Ehrlich, and nothing here takes away from that critique or suggests that the democratic reform of technology that Feenberg imagines is estranged from environmental concerns. Though I will not go into the issue at any length here, however, I think that if we were going to look for debates that have both oriented and divided the contemporary environmental movement we would do better to look at disputes involving issues of race and environmental justice.

As I suggested earlier, the population debate in the environmental movement has become more specifically an immigration debate. Anyone who might suspect that there is some connection between the emergence of immigration as a focal point for right-wing environmentalists and the rise of the environmental justice movement would be on the right track. Again, Mark Dowie, whose work chronicles the progressive backtracking of the environmental movement since the early 1970s, ends his book *Losing Ground* on a note of hope because he sees a rebirth in the environmental movement around issues of justice rather than lifestyle politics. Beyond the differing ideologies of animal rights activists, Earth First!ers, eco-socialists, liberal environmentalists, and neo-luddites is an emerging recognition that environmentalists can and must rally around a common call for justice (Dowie 1996, 262). Following Dowie's lead, I would suggest that the principles of environmental justice adopted at the First National People of Color Environmental Leadership Summit in October 1991, and the Sierra Club centennial address by Executive Director Michael Fischer in May 1992 - inviting "a friendly takeover of the Sierra Club by people of color" - to be the beginnings of the debates that will shape the movement into this new century.

## Democracy as a Means but for What Ends?

I now turn to the more important question of the role of environmental issues in Feenberg's larger argument in *Questioning Technology*, concerning the importance of and possibility for the democratic reform of technology. Even a cursory glance at the book reveals that the reform of technology is the principle focus of Feenberg's work (both here and in his last two monographs), not recent environmental history. As I said at the beginning, Feenberg's basic idea on the relationship between the environment and technology is that environmental issues will help to press the necessity of the democratic reform of technology. In turn, a more democratically oriented technology will produce greener technologies which will be better for the environment (220). For Feenberg, the democratic rationalization of technology does not amount to a naïve attempt to throw open every technological question to non-experts. Democratization and participation can come in at more reasonable points in the process of design and production and can involve many representative steps, such as improving the influence of professional organizations in the process.

What bothers me at times though is the sense that Feenberg appears to see environmental reform as a black box in this process, or better yet, a green box. Environmental issues are potentially reduced to a motivation for democratic reform and a beneficial byproduct of that reform. Environmental sustainability is therefore possibly simplified in this process to a mere end. But there are many different ways that the environment could be renewed and many different ways that this end could be achieved. I would argue that what we have to think about is not just the democratic reform of technology as an end friendly for and responding to environmental pressures, but the form environmental renewal will

take as an end as well. I have every reason to think that Feenberg would agree with such a claim.

Democracy and ecological concerns, as Feenberg points out in his analysis of Ehrlich, do not always go hand in hand. From Malthus to William Ophels, there have been plenty environmental theorists who have concluded that a strong, often undemocratic, state is the only answer to environmental ills. What makes Feenberg's views different? Clearly it is the priority of democracy to his notion of the reform of technology. But how far does that priority get us? Let's restate the place of environmental issues in Feenberg's scheme. Environmental concerns enter Feenberg's theory on one end as part of the motivation for the reform of technology, and leave on the other end, as products of a reformed technological processes. But viewed thus, there is an unambiguous place for democratic concern only at the front of this process: democratic movements for the reform of technology motivated in part by environmental problems. What guarantees do we have however that the end products of a more democratic process will be more democratic environmental technologies? The only claim that could be made on the face of it is that the production of undemocratic green technologies out of a more participatory process of technological design would be inconsistent with the democratic foundation of the reformed technological process. A technological process rooted in democratic reform would be irrational to select undemocratic technologies as an output.

Perhaps it is too much to ask that the green technologies produced by this process be guaranteed to be democratic. After all, the virtue of democratic theory is that the process is more important than the product: we think a decision based on democratic principles is better simply because it came out of a democratic process even if its products are not as efficient as the product of a non-democratic process. For example, a train schedule that was more responsive

to the needs of local communities is better even if the trains do not always run exactly on time, as opposed to a fascist train schedule where the trains always run on time but only in locales designated by a tyrant. But in the case of environmental issues the priority of democracy is crucial not only as a valuable practice in itself but also perhaps as a guarantor of long term environmental sustainability.

Before explaining this point further it will help to try to figure out what is meant by “democracy” in this discussion. Talking about “democratic technologies” and “democratic practices” can be very vague and confusing. Feenberg is clear however that when he talks about democratic rationalization or the democratic reform of technology he is not embracing a thick or strong account of democracy to the exclusion of all else. He does not maintain that all technological decisions need to be directly democratic producing a prescribed set of values. Democracy for Feenberg seems to mean something simpler like “participation.” A decision is democratic if it is open to participation by a range of agents in some process, it is undemocratic if it is closed to participation.

This understanding sounds right to me. Democracy has become a mystified term in some contemporary schools of moral and political philosophy. As an important case in point we often find overly prescribed notions of democracy in the technology literature. Richard Sclove’s work is sometimes accused of this problem. A good example is also found in F. N. Laird’s treatment of participatory processes in technological decision making. Laird describes democratic participation thusly:

Truly democratic participation changes the outlooks and attitudes of participants. It makes people more aware of linkages between public and private interests, helps them to develop a sense of justice, and is a critical part of the process of developing a sense of community (Laird 1993, 345).

But clearly this is too much to expect out of all democratic processes.

Unambiguous cases of democratic practices, such as voting, are not made undemocratic if “the outlooks and attitudes” of the participants are not changed, nor when participants do not develop a sense of “justice” or “community” following participation in such practices. Voting is still democratic even if it is only merely participatory. Surely democratic practices can lead to such outcomes beyond an occasion for participation, but they need not. This is not to say that I oppose thicker aspirations for our understanding of democracy. I have recently advanced versions of civic republicanism specifically for environmentalism (see Light 2003). We are mistaken though if we claim that all democratic practices must meet those aspirations in order to count as democratic practices.

If democratic technologies can be minimally understood as those that admit the possibility of public participation, what is the importance of participation to environmental processes? Feenberg identifies the importance of such practices in their potential to aid in a cultural transformation to one that would demand both more democratic and more sustainable forms of technology. If we assume that current unsustainable technologies of production and consumption will never change then Ehrlich’s worries about growth in population become difficult to answer. More people will mean more intensive use of such technologies, more drains on natural resources and hence more environmental devastation. While such a forecast is not true across the board – Feenberg gives a good example of how agricultural technologies of even the worst sort are often underutilized now – it will be true for many quasi-public goods which have discernable limits absent changes in regulation. Take water for example. In some parts of the U.S. major water shortages have been the result of over utilization which can be indexed to population growth. But such

pressures do result in new technologies which in turn decrease the impact of population pressures on these problems.

The question for a more ambitious form of sustainability is how to generate changes in technology prior to the point of crisis in delivery of environmental services. Commoner, as Feenberg points out, did not sufficiently appreciate the importance of cultural transformation to spur changes in technology, lumping too much of such concern into an uncharitable assessment of lifestyle politics. But later Commoner did revise this view, and as Feenberg puts it, once he became “involved with movements against toxics and for recycling, he too [came] to recognize the importance of voluntarism in the environmental movement, not for the sake of self-imposed poverty, but as a source of cultural change” (67). This view certainly seems right to me. As I have argued at length elsewhere, public participation in environmental processes is important because it does help to create a “culture of nature,” or at least a critical mass of people who have a stake in the landscapes around them and hence an interest in beneficial environmental reforms, including moves to more sustainable technological infrastructures (see Light 2000). When such interests are created, we need not resort, as Feenberg puts it, either to political or moral coercion in opposition to people’s perceived interests or to “market incentives,” to trick them into signing on to a range of environmental ends (66). Instead such practices create a rational scheme in which we may act without requiring such top-down stimulants.

What kinds of practices would get us this kind of cultural change, opening the door to a broader embrace of green democratic technologies? Feenberg seems to be happy with the outcome of technological reform residing in democratic control over environmental decision-making – the setting of priorities, avenues for development of green technology, etc. The goal could

however be democratic participation in on the ground environmental management as well which might go further to continuing the kinds of cultural change needed to spur more technological evolution. One example of a practice that has this potential is public participation in a range of projects known as “restoration ecology.”

Restoration ecology is the technological practice and science of restoring damaged ecosystems, most typically ecosystems which have been damaged by anthropogenic causes. Such projects can range from small scale urban park reclamations to huge wetland mitigation projects. These projects admit to large-scale public participation. In the U.S. for example, the cluster of restorations known collectively as the “Chicago Wilderness” project in the forest preserves surrounding the city, have attracted thousands of volunteers to help restore the native Oak Savannah ecosystems which have slowly become lost in the area (Stevens 1995).

While there are many things that could be said about it, in general, restoration makes sense because on the whole it results in many advantages over mere preservation of ecosystems that have been substantially damaged by humans. But it must be remembered that this is a technological practice, very different in kind than acts of environmental preservation. Restoration requires more intense and active forms of environmental management than many other comparable environmental projects. As a technological practice then, what are its goals? Clearly the goals are to create something as close to the original as possible that is able to maintain and regenerate itself in the long run. In this sense, not only must the technology produce a sustainable environmental outcome, but the technology itself needs to be self-sustaining and this will require a different kind of technology. But the goal should not just be to create new landscapes that can perpetuate themselves, but to create forms of producing

new landscapes which will stimulate a stronger human cultural relationship with those places.

If we were to only focus on the fact that restoration is taking place and chalk that up as proof of the importance of the sort of environmental issues which will motivate a democratic reform of technology, we would be missing something quite important. What we would be missing is that the fact that landscapes are being restored is not nearly as important as the choices that we have to make about what to value in those restoration projects which produce those landscapes. Seen as a technological practice it is easy enough to focus on the end products of restorations only and then use this focus to endorse the best technologies which can produce the best restored landscapes. I would argue however that as a human technological practice that involves our cultural connection to nature, we need to think about what values are produced in that practice and how those values can best be made use of in the broader, long-term project of creating a sustainable society. The kinds of technological interventions we can make through restoration need to be gauged so that they admit to creating opportunities for public participation in these projects if we are to see them fulfill their full cultural potential.

When restorations are performed by volunteers then they are, in the way I have described the role of participation above, democratic. The value of this participation is not however justified in a vacuum. In the case of restoration, participatory practices get us better restorations because they create the sorts of cultural changes that Feenberg and I agree are a necessary prerequisite for the democratic reform of technology. Much of my work over the past several years has been dedicated to proving the proposition that restorations that are not produced by volunteers do not capture this democratic value and do not

necessarily aid in the creation of communities committed to the protection of their local environments.

Stepping back from this example then, what is needed as an outcome of the democratic reform of technology is not just more sustainable technology, in terms of their impacts on the environment, but technologies which are more amenable to strengthening our cultural ties with natural systems rather than separating us from them. For example, we don't just want to replace unsustainable agricultural practices with new ones which are lighter on the land and less likely to compound the environmental impacts of the addition of more users on a food delivery system. What is ideally needed are agricultural practices which help to remind people of their role in the food production process, and, if possible, give them a role in that process as stewards of their environment. In the case of restoration what is needed is the development of technologies that make it easier for people to help to maintain the ecosystems around them. This is not to say that we won't achieve sustainability until everyone raises their environmental consciousness to the point where they are all made aware of their individual impacts on the environment. I for one am more than happy with the kinds of structural changes in development patterns, for example, which garner energy savings without requiring people to choose to live differently than they would otherwise (such as encouraging more dense development in cities). But, where possible, we would do well to make it easier for people to insert themselves into the environmental processes around them and thus aim to stimulate the creation of environmental technologies which are more conducive for those kinds of relationships.

Given the cultural importance of encouraging actual participation in local environments, I would argue that we should not be asking only what we want environmentalism or environmental issues to do for us with respect to the reform

of technology but instead we should first ask what sort of practices will produce a democratic environmentalism that in turn will shape the future direction of a democratic technology. Such a view would be consistent with Feenberg's idea of democratic rationalization, but it could be made more explicit. If environmentalism contains its own internal democratic end (here, the value of participation in local environments) then this end must be prioritized in the democratic reform of technology. There is a bit of chicken-and-egg reasoning here. Environmental ills will only serve as a motivation for technological reform if we feel a stake in environmental problems. Feeling a stake in environmental problems may require participation in nature in a direct sense. But democratic technological reform may be a key for encouraging participatory technologies and systems in environmental circles. There is no necessary paradox here, only a cautionary tale that democratic practices must become the glue that holds together reform of technology and renewal of the environment as these two sets of practices mutually effect each other.

Let's go back now to the beginning of this chapter. We do not need to be an enemy of the people in order to be a friend of the earth. Whatever it means to be a friend of the earth (and to be truthful, I've never quite understood the sentiment) requires instead that at least some of us engage in a cultural connection with the broader aims of environmentalism expanded to include the ends of humanism: building more just and sustainable communities of persons. At the end of *A Friend of the Earth*, it is Tierwater's personal connections to his ex-wife and now deceased daughter that make it possible for him to start over and to see the promise of humanity even in the face of the great peril it has created. Though we are not offered an easy happy ending, at least we get a glimpse of an important morality tale that all of us should face: to be more morally responsible in relation to our effects on the planet we must form connections not with some

abstract conception of nature but more concretely with each other as inheritors of the conditions we have created for ourselves. Perhaps this is the story we need to be telling each other more often.

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