

# Toward a More Democratic Ethic of Technological Governance

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*Recent scholarship in technology and society studies has given attention to the notion of technological citizenship. This article seeks to further integrate perspectives on this topic with theoretical contributions about the development of moral autonomy. The author challenges the presumption that the strategy of expanding opportunities for participation in technological decision making will in itself develop people's autonomy and citizenship. He argues that concurrent efforts must be made to democratize the political-economic structures of key technologies and to help people prepare morally for citizenship roles in governing these technologies. On this basis, a series of initiatives are suggested.*

## Introduction

A growing amount of attention has been devoted to what it means to be a "citizen" of technological society. This attention is a direct, if not always explicit, outgrowth of the realization that technologies, especially when embedded in large-scale complex systems, pose dilemmas for how we govern and are governed by some of the most significant and powerful institutions in our time. A conceptual framework developing around notions of *technological citizenship* contributes to our understanding of both the problems and the possibilities of greater participation in the making of choices that powerfully influence the shape and texture of contemporary life (Frankenfeld 1992; Dahl 1985; Sclove 1991, 1993; Laird 1993). Yet, insufficient attention has been focused on the ethical implications of complex technological systems and of the reforms (or alternative technologies) envisioned by various thinkers wishing to make these systems more democratic<sup>1</sup> and reflective of human ends.

In this essay, I do not intend to restrict the meaning of ethics to the choices and actions of individuals nor do I intend to create a dichotomy between

ethics and politics.<sup>2</sup> Ethical issues transcend the different levels of human organization and, therefore, *political* systems embody *ethical* systems.

Analyses of the current technological order focus on the repression and denial of individual *autonomy* as the most undesirable feature of this order and formulate accordingly their suggestions for change. However, the meaning of autonomy at different levels of ethical inquiry has received insufficient attention. How does autonomous development occur among the adult members of society? How can the society realize more authentically participatory governance of technological institutions?

This essay builds upon earlier work by injecting an *ethical* perspective into the discussion of some of the most pressing *social and political* challenges of our time.<sup>3</sup> The goal is twofold: (a) to deepen our understanding of the ethical questions and problems raised by proposals to expand citizen participation in the governance of technological systems, and (b) to incorporate insights and theories of how people's ethical orientations develop (or fail to develop) into the discussion of how to construct and reconstruct these technological systems according to democratic values and criteria.

The essay attempts to integrate "micro," that is, *intra- and inter-psychic*, and "macro," that is, *political-economic*, conceptions of autonomy into a more holistic "psychopolitical" perspective on technological citizenship and governance.<sup>4</sup> The focus of attention shifts thereby to a sphere of human experience typically overlooked in political and psychological analyses of autonomy: the space where the inner and outer worlds of experience intersect. By focusing on autonomy as well as power, responsibility, and participation, an integrative perspective becomes possible. As important passageways between inner and outer worlds, these themes are crucial to the problem of governance—both of oneself and of the larger social order. Attention to these themes will permit us to address a series of important questions:

- How concerned, or even aware, are we that our technologies often curtail our autonomy by restricting our opportunities for meaningful personal and social choice?
- How can we then understand either our unawareness or our "willingness" to allow this to happen?
- What is the relationship between the political forms embodied in various technologies and the development of individual and collective capacity for critical moral reflection and action?
- How might we structure opportunities for both our own moral development and the design of technologies in line with democratic principles?

This inquiry proceeds by reviewing the literature on the problem for autonomy posed by the pervasively authoritarian political complexion of

many technological systems on which society has come to depend. The literature on technological citizenship is then surveyed to provide a sketch of the possible means of confronting this problem. This is followed by a critical ethical evaluation of the issues raised by this literature. Finally the article assesses the implications of these ethical concerns for technological citizenship.

### **Technological Governance and the Problem of Technological Authoritarianism**

In *Autonomous Technology*, Langdon Winner concludes that most analysts of the social and political impact of technology have missed a subtle yet profound difference between the claim that “technology *requires legislation*” and the notion that “technology *is legislation*” (1977, 323). (quoted author’s use of italics) Winner argues that the politics of technology involves more than contemplating the occasional need for political intervention; larger, more complex technologies especially must be seen as political systems in their own right. His central theoretical tenet is that artifacts have politics:

Consciously or unconsciously, deliberately or inadvertently, societies choose structures for technologies that influence how people are going to work, communicate, travel, consume, and so forth over a very long time. . . . Because choices tend to become social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made. In that sense technological innovations are similar to legislative acts or political foundings that establish a framework for public order that will endure over many generations. (Winner 1986, 28-29)

According to Winner, a sociotechnical order embodies a constitution of sorts—“one that stands parallel to and occasionally overlaps the constitution of political society as such” (1986, 55).

The idea that sociotechnical order embodies a constitution is coupled to the notion that each major technological system implies a social contract: an implicit commitment to provide certain kinds of socially desired “goods” in exchange for certain kinds of participation in the maintenance of the system (Winner 1982, 272). Generally, this “participation” entails conforming to the various rules, roles, and relationships that work to preserve and enhance the system. Human autonomy is subverted by technological autonomy; the well-being and “freedom” of the participants is, in this scheme, a function of the well-being and freedom of the system itself.

### *Authoritarian versus Democratic Technologies*

When public life is supposed to be governed chiefly by democratic principles and institutions, the character and conditions of the sociotechnical order pose enormous contradictions. If it is true, as Winner contends, that "our instruments are institutions in the making" (1986, 54), then it becomes clear why the domination of large, centralized, hierarchical institutions has coincided with the growing importance of large-scale technics, systems far too complex to be governable by ordinary citizens.

This problem underscores a theme advanced by technological critics like Lewis Mumford (1964) and Jacques Ellul (1964) more than thirty years ago: large-scale technics embody some of the most insidious sources of tyranny in the modern world.<sup>5</sup> Of course, this is not a fair characterization of *all* technologies. As Mumford observed: "Right down to our own day, two technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centered, immensely powerful, but inherently unstable, the other man-centered, relatively weak, but resourceful and durable" (1964, 2).

Nuclear power provides the prototypical example of technological authoritarianism. In retrospect, given the convergence of national security and entrenched economic interests that sponsored it, it is remarkable that it was ever believed this technology would turn out otherwise. Despite promises of electricity "too cheap to meter," "peaceful" application of the atom has exacted a progressively steeper price, both financially and in terms of freedom to exercise technological choice. Born of "military necessity," nuclear power has never shed its high-security character, even though its commercial development occurred under ostensibly civilian control (Strauss quoted in Ford 1986). As with all technological imperatives,<sup>6</sup> there have always been good, sound, *practical* reasons for this barbed-wire complexion: so vulnerable to sabotage or accident (Lovins and Lovins 1982), so potentially lethal are nuclear components and fuel that the technology requires what Denis Hayes described as "a garrison mentality in those responsible for [its] security" (1977, 71-72). Thus, according to Hayes, "[t]he increased deployment of nuclear power facilities must lead society toward authoritarianism" (p. 71).

There is a temptation to claim that this notion of technological authoritarianism, dependent on examples of highly centralized technologies like nuclear power, is an anachronism; after all the *decentralization* of technologies is a more recent trend.<sup>7</sup> Such a claim can be refuted on two grounds. First, despite the failure of nuclear power to "deliver" on most of the promises that were

made for it, its protagonists continue to prepare for a “second coming.”<sup>8</sup> Although power plants are now constructed on a much smaller scale and “alternative” energy technologies and “independent” energy producers are increasingly being connected to the power grid, the grid itself is under more centralized control than at any time in the past.<sup>9</sup> Second, even seemingly decentralized technologies, like the computer, which promise liberation from centralized and hierarchical authority, depend on the power grid. Their use is also shaped by increasing global centralization of the “hardware” and “software” manufacturers, the telecommunications systems, and the information networks. Even within the workplace, computer information, monitoring, and management systems lead to centralization.<sup>10</sup>

### **Technological Citizenship and the Promise of Democratization**

If our large-scale technological systems have become authoritarian institutions, then proposals and initiatives to democratize these institutions would seem to offer the most obvious and direct remedy. The literature on technological citizenship ties the democratization of technological systems to expanding opportunities for “ordinary” citizens to participate in the decisions made about the goals, configuration, and management of new and existing technologies.

What does the concept of citizenship mean in the realm of technology? How do we determine who is a citizen of “information society” or “electric society” or “automotive society?” What rights and obligations does such citizenship confer? Defining such citizenship is problematic because the meaning of participation, an essential element of citizenship, has become so trivialized. Meaningful participation, such as the power to participate in the decisions about how—or even whether—various technologies should be introduced in the first place, has too often been unconsciously surrendered, whereas the illusion of power provided by a growing array of technical instruments has been embraced. Are “citizens” simply the users or consumers of the particular technology and its outputs? Is participation no more than having so many buttons to push or switches to turn? What about those who neither use nor exercise decision making power over technologies, but who are nonetheless affected by them? What are their rights?

In his essay on technological citizenship, Philip J. Frankenfeld used the notion of jurisdiction, familiar from discussions of citizenship in the usual sense. Redefining it to mean “sphere of impact,” Frankenfeld explored its application to technologies that pose substantial physical hazards:

[T]he status of technological citizenship may be enjoyed at the national, state, local, or global level or at levels in between. Hence one can be a technological "citizen" of . . . the "Chernobyl ecosphere," of the "plastic explosives production and use 'noösphere'" —which is global in scale—of a particular "nuclear-free zone" in the noncontiguous network of them, of the "realm" covered by the "nonproliferation treaty" . . . . Currently, there is no "there" there, and there is no "of" of many of these realms of impacts of technologies to make these "realms"—let alone citizenship within them—meaningful. However, one *would* be a technological citizen *of* any of these spheres of impact *if* their inhabitants deigned to create a set of agencies, a cocoon of protections or benefits, or a cocoon of rights and responsibilities granting subjects status in relation to impacts of technologies with a specific overarching purpose. (1992, 463-64) (quoted author's use of italics)

This notion of citizenship goes beyond the matter of jurisdiction. As Frankenfeld observed, "there is no 'there' there." Citizenship is merely a possibility that awaits proactive development by would-be technological citizens. Thus, jurisdiction—even when defined as sphere of impact—does not satisfy the conditions of technological citizenship.

### *A Model of Technological Citizenship*

Frankenfeld defined technological citizenship as

equal membership, participation, and standing or status of persons as agents and subjects within a realm of common impact to at least one "technology" or instance of consciously amplified human capacity under a definable state that governs this technology and its impacts. Such status is defined by a set of binding, equal rights and obligations that are intended to reconcile technology's unlimited potentials for human benefit and ennoblement with its unlimited potentials for human injury, tyrannization, and degradation. (1992, 462)

Accordingly "the overarching *goals* of citizenship are (1) *autonomy*, (2) *dignity*, and (3) *assimilation*—versus alienation—of members of the polity" (p. 462). (quoted authors' italics)

In his model, Frankenfeld has identified a series of symmetrical rights and obligations that such citizenship conveyed. Technological citizenship includes: "1. rights to knowledge or information; 2. rights to participation; 3. rights to guarantees of informed consent; and 4. rights to the limitation on the total amount of endangerment of collectivities and individuals" (1992, 465).

The obligations of citizenship, which are viewed by Frankenfeld as inseparable from the rights,<sup>11</sup> include informed consent and autonomous thought. These translate into three further ones: "(1) obligations to use knowledge for one's own self-validation of safety and peace of mind, (2)

obligations to participate and to accept the will of the majority unless one is a strong natural rights individualist, and (3) obligations to exercise technological civic literacy and technological civic virtue" (Frankenfeld, 1992, 473).

Again and again we see the same themes emerging: autonomy, participation, and consent. The remarkable consistency with which these concepts appear together suggests a vital symbiosis at work.

### *Technological Citizenship and the Presumption of Autonomy*

In the Lockean conception of representative democratic governance, so influential in the founding of the United States, the consent of the governed is the central source of political legitimation. The power to give or withhold one's consent is, then, a crucial dimension of participation, and, therefore, of citizenship. The issue of consent is central to the problem of governance of technologies. Many complex technologies pose substantial hazards and risks to individuals, communities, regions, or even to the entire planet. To impose such risks on people without even their tacit consent is undeniably an act of tyranny. Accordingly, discussions of technological citizenship have focused on risk, for of all the impacts of specific technologies, their hazards are among the most onerous and potentially devastating.

Such matters are both crucial and complex; they are, quite simply, beyond the grasp of most people. *Informed* consent<sup>12</sup> is a critical ethical standard for the appropriateness of technological choices in a democratic society, and yet due to the daunting complexity of most technological decisions and the tendency of most human activity in a technological society to be highly specialized, informed consent remains at best a noble ideal that may be approached but never fully reached.

Much of the political analysis of these themes proceeds from a presumption that citizens are autonomous beings, or at least, would be if they were unfettered by negative and paternalistic external constraint. This external condition of *civil autonomy* needs to be distinguished from the more internal notion of autonomy. In an analysis of the role of consent and autonomy with respect to air pollution, Mary Gibson views the internal dimension of autonomy as involving one's "capacities of critical examination and rational reflection involved in shaping oneself" (1985, 147). When internal and external autonomy are combined, one can achieve "autonomy as self-determination," or what political philosopher and ethicist David Cooper has called "personal autonomy" (1993, 114-16).

According to the literature on risk, consent, and autonomy, self-determination will develop as citizens gain experience participating in matters of governance. As Gibson asserted:

Critical thinking and rational reflection, capacities essential to autonomy, develop together with—making possible and made possible by—cooperative social relations. . . . The more one exercises these capacities, the further they develop, so that one is not only developing necessary conditions for autonomy, more and more one is, at the same time, exercising autonomy. The degree to which one exercises autonomy is the degree to which one is autonomous. (1985, 147, 150-51)

Thus, according to Gibson, one becomes autonomous by thinking and acting autonomously. Action, in this sense, involves “actually going through the process of deliberation, choice, and implementation” (1985, 151). But against what ethical criteria do people evaluate the choices?

In his discussion of the governance of nuclear weapons, Robert Dahl (1985) examines the political competence of those who govern in terms of their *moral competence* and *technical or instrumental knowledge* (1985, 24-29). Dahl is especially concerned with the development of moral competence, because the acquisition of technical knowledge is generally not problematic. Moral competence requires two further qualities, *moral understanding* or *capacity* and *virtue*. Moral understanding, according to Dahl, involves having “an adequate understanding of the proper ends, goals, or objectives that the [governing system] should strive to reach” (p. 25). But understanding without a corresponding resolution to act, that is, without virtue, would be, in his words, “utterly bootless.”

If those who govern must be morally competent, what is the probable level of moral development of the majority of the American adult population? Considering the case for a political system of guardianship by a technocratic elite, Dahl argued that most people are “incompetent to govern themselves—let alone others” (1985, 28). This, of course, is the classic technocratic justification of why lay citizens should not participate in technological decision making. But Dahl also questioned the moral competence of most technical experts and ultimately rejected the idea of a nondemocratic regime, because only in a democratic system can people have an opportunity to develop their moral competence:

It is true that a democratic regime runs the risk that the people will make mistakes. But the risk of mistake exists in all regimes in the real world, and the worst blunders of this century have been made by leaders in nondemocratic regimes. Moreover, the opportunity to make mistakes is an opportunity to learn. Just as we reject paternalism in individual decisions because it prevents the



development of our moral capacities, so too we should reject guardianship in public affairs because it will stunt the development of the moral capacities of an entire people. At its best, only the democratic vision can offer the hope, which guardianship can never do, that by engaging in governing themselves, all people, and not merely a few, may learn to act as morally responsible human beings. (1985, 51)

Gibson's and Dahl's ideas of "learning by doing" seem, on the face of it, a sufficient method of promoting the moral development of a citizenry toward greater competence to govern our technological systems (and, simultaneously, toward making these systems more democratic). After all, developmental theory suggests that the development of autonomy in children proceeds in precisely this way. But adults, unlike children, do not approach each new situation with the same openness. Instead, they confront each new situation with all of the fears, self-doubts, preconceptions, distortions, defense mechanisms, learned helplessness, prejudices, bad habits, unrealistic expectations, frustrations, and disappointments that a lifetime of socialization can produce. Can such "baggage" be simply overcome when an opportunity to act autonomously arises? By what magic will these blockages and distortions be lifted?

Political analysis is silent on these matters for they do not fall within the realm of its inquiry. But they demand attention, because any effort to bring about a democratic scheme of governance that ignores them runs a risk of reproducing an authoritarian system under a democratic guise. It is important, therefore, to examine carefully the process of moral development.

### **Moral Development and the Emergence of Autonomy**

Autonomy is an emerging and evolving outcome of the development of logical and moral reasoning, which developmental theorists regard as integral to the ability of people "to participate fully in the adult world" (Cooper 1993, 75).

David Cooper (1993) distinguishes two conceptions of autonomy: *personal autonomy* and *moral autonomy*. Personal autonomy—or our earlier autonomy as self-determination—is a necessary, but by no means sufficient, condition for moral autonomy. Personal autonomy exists when "[o]ne is controlled by an independent will with a stable, fairly consistent set of beliefs, in contrast to being controlled by (1) biological or introjected social desires that we consciously reject, or (2) social and external forces that we consciously reject" (Cooper 1993, 116). But "personal autonomy is not moral autonomy." To support this contention, Cooper cites Feinberg's observation that "a self-governing person is no less self-governed if he governs himself

badly, no less authentic for having evil principles, no less autonomous if he uses his autonomy to commit aggression against another autonomous person" (Feinberg, quoted in Cooper 1993, 116). It is not enough to state, as Mary Gibson (1985) has done, that autonomous persons practice critical examination and rational reflection because the underlying values and principles according to which one chooses make a great deal of difference. As Cooper asserted, "[a]utonomy without some commitment to a notion of common social good leads to isolation, alienation, and meaninglessness. Without some sense of moral or social commitment, then, social life in a full moral sense is only a fantasy" (1993, 118).

Cooper sees morally autonomous persons as independent, not only "in the sense that the rules they follow are self-imposed," but also "in the sense that they are choosing with a full understanding of the public nature of moral rules" (1993, 119). Such individuals are deemed fully conscious of their connectedness to a public existence and their duty to follow moral principles with "a universal social purpose" (p. 120). This does not mean that such individuals all value the same things, but rather that they consider the broadest possible meaning and consequences of their choices.

In this context, moral autonomy can be viewed as a "highest stage" of moral development. Moreover, it can be linked to the potential for a durable democratic system of governing and identified directly with Barber's description of citizenship in a *strong democracy*:

[T]o be a citizen is to participate in a certain conscious fashion that presumes awareness of and engagement in activity with others. This consciousness alters attitudes and lends to participation that sense of the *we* I have associated with community. . . . Indeed, from the perspective of strong democracy, the two terms *participation* and *community* are aspects of one single mode of social being: citizenship. (1984, 155) (quoted author's use of italics)

Alas, there is strong evidence that many American adults do not achieve even personal autonomy, let alone moral autonomy. One indicator of this is the degree to which various obsessions and compulsions—including addictions—"govern" people's decision making.<sup>13</sup> Isolation, alienation, and meaninglessness have been identified by many social observers as conditions that fundamentally characterize contemporary American life.

Erich Fromm (1955) has contended that premature ego development, manifested in egocentric, ethnocentric, racist, and other authoritarian orientations, is a widespread phenomenon in contemporary society. Yet Cooper claims that a social ethics derived by morally autonomous people "requires us to strive to decenter, in order to take everyone into consideration" (1993, 121).

The problem of hindered or even arrested moral development is exacerbated by authoritarian institutions such as the large technological systems that dominate much of our public life and work to inhibit autonomous expression.<sup>14</sup> As Cooper observed, “[t]he crucial feature of these institutions, as it relates to the ideal of moral autonomy, is the lack of downward accountability. Those lower in the hierarchy are to be the beneficiaries of decisions; they are not expected to partake in the decision making” (1993, 124).

Moral autonomy, as Cooper and others understand it, requires the highest level of moral development—what developmental psychologist Lawrence Kohlberg (1973) has termed the “postconventional” level, stage six “universal-ethical-principle orientation.”<sup>15</sup> In the contemporary society, choices are often made at a much lower level of moral reasoning. Consider, for example, Kohlberg’s “preconventional” level, stage two description of the “instrumental-relativist orientation”:

Right action consists of that which instrumentally satisfies one’s own needs and occasionally the needs of others. Human relations are viewed in terms like those of the market place. Elements of fairness, of reciprocity, and of equal sharing are present, but they are always interpreted in a physical pragmatic way. Reciprocity is a matter of “you scratch my back and I’ll scratch yours,” not of loyalty, gratitude, or justice. (1973, 631)

This appears to be a fair characterization not only of how individuals frequently operate, but also of how a number of society’s core institutions are structured. The obvious example, alluded to in the above description, is the market. At best, most people may operate some of the time at the next, “conventional,” level of “interpersonal concordance orientation,” in which “[g]ood behavior is that which pleases or helps others and is approved by them” and in which “[t]here is much conformity to stereotypical images of what is majority or ‘natural’ behavior” (Kohlberg 1973, 631).

The above observations and claims pose a problem for proposals to democratize our political systems simply by expanding opportunities for people to participate in decision making. Such expansion and implementation activities provide no assurance that people will act autonomously so as to produce durable democratic governance. Yet, the framework of technological citizenship operates from the presumption of autonomy. Learning how to become a morally autonomous and responsible citizen requires a degree of openness, caring, flexibility, courage, and trust that may be difficult, or even impossible, for people who have not progressed beyond the conventional level of moral development by the time they have reached adulthood. It is

likely that they will simply *reproduce* the familiar cognitive and social structures, which reflect the denial and repression of autonomy.

Underlying this claim is a more profound one: authoritarian structures of governance do not exist merely because some people seek to impose them on everyone else; they also exist because enough other people identify with them and, in a perverse sort of way, "prefer" them. Until we can successfully address these problems, efforts to promote citizen participation in the governance of society's major institutions will do little more than reinforce these authoritarian predispositions.

### **Strategies for Democratic Renewal and Moral Development**

Creating authentic opportunities for expanded citizenship within the sociotechnical order requires fundamental changes in the social contracts that each major technology embodies. The rules, roles, relationships, and expectations according to which sociotechnical regimes (that is, technological systems) operate will have to be substantially revised.

Yet, such structural changes will not, of themselves, yield durable participatory arrangements; good citizenship entails far more than having ample opportunities to participate in public affairs. Exercising the power to "just say no" to technology is far too simplistic a solution, when we depend upon numerous technical instruments and systems.<sup>16</sup> Besides, saying no is easy: to what will we say *yes*?

We cannot assume that expanded opportunities to participate in decision making will suffice in stimulating people's moral development toward the maintenance of democratic traditions and the responsible stewardship of our common wealth. Any scheme that fails to give attention to the dynamics of the intra- and inter-psychic dimensions of autonomy runs a high risk of leading to the reproduction of authoritarian systems under democratic guises. Special efforts must therefore also be instituted to further the moral development of adult members of society.

Strategies for accomplishing the goals outlined above can be categorized into macro-level and micro-level strategies. Political and economic macro-level strategies address the structural characteristics of technologies and sociotechnical regimes. Social and psychological micro-level strategies address the developmental and behavioral characteristics of the citizens of technological polities. These two types of strategies must be pursued concur-

rently so that their effects can be mutually reinforcing. Some possible strategies of each type are presented below.

### *Macro-Level Strategies*

Strategies to make structural changes to sociotechnical regimes must immediately confront a sobering reality: such systems typically embody powerful and entrenched alignments of political-economic interests. Any initiative of change threatening to these interests will be vigorously resisted.

However, the difficulty is not merely one of stepping on the wrong people's toes; *all of our toes* are by now involved. As our collective fate has become increasingly tied to the ascending sociotechnical order, the established structures of technological governance have developed powerful ways of tying basic conceptions of social welfare to their own preservation. This is quite apparent, for example, when the electricity has gone out for any length of time.

But history has also shown that well-organized and persistent social movements can be successful in achieving meaningful structural changes. Usually, these changes have required legal challenges through legislative and/or judicial initiatives, in order to succeed.<sup>17</sup>

*Articulating a more democratic vision of technology.* Articulation of a vision of technology that re-establishes the primacy of individual and social development as the most important human goals<sup>18</sup> must be part of a *proactive* process addressing the problem that authoritarian technologies create for authentically democratic modes of living. Technology needs to be returned to its appropriate subordinate role in the service of human ends. Pursuit of such a vision involves the development of an ethic of technological governance vastly different from the prevailing ethic, which has *perverted* human needs, placing *them* in a subordinate role in the service of the technological order.

*Designating meta-technologies as public trusts.* Once such a vision has taken root, attention can turn to more specific macro-level strategies for democratic renewal, such as a reassessment of the appropriate legal status of those technological systems that are most central to the functioning of the sociotechnical order. Organizational theorist Donald A. Schon (1971) has identified such systems as " 'meta' technologies." He characterized them as having the power to "facilitate the processes of technological innovation and diffusion, and thereby to increase the society's leverage on technological

change itself" (Schon 1971, 26). Among the technologies Schon included in this group are infrastructure technologies (energy systems, transportation systems, telecommunications systems, and the like), electronic technology, and the computer.

Because of their central role and their capacity to direct and shape the process of technological change (and, therefore, social and political change as well), meta-technologies should be formally recognized as critical to the public interest and well-being. Conferring public trust status on meta-technologies could be justified by the need to protect the public interest in democratic processes and institutions. The *Public Trust Doctrine* originally encompassed the public interest in navigation, but over the years the doctrine has been extended to incorporate other spheres of activity.<sup>19</sup> Public trust status could be conferred on core technologies through a National Technology Policy Act.

The advantage of public trust status is that the institutions empowered to control and manage such assets are publicly accountable for the social consequences of their decisions and actions.

*The reconstruction of technological systems.* The failure of existing meta-technological structures and institutions to adhere to fundamental humanistic values is grounds for their radical reconstruction. The seeming irrevocability of large technological commitments presents one of the gravest ethical challenges to contemporary society. Yet the structures to which such commitments have been made were socially constructed, and presumably with some courage, care, and intention, they could be *dismantled and reconstructed*.

At the national level, meta-technologies that are deemed to be antithetical to democratic principles and practices could be held in violation of the public trust, and efforts to reconstruct (or, if necessary, dismantle) them could proceed. To maximize public involvement and input in the reconstruction, various methods could be employed, such as a national initiative and referendum and nationally interlinked "town meetings." This could be a rare opportunity to employ telecommunications technology for a socially productive purpose.

At a more local level, smaller technologies (or the local installations of meta-technologies) could be subjected to what Richard Sclove (1991, 1993) has called democratic design criteria applicable to community, work, and other social structures. In fact, Sclove sees actions involving local initiatives as feasible in the short term, whereas those requiring "translocal political interest and coordination" would take more time.<sup>20</sup> (Sclove 1991: 243)

### *Micro-Level Strategies*

If it is unrealistic to expect that merely involving people in decision making will be sufficient to stimulate their moral development, what might be capable of doing so? One strategy that may be effective in empowering adults to resume their moral development is participatory role playing.

Lawrence Kohlberg (1980) has suggested that structuring opportunities for participation might stimulate moral and social development in school-age children. With a nod to Piaget and Dewey, Kohlberg stated

The aim of civic education is the development of a person with the structures of understanding and motivation to participate in society in the direction of making it a better or more just society. This aim requires experiences of active social participation as well as the learning of analytic understandings, of government, and the moral discussion of legal and political issues. . . . My own theory argues . . . that if sociomoral development is the aim of social education, the central means of social education is the creation of opportunities and experiences for social role-taking and participation. (1980, 464)

Role playing is a central element in this scheme and a feature that makes Kohlberg's ideas distinct from strategies that simply thrust people into decision-making situations. By forcing one to step outside one's usual roles, role playing leads to a better appreciation of one's own reality and of the manner in which it can impede one's capacity to develop autonomy.

These roles are not intended to be the *actual* roles of decision maker and implementer in real governing situations; rather, they are *practice* roles—a kind of “dress rehearsal” for these actual roles. Of course, the examples Kohlberg offered were applicable to high school students and included participation in the governance of the school and participation in community service projects. The challenge is to extrapolate methods of structuring such learning situations to the adult level.

Brazilian educator and social thinker Paulo Freire has developed a model and methodology of *conscientização*, translated as “critical consciousness,” a type of “problem-posing education” that serves as a basis for oppressed groups to gain autonomy in the process of securing just solutions to the social injustices they are experiencing. At root, critical consciousness involves dialogue among people in which the central themes that characterize their reality are discovered and elaborated. The most fundamental theme “of our epoch,” Freire has contended, is “that of *domination*—which implies its opposite, the theme of *liberation*, as the objective to be achieved” ([1972] 1986, 93). (quoted author's use of italics)

Freire's methodology has been applied in a number of educational settings in Brazil and elsewhere, typically in work with adults where basic literacy

training provides the starting point for the process. Yet the ultimate end of this method is *civic education*, in which the autonomous development of participants is stimulated through the use of dialogue about problem-conditions that are characteristic of the reality in which the participants live.

A team of educators working with poor rural villagers in Ecuador adapted this method by introducing a game in which the participants played different roles that reflected the highly stratified social context of their life (Smith et al., 1979). The team operationalized Freire's conception of critical consciousness in terms of the following elements:

- (1) the capacity to *see one's situation as problematic* and susceptible to change, in contrast with viewing one's plight as static, fated by God, and unchangeable;
- (2) *the keen awareness of social injustice*—how the situation was not as it should be, or where there are inherent contradictions;
- (3) *relationship to the oppressor*—the realization of how oppressed people play host to the oppressor, collude in maintaining the status quo through inaction and belief in the inherent "rightness" of the oppressor; and
- (4) *critical collaborative action* to transform the situations that lock the oppressed and the oppressor into oppressive relationships. (Smith et al. 1979, 14) (quoted author's use of italics)

In applying Freire's ideas in this way, the team was able to structure an occasion for the stimulation of the participants' consciousness about their social, economic, and political status—that is, consciousness about their *citizenship* rights and opportunities—in relation to other groups in the social order. This also provided opportunities to stimulate the villagers' moral development. Thus by working with adults in a very different cultural context, the team accomplished essentially what Kohlberg has advocated in his work with youth.

## Conclusions

The eventual collapse of authoritarian technologies will only occur if the collective consciousness of society becomes more capable of recognizing this authoritarian tendency as an abdication of moral responsibility.

The social dismantlement and reconstruction of technological systems deemed contrary to the principles of moral autonomy and democracy can and should be done so as to minimize disruption, dislocation, and exposure to hazards. However, for this to happen, we must consciously move away from the crisis orientation characteristic of technological society. Unfortunately, it has taken a series of technological, environmental, and financial disasters to bring the global community to its senses about the fundamental untenability



of nuclear power. Nevertheless, now nuclear power technology is ready for social dismantlement—this process has, in fact, already begun.

But we must learn the appropriate lesson: the hazards this technology (and numerous others) pose for our way of life are as much political as they are environmental or economic. On this basis such technologies must be rejected. If we fail to learn this lesson, we will submit to new technological tyrannies in the name of a cleaner environment or improved health.

As we begin to dismantle the more glaringly authoritarian technologies, it will be possible (perhaps increasingly so) to restructure our remaining technologies. There is no assurance that democratic (participatory) mechanisms of technological choice will always yield technologies that are compatible with democratic principles. However imperfect the results, we should accept such choices *because of how they have been made*, and anticipate that as people's participation and moral development expand, choices will yield progressively more compatible structures. For this to work, we must be careful not to become habituated to the initial choices because once technologies become well established, they tend to shape their surroundings and exact progressively greater degrees of conformity. Langdon Winner's wisdom about how we should embark on this process is indispensable:

We should try to imagine and seek to build technical regimes compatible with freedom, social justice, and other key political ends. Insofar as the possibilities present in a given technology allow it, the thing ought to be designed in both its hardware and social components to accord with a deliberately articulated, widely shared notion of a society worthy of our care and loyalty. . . . Faced with any proposal for a new technological system, citizens or their representatives would examine the social contract implied by building that system in a particular form. They would ask, How well do the proposed conditions match our best sense of who we are and what we want this society to be? (1986, 55-56)

All that remains is to focus the collective will to begin the process.

## Notes

1. Following Frank Laird's contribution, I wish to recognize that the pursuit of the democratic ideal is conditioned by different *theories of democracy*. For the purposes of this article, I shall be emphasizing the *theory of direct participation*. As Laird reports, direct participation "is premised on the notion that democratic governance includes the full participation of individuals as individuals . . . , insists on the empowerment of the individual . . . , [and] places a strong emphasis on the effects of participation on those who engage in it" (1993, 343-45).

2. Reinhold Niebuhr (1932) believed only individuals are capable of being moral agents; collectivities are not moral agencies and, at best, are capable of *justice*. However, in his treatise

on the psychology of ethics, Erich Fromm (1947) introduced conceptions of ethics that were applicable to an entire society. For example, his conception of *socially immanent ethics* referred to "those norms in any culture which contain prohibitions and commands that are necessary only for the functioning and survival of that particular society. . . . The qualities which rank highly in the operation of a particular society become part of its ethical system" (1947, 241-42).

In a recent discussion Langdon Winner acknowledged that: "Beginning with Aristotle, philosophers have noticed that there is a logical juncture where ethics finds its limits and politics begins. That turning point comes when we move beyond questions of individual conduct to consider the nature of human collectivities and our membership in them." (1990, 57) Yet Winner argues that political reflection must be incorporated into treatments of engineering ethics. Thus, implicitly, he is calling for the abandonment of the age-old dichotomization of ethics and politics, a position I endorse.

3. Recent scholarship on technological citizenship and technological governance refers to the ethical implications of various types of political philosophies and structures. Dahl identified "moral competence" as a crucial element of "political competence" (1985, 24-28). Gibson (1985), like Scheffler (1985), equated the right of "informed consent" (an ethical concept borrowed from the medical profession) with autonomy, asserting an "intrinsic value" in its realization. Yet such references fall short of a careful examination of the ethical principles underpinning such claims, and of how they might differ from other ethical principles, some of which are central to the value system of American culture. See also Cooper (1993), Friedman (1983), Fromm (1947, 1955, 1973, 1976), Gilligan (1982), Kohlberg (1973, 1980), Mitcham (1989) and Munson (1992).

4. The term "psychopolitical" is chosen instead of the established "political-psychological." For the most part, the area of inquiry known as "political psychology" studies the psychological makeup of political leaders, such as elected officials. Rarely does the discussion turn to the *collective psyche*.

5. Large-scale technologies are not inherently anti-democratic, although they do have the propensity to frustrate participation and exclude people; correspondingly, small-scale technologies are not inherently democratic, although they do have (generally) greater accessibility and control. In our society, it appears that large-scale technologies are frequently considered more efficient. However, as Winner (1982) has warned, *efficiency* is an ideologically loaded concept that is itself a reflection of a bias toward large-scale complex systems.

6. "[T]echnologies are structures whose conditions of operation demand the restructuring of their environments. . . . It is simply a matter of specifying what needs to take place before an instrument is in working order" (Winner 1977, 100). "The force of technological imperatives is reinforced by their connection to what are perceived as the necessities of life. Certain technical means stand at the very basis of human survival. Failure to provide for them is to invite discomfort, suffering, or even death. For this reason the technological imperative is much more than a functional requirement. It is also a moral standard". (Winner 1977, 100, 102)

7. The popularity of decentralization among various groups of political and social reformers as a strategy for democratizing social and political institutions has given it the quality of a mystique. People overlook the fact that decentralization has most commonly been employed by *centralized sources of power and authority* (whether private or public) to increase functional efficiency or control. Because the meaning, forms, and purposes of decentralization are confused, Winner has exclaimed that it is "one of the foggiest, most often abused concepts in political language" (1986, 85).

8. The "second coming" thesis suggests that growing electricity demand and legislative initiatives to curb the use of fossil fuels will lead to re-emergence of nuclear power by creating the need for "clean" energy sources that can be implemented on a large enough scale. See

Rudolph and Ridley (1986, 238-43). For a more recent mass media presentation of the same theme, see Greenwald (1991, 54-61).

9. The major investor-owned power companies, which dominate the industry-sponsored organization that manages the national power grid (the North American Electric Reliability Council), are vast regional and multiregional entities. There has been an ongoing process of consolidation and integration in the industry ever since it emerged in the late nineteenth century. Even the "independent" energy producers, spurred into existence by the Public Utilities Regulatory Policies Act (PURPA) of 1977, are frequently owned partially or even wholly by regionally integrated utilities. And, of course, government regulation of the industry has also become more centralized: the Federal Energy Regulatory Commission (FERC) regulates aspects of the interstate utility system. State regulatory bodies have found it increasingly difficult to regulate effectively in an environment of regionally integrated utilities. See also Messing, Friesema, and Morell (1979) and Rudolph and Ridley (1986).

10. The computer-based monitoring of people as they work and the privacy violations it facilitates have become so endemic that the United Nations has created a special task force to study this problem worldwide. It should be noted that the benefits and liabilities of work-related computer use are distributed quite unequally: the monitoring disproportionately affects production workers and those employed in the service sector, such as telemarketers. These groups of workers are most likely to view the computer as a source of authoritarian control, recording their every move and eliminating their opportunities for creative and independent judgment. Professional and managerial workers, on the other hand, can be expected to view the computer more as a "liberating" tool or aid. For penetrating and provocative analyses of computer-assisted authoritarianism and worker reactions to it, see Noble (1983, 1986) and Howard (1985).

11. By presenting rights and obligations as a unity, Frankenfeld is intentionally anchoring them to a particular ethical conception, such as Lawrence Kohlberg's theory of six stages of moral development. Only at the sixth and highest stage (the second of two "postconventional" levels) do rights and obligations become, in Kohlberg's words, "completely correlative" (1973, 637).

12. The notion of "informed consent" is borrowed from medical ethics, where it plays a vital role in actualizing the moral principle of autonomy. In an excellent treatment of informed consent as applied to medical technology and health care, Munson (1992, 322-24) contends that to be valid, informed consent requires an opportunity for genuine deliberation of a decision. This, in turn, requires that people possess not only information but also *understanding* and that they be *competent* enough to grant or withhold their consent.

13. Cooper raised the issue of whether compulsions, addictions, and other forms of dysfunctional social behavior inhibit autonomy (1993, 115, 129-33). Zimmerman (1992, 414-19) and Glendinning (1993, 97-114) have argued that technology itself may constitute a form of addiction.

14. In his theoretical work, Kohlberg (for example, 1980, 455-70) has tended to identify social institutions such as education, government, business, and the media as the primary sources of the suppression of moral development.

15. Kohlberg's work is a direct outgrowth of Piaget's, yet focuses more specifically on moral development as a special domain of cognitive development. Kohlberg has theorized three distinct and progressive levels of moral development, which he named *preconventional*, *conventional*, and *postconventional*. Each is subdivided into two stages, for a total of six progressive stages. In incorporating Kohlberg's scheme into this analysis, I am fully conscious (and supportive) of the criticism that Piaget and Kohlberg both utterly failed to recognize the profound gender differences that shape moral values and guide moral action. This failure, along with an immensely valuable elaboration of how gender identity yields fundamentally different ethical

frames of reference, have been powerfully presented by Carol Gilligan (1982). For the present purpose, Gilligan's lesson is indispensable to the notion of moral autonomy, with its emphasis on a capacity to feel connected to others and to see one's well-being as integral to theirs. At the same time, Kohlberg's scheme is still useful for highlighting the vast discrepancy between the level of moral development at which moral autonomy becomes possible and the level of moral development characteristic of most members of adult society.

16. For provocative analyses of the meaning and implications of "saying no" to technology, see Noble (1983) and Piller (1991).

17. The only exception to this that comes to mind is the "defeat" of nuclear power by the anti-nuclear movement. However, a strong case can be made that nuclear power's failure was not simply a result of the broad-based social movement against it as those in the movement like to believe (Zimmerman 1992, 178-271).

18. Such an endeavor by no means assures consensus about the substance of the vision. However, such process engages large numbers of people in critical reflection and dialogue, which is a democratic and humanizing end in itself.

19. For more background on this doctrine, including different ways it has been or might be applied, see Rose (1986), Blumm (1989), Zimmerman (1989), Lahey, Zurier, and Salinger (1990), and Malley and Silverstein (1991).

20. Although Sclove's argument is appealing because small-scale and local efforts have the highest prospects for success in the short run, the problem is that the most pervasively authoritarian technologies tend to be those that are large-scale, highly centralized, and highly interconnected.

## References

- Barber, Benjamin. 1984. *Strong democracy: Participatory politics for a new age*. Berkeley: University of California Press.
- Basalla, George. 1988. *The evolution of technology*. New York: Cambridge University Press.
- Blumm, Michael C. 1989. Public property and the democratization of western water law: A modern view of the public trust doctrine. *Environmental Law* 19:573-604.
- Cooper, David. 1993. *Value pluralism and ethical choice*. New York: St. Martin's.
- Dahl, Robert. 1985. *Controlling nuclear weapons*. Syracuse, NY: Syracuse University Press.
- Ellul, Jacques. 1964. *The technological society*. New York: Random House.
- Frankenfeld, Philip J. 1992. Technological citizenship: A normative framework for risk studies. *Science, Technology, & Human Values* 17:459-84.
- Freire, Paulo. [1972] 1986. *Pedagogy of the oppressed*. Trans. by Myra Bergman Ramos. New York: Continuum.
- Friedman, Maurice S. 1983. *The confirmation of otherness in family, community, and society*. New York: Pilgrim.
- Fromm, Erich. 1947. *Man for himself: An inquiry into the psychology of ethics*. New York: Holt, Rinehart & Winston.
- . 1955. *The sane society*. New York: Holt, Rinehart & Winston.
- . 1973. *The anatomy of human destructiveness*. New York: Holt, Rinehart & Winston.
- . 1976. *To have or to be*. New York: Harper & Row.
- Gibson, Mary. 1985. Consent and autonomy. In *To breathe freely: Risk, consent, and air*, edited by M. Gibson, 141-67. Totowa, NJ: Rowman and Allanheld.
- Gilligan, Carol. 1982. *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.

- Glendinning, Chellis. 1993. The conversation we haven't had: Technology, trauma, and the wild. In *Technology for the common good*, edited by M. Shuman and J. Sweig, 97-114. Washington, DC: Institute for Policy Studies.
- Greenwald, John. 1991. Time to choose. *Time*, 29 April, 54-61.
- Hayes, Denis. 1977. *Rays of hope: The transition to a post-petroleum world*. New York: W. W. Norton.
- Howard, Robert. 1985. *Brave new workplace*. New York: Elisabeth Sifton Books.
- Kohlberg, Lawrence. 1973. The claim to moral adequacy of a highest stage of moral judgment. *Journal of Philosophy* 70:630-46.
- . 1980. Educating for a just society: An updated and revised statement. In *Moral development, moral education, and Kohlberg: Basic issues in philosophy, psychology, religion, and education*, edited by B. Munsey. Birmingham, AL: Religious Education Press. 455-470.
- Lahey, William L., Lauren Sandler Zurier, and Kenneth W. Salinger. 1990. Expanding public access by codifying public trust doctrine: The Massachusetts experience. *Maine Law Review* 42:65-93.
- Laird, Frank N. 1993. Participatory analysis, democracy, and technological decision making. *Science, Technology, & Human Values* 18:341-61.
- Lovins, Amory B., and L. Hunter Lovins. 1982. *Brittle power*. Andover, MA: Brick House.
- Malley, J. Wallace, Jr., and Jeffrey M. Silverstein. 1991. The public trust doctrine and federal condemnation: A call for recognition of a federal common law. *Vermont Law Review* 15:501-30.
- Messing, Marc, H. Paul Friesema, and David Morell. 1979. *Centralized power*. Washington, DC: Environmental Policy Institute.
- Mitcham, Carl, ed. 1989. *Ethics and technology. Research in philosophy and technology*. Vol. 9. Greenwich, CT: JAI Press.
- Mumford, Lewis. 1964. Authoritarian and democratic technics. *Technology and Culture* 5:1-8.
- Munson, Ronald. 1992. *Intervention and reflection: Basic issues in medical ethics*. 4th ed. Belmont, CA: Wadsworth.
- Niebuhr, Reinhold. 1932. *Moral man and immoral society*. New York: Charles Scribner's Sons.
- Noble, David F. 1983. Present tense technology. Part 3. *Democracy* 3 (4): 71-93.
- . 1986. *Forces of production: A social history of industrial automation*. New York: Oxford University Press.
- Piller, Charles. 1991. *The fail-safe society*. New York: Basic Books.
- Rose, Carol M. 1986. The comedy of the commons: Custom, commerce, and inherently public property. *University of Chicago Law Review* 53:711-81.
- Rudolph, Richard, and Scott Ridley. 1986. *Power struggle*. New York: Harper & Row.
- Scheffer, Samuel. 1985. The role of consent in the legitimation of risky activity. In *To breathe freely: Risk, consent, and air*, edited by M. Gibson, 75-88. Totowa, NJ: Rowman and Allanheld.
- Schon, Donald A. 1971. *Beyond the stable state*. New York: W. W. Norton.
- Sclove, Richard E. 1991. The nuts and bolts of democracy: Toward a democratic politics of technological design. In *Critical perspectives on nonacademic science and engineering*, edited by P. Durbin. Research in Technology Studies, vol. 4. Bethlehem, PA: Lehigh University Press. 239-262.
- . 1993. Technological politics as if democracy really mattered: Choices confronting progressives. In *Technology for the common good*, edited by M. Shuman and J. Sweig. Washington, DC: Institute for Policy Studies. 54-79.

- Smith, William, Alfred Alschuler, Carlos Moreno, and Enrique Tasiquano. 1979. "Critical Consciousness". Photocopy.
- Winner, Langdon. 1977. *Autonomous technology: Technics-out-of-control as a theme in political thought*. Cambridge: MIT Press.
- . Energy regimes and the ideology of efficiency. 1982. In *Energy and transport: Historical perspectives on policy issues*, edited by G. H. Daniels and M. H. Rose. Beverly Hills, CA: Sage. 261-286
- . 1986. *The whale and the reactor: A search for limits in an age of high technology*. Chicago: University of Chicago Press.
- . 1990. Engineering ethics and political imagination. In *Broad and narrow interpretations of philosophy of technology*, edited by P. Durbin. Philosophy and technology, vol. 7. Dordrecht, the Netherlands: Kluwer Academic Publishers.
- Zimmerman, Andrew D. 1989. Close call at sea: Delaware's Coastal Zone Act weathers a constitutional challenge. *Coastal Management* 17:1-23.
- . 1992. Governing change in large technological systems: A political history of electricity in the United States. Ph.D. diss., University of Delaware.

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