

Part II.

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from *Questioning Technology*

DEMOCRATIC RATIONALIZATION

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TECHNOLOGY AND POWER

Technology is power in modern societies, a greater power in many domains than the political system itself. The masters of technical systems, corporate and military leaders, physicians and engineers, have far more control over patterns of urban growth, the design of dwellings and transportation systems, the selection of innovations, our experience as employees, patients, and consumers, than all the electoral institutions of our society put together.

But, if this is true, technology should be considered as a new kind of legislation, not so very different from other public decisions (Winner, 1995). The technical codes that shape our lives reflect particular social interests to which we have delegated the power to decide where and how we live, what kinds of food we eat, how we communicate, are entertained, healed, and so on. The legislative authority of technology increases constantly as it becomes more and more pervasive. But if technology is so powerful, why don't we apply the same democratic standards to it we apply to other political institutions? By those standards the design process as it now exists is clearly illegitimate.

Unfortunately, the obstacles to technical democracy are considerable and growing. They include the technocracy, which offers persuasive arguments for passivity. This vitiates all aspects of democratic life, but it is particularly worrisome in the emerging technical public sphere which contends directly with technocratic power without the benefit of democratic forms and traditions to maintain at least a facade of participation. The very right of the public to involve itself in technical matters is constantly called into question. In the technical sphere, it is commonly said, legitimacy is a function of efficiency rather than of the will of the people, or rather, efficiency *is* the will of the people in modern societies dedicated above all to material prosperity.

Political theory has yet to come to terms with these problems and often parrots technocratic alibis for undemocratic procedures in what are in fact contentious fields, such as medicine, transportation, urban

design, and computerization of work, education, and other institutions. Meanwhile, we are treated to interminable and increasingly scholastic debates over such questions as the ultimate grounds, if any, of political obligation. Yet it is in the technical fields that the conditions for the exercise of rights are laid down and the good life effectively defined. As Langdon Winner writes,

As our society adopts one sociotechnical system after another it answers some of the most important questions that political philosophers have ever asked about the proper order of human affairs. Should power be centralized or dispersed? What is the best size for units of social organization? What constitutes justifiable authority in human associations? Does a free society depend upon social uniformity or diversity? What are appropriate structures and processes of public deliberation and decision making? For the past century or longer our responses to such questions have often been instrumental ones, expressed in an instrumental language of efficiency and productivity, physically embodied in human/machine systems that seem to be nothing more than ways of providing goods and services (Winner, 1986: 49).

Admittedly, the reluctance of democratic theorists to discuss technology, much less to incorporate it into political theory, is not much abated by the anti-modern rhetoric of a few highly visible critics of technology. Nor do the wild projections of uncritical enthusiasts alter the scholarly inclination to ignore the whole technology business as a mare's nest. A much more nuanced approach is needed to bring the democratic theorists out of hiding and to involve them in the discussion.

COMMUNITARIAN DEMOCRACY

In the first part of this book, I argued that recent movements for technological change emerged within the context of the political Left. Thus it is not surprising that anti-technocratic movements of students and workers, like environmental movements, are often associated with the traditional Left critique of political representation. Concepts such as "self-management" and "participatory democracy" have been promoted as direct democratic alternatives to the prevailing political system. Motivating this preference for direct democracy is opposition to alienation, both capitalist and technocratic. But these movements are also haunted by a tension between their populism and the unavoidable

reliance on expertise in any modern society. While a few activists hope for the end of specialization and a return to more primitive social arrangements compatible with pure direct democracy, most seek an uneasy compromise with the existing systems of representation. This approach converges with that of some recent democratic theory.

Political theorists have always been divided over the issue of direct versus representative democracy. The advocates of direct democracy, such as Rousseau, remind us of the importance of public participation, but it is the mainstream theories of representative democracy that have influenced actual political arrangements. Nevertheless, the argument for direct democracy is simple and compelling: representatives substitute themselves for the "people" and pervert their will. True personal freedom and independence can only be realized through active participation. Representation, even at its best, diminishes the citizens by confiscating their agency.

In response to such arguments, democratic theory usually pays lip service to the desirability of a lively public sphere. However, the fact that such a public sphere is, in the context of representative theory, an informal requirement of full democracy leads to a peculiar ambiguity: the constitutional conditions that make public participation possible also protect the privately owned mass media which everywhere substitute themselves for discussion and social action. Disarmed by its emphasis on representation and the central role of majorities in electoral politics, conventional democratic theory tends to devalue or ignore actual public participation by smaller numbers and tacitly to accept the mass mediated shadow for the substance of public life.

There has been a reaction against this impoverished version of democratic theory in recent years which has led to a reevaluation of participatory democracy. The new focus on participation is a more thoughtful version of the populism of the 1960s. The issue is no longer direct democracy versus representation. It is difficult to imagine an alternative to representation today. Even Rousseau believed that direct democracy was only possible in a small-scale setting such as a single city: Geneva was his model and at the time its population numbered a few thousand. Despite its obvious defects, representation is required wherever distances and large populations conspire against direct face-to-face deliberation. The contemporary response to this difficulty is to call for the multiplication of direct democratic forums in the context of a representative political system. The aim is to show, as Frank Cunningham puts it, that "different degrees of direct and representative practices should be

regarded as complementary rather than exclusive, global alternatives" (Cunningham, 1987: 47). In formulations like this little remains of the ideal of direct democracy except its critique of the bureaucratic and procedural formalism of the modern state. But that is quite a bit, after all.

One of the most prominent advocates of the new populism is Benjamin Barber. Barber argues for a theory of "strong democracy," by which he means a participatory politics that relies primarily on local collective action (Barber, 1984). He describes the prevailing liberal democracy as "thin" by contrast. Thin democracy is mainly concerned with protecting individual rights and as a result it tends to demobilize and privatize the community. Only reinvigorated communities can arrest the slide of modern society into media-manipulated passivity. They must provide the scene for democratic learning processes and character formation. The electoral system has its uses but there is no way to delegate the experience of political participation which is essential to a truly democratic society. Thus Barber is not opposed to representation, he just believes it insufficient by itself to support democratic values and goals (Barber, 1984: xv).

Barber's theory offers a context for the sorts of movements discussed in the last chapter. All too often, public interventions into technology are dismissed as nonpolitical or, worse yet, undemocratic because they mobilize only small minorities. Such movements never satisfy thin democracy which emphasizes rights and representation to the exclusion of the central role of citizen action. Barber's strong democracy gets us closer to an adequate account. He is concerned with agency because of its importance in shaping the citizenry. Democratic interventions into technology, which frequently take a populist form, would seem to fit right in. However, Barber scarcely mentions technology, and his notion of leadership in a strong democratic society sidesteps the specifically technical problems of management and expertise. This lacuna is particularly apparent in his short discussion of workers' self-management, but it needs to be addressed in many domains, in medicine, education, urbanism, and so on (Barber, 1984: 305).

Richard Sclove has tried to rectify that oversight with a well developed defense of strong democracy in the technical sphere (Sclove, 1995: chap. 3). Like Barber, he does not advocate dismantling representative structures, but rather supplementing them with participatory institutions. Also, like Barber, he argues for increasing the autonomy of local communities and devolving as much authority on them as possible.

What he adds to Barber's argument is the notion that this is not merely a matter of political arrangements but also requires appropriate technology. It is the combination of these themes that Sclove sees as his basic contribution: "The theory of democracy and technology developed here contrasts with predecessor theories that emphasize either broadened participation in decision making or else evolving technologies that support democratic social relations, but that do not integrate these procedural and substantive concerns" (Sclove, 1995: 32-33).

Sclove argues for adjusting technological design to the requirements of strong democratic community. He suggests that design criteria be open to public discussion and decision. This technology-conscious revision of the idea of strong democracy draws support from some of the same phenomena discussed in the previous chapter, especially from the movement for participatory design which he analyzes at length as a harbinger of a different technological future compatible with democratic values (Sclove, 1995: chapter 11).

It is not just that user participation in design responds to the democratic ideal of widening opportunities to intervene in public life. Still more important for Sclove is the expected impact of lay participation on the elitist culture and design criteria of the technical professions. Here Sclove's argument converges with my own. We agree that where the public is involved in technological design, it will likely favor advances that enlarge opportunities to participate in the future over alternatives that enhance the operational autonomy of technical personnel.

But there are still problems with the populist approach. When technology is factored into the political equation, agency, representation, and locality all take on a new aspect that does not quite fit the strong democratic framework. For example, in modern technological societies the "people" are not just locally defined. They are also fragmented into subgroups organized by specific technical mediations. For the most part they can only act in the technical sphere through those subgroups, whether they be factory or clerical workers, students, patients, or soldiers. The geographically bounded units of traditional politics may eventually integrate the various technically mediated subgroups through legal or regulatory decisions. But usually where politics in the familiar sense of the term is involved at all, it draws the conclusions of an initial round of struggle that follows the links in technical networks. Unfortunately, all too often the fragmentation of technical publics renders them politically impotent and things never get this far.

The significance of this situation was already recognized by John Dewey, whose early articulation of the problems of combining participation and representation remain pertinent today. Indeed, on technology Barber's position represents a regression with respect to Dewey who, already in the 1920s argued for something like strong democracy, fully conscious of the difficulties posed by the "machine age." Dewey saw that the extreme mobility of a modern society was destructive of traditional forms of local community. Meanwhile, the new links being forged by the advancing technical system were still inarticulate. Dewey described the dilemma as follows:

Indirect, extensive, enduring and serious consequences of conjoint and interacting behavior call a public into existence having a common interest in controlling these consequences. But the machine age has so enormously expanded, multiplied, intensified and complicated the scope of the indirect consequences, have formed such immense and consolidated unions in action, on an impersonal rather than a community basis, that the resultant public cannot identify and distinguish itself (Dewey, 1980: 126).

Dewey hoped that the free and cosmopolitan communication made possible by modern technology would to some extent mitigate this problem and revitalize local community. But the two terms of the dilemma—large-scale technical systems as the form of our technological future, and local community as the site of democratic deliberation—remained fixed for him.¹ Sclove's solution to the problem is more daring. Since we have now gone well beyond Dewey's rather uncritical confidence in science and technology, and have accepted their underdetermined, contingent character, why not decide politically that they be redesigned to fit local control? Sclove is not foolish enough to want to get rid of all large-scale systems, but he does believe that vastly increased local self-reliance lies in a technically feasible future (Sclove, 1995: 128). Hence his "democratic design criterion" F: "Seek relative self-reliance. Avoid technologies that promote dependence and loss of autonomy" (Sclove, 1995: 98).²

¹ For more on Dewey's theory of technology and community, see Hickman (1990).

² For a critique of decentralization politics that also contains an appreciation of its motives, see Winner (1986: chap. 5).

This ambitious solution to the incompatibility of technical and democratic forms is related to other problems with representation. Popular action in the technical sphere always presupposes a background of accomplishments embodied in specialized knowledge and technical leadership. Technical experts are not chosen by the people, but achieve their position through training and administrative procedures. Past popular action informs their traditions and culture, and insures that they serve many interests in carrying out their professional tasks, but present public participation generally comes from outside technical institutions.

Experts often resist these external interventions as undemocratic and claim to be the true representatives of a universal human interest in efficiency already embodied in their technical culture. In chapter 4 I challenged this view as a philosophy of technology, but it is also the legitimating basis of modern technical administration. And given the enormous authority administration wields over so many aspects of life, it certainly needs a legitimating basis of some sort.

But in reality, who or what does it represent? Must we choose between accepting administrative claims to universality or rejecting administration itself as a form of arbitrary domination? Sclove attempts to finesse this choice with a call for redesigning the technical infrastructure for local control, but what if we find this path of technical evolution implausible? Would we then have to conclude that public interventions into technology are either incompatible with modernity or fundamentally *undemocratic*.

This is the argument of pluralists such as Rein de Wilde who reject populism as a peculiarly American expression of the "democratic sublime" (de Wilde, 1997). In his view the most authentic form of representation is electoral and the subordination of technical and administrative personnel to normal parliamentary government is the only possible "democratization" of technology. Clearly, a far more developed account of the problem of representation is required to answer such arguments.

TIME, SPACE, AND REPRESENTATION

The problem we are up against has to do with the nature of representation in the technical sphere. If technology is political and its design a kind of legislation, then surely it must represent interests much as do ordinary political decisions and laws. But technical representation will be different from the kinds of electoral representation with which we are familiar just to the extent that the medium of technology is different from law. So far theorists of technical democratization have not directly

addressed these differences. This may be one reason they have had little success in interesting political theorists in technology. If the issue of technical democratization is only approached within the populist framework, it is as easily dismissed as populism, which does not have a particularly wide audience in political theory.

As we have seen, the spatial parameters of societies have always been considered determining for the form of their governmental institutions. The face-to-face authority of the tribe or the assembly in earlier times gives way to the authority of the monarch or elected officials in large-scale societies. The extent of a territory is the measure of its inhabitants' dependence on political representation. As the global society outruns the attention and communication potentials of the assembled citizens, a correlated local sphere emerges as its complement. Representation is organized around territorial units which are small enough to reflect common interests that engage the concern and animate the discussions of local citizens. The representative is the bearer of these local concerns, responsible as an individual to the citizens. The representative's duty is to carry a message, to testify for the constituents, either for their real will or the ideal will postulated by the representative on moral or other grounds.

But space does not play the same role for technical authority. No matter how large the society, if its basic technologies are simple, they remain under individual control. Even where a few strategic technologies, such as irrigation, are controlled from a center, that control is generally not a material but a symbolic power base. It is doubtful that the farmers of ancient Mesopotamia obeyed because they feared the water being shut off; more likely, mastery of water manifested the divinity of their rulers and made obedience second nature. In a sense, then, premodern societies enjoyed a kind of direct democracy in the technical sphere where ordinary people controlled their own tools.

In an advanced technological society, this is no longer the case. The change has something to do with the new role of time in the technologically mediated social system. The accumulation of specialized knowledge and expertise implies a necessary specialization of personnel and function. The direct creation and appropriation of technology by users, characteristic of premodern societies, is no longer possible. Thus here it is temporal parameters rather than spatial ones that determine the shape of authority.

The technical system is not of course entirely closed. It is permeated by social influences which show up in designs that, as I have argued in

chapters 4 and 5, have political implications. Design comes to reflect a heritage of properly technical choices biased by past circumstances. Thus in a very real sense, there is a technical historicity; technology is the bearer of a tradition that favors specific interests and specific ideas about the good life.

But unlike the spatial parameters of democracy, these temporal ones are not obvious. As we also saw in chapter 5, the differentiation of specializations gives specialists the illusion of pure, rational autonomy. This illusion masks a more complex reality. In reality, they represent the interests which presided over the underdetermined technical choices that lie in the past of their profession. The results are eventually embodied in technical codes which in turn shape the training of technical personnel. We have, in a sense, passed from an open direct democracy of technique to a covert representative form. But in what does that representation consist? How and by whom are local interests and decisions translated into technical codes capable of operating across time and space? Is there an equivalent in the technical domain of the global/local dichotomy and the associated notion of testimony?

Clearly, spatial locality is not primary. Labor unions have discovered that to their dismay as corporations use high-technology communication and transportation to ship production beyond their reach. Thus even where the technical "global" can still be understood in geographic terms, its identification with the entire surface of the planet renders local geographic units impotent to influence it. The spatialized global/local dichotomy on the basis of which political representation is organized cannot be directly transposed to the technical sphere.

The emergence of large-scale technical systems suggests an alternative principle of organization: the technical network itself. We have seen in chapter 5 how the network serves as the privileged site of protest and controversy. And of course we are all enrolled in so many networks, medical, urban, productive, and so on, that our various technical personas cover much of the political landscape.

If the technical "global" is taken to refer to the larger networks, then its "local" correlate becomes the basic institutional settings in which tactical resistances emerge. These may not have much relation to geographic localities. As patients, for example, the individuals may meet at a hospital, or even online as I will explain in chapter 8. As urban citizens, they may be united along the corridor of a proposed—and contested—freeway. Wholly new types of alliances can follow the pathways of the network between, for example, Nike wearers in the US and Asian shoe-

makers. Sometimes the usual relations of government and citizenry are reversed, and the creation of a government regulatory agency calls into being a subgroup of clients who, in acting together, acquire a technological surrogate of traditional citizenship (Frankenfeld, 1992: 464).

Where the individuals deliberate and act in those "local" technical settings, they reenact in the technical domain the very sort of populist participation so prized by advocates of strong democracy when it appears in local geographical settings. True, that deliberation may be highly mediated, and the action may be unexpected from a traditional standpoint, as in the case of consumer boycotts, but these interventions are the equivalent for a technologically advanced society of geographically local action in earlier times.

PARTICIPANT INTERESTS

What is it that unites the individuals in these new networked locales? Insofar as they are enrolled together, they have what I call "participant interests" in the design and configuration of the activities in which the networks engage them (Feenberg, 1995: 104ff). The concept of participant interests refers to the diverse personal impacts of technical activity: side-effects, both beneficial and harmful, social preconditions and consequences, effects on life conditions, and so on. Some of these are familiar, especially as they are articulated by unions in the sphere of production. As nodes in the technical networks of production, workers have participant interests in such things as health and safety on the job, educational qualifications and skill levels, and so on. Parallel phenomena characterize every type of network participation in every technical domain, although the emphasis differs from one domain to another.

Labor, for example, focuses most sharply on the impact of technology on job security, not an important consideration in other domains. Indeed, the labor movement is a rather limited case of technical politics, although it often functions as an implicit model of struggle over technology. The limits of this case are due to the peculiar evolution of the American labor movement, which agreed after World War II that most of the social and human context of production would lie outside the legitimate sphere of negotiation. Labor issues thus tend to be formulated in a way which abstracts from many of the most important implications of technology for workers.

This limitation dovetails with the tendency of economics and applied ethics to treat technology as a given, a constant, against the

background of which individuals pursue their welfare and face ethical choices. But, as Hans Radder writes, "What is at least as important [as 'moral choices,' 'adverse side effects,' and 'costs and benefits'] in a normative evaluation of (proposed) technologies is the *quality* of the natural, personal, and sociocultural world in which the people involved will have to live in order to successfully realize the technologies in question" (Radder, 1996: 150). World-defining technical struggles emerge around these considerations. They are the technical equivalent of major legislative acts. As they become more commonplace, the democratic significance of technical politics will surely become clearer.

There is no more compelling example of this phenomenon than the movement of disabled people for barrier-free design (Sclove, 1995: 194-195). This is a case where a very simple design change, the sidewalk ramp, transforms the daily life of a large population. That design change was excluded by standard codes so long as disabilities were regarded as private problems. When the disabled finally demanded facilities for mainstream social participation, this immediately impacted many technical arrangements. The changed technical code of sidewalk construction is semantically "pure" of the ethical considerations that justify it and refers only to cement, but it does in fact represent a definite social group and its demands for a more accommodating world.

The example of the struggle over AIDS discussed in the last chapter is a more complex case, revealing how life inside a technical network gives rise to participant interests in changing a technically constituted world. Patient demands for a generalization of experimentation were a way of accommodating medicine to the needs of the terminally ill. Note that those demands involved significant modifications of the technical rules under which experiments were conducted. The use of placebos, the requirement that subjects have no prior history of experimental participation, and the limitation of participation to statistical minimums were some of the arrangements that were challenged.

These challenges were issued on ethical grounds, although they are hardly matters of right in the strong sense in which the Nuremberg Code defined absolute claims human subjects could make regardless of cost and consequence. It would make more sense, I think, to argue that these demands reflect participant interests which define a good medicine *ought* to deliver insofar as its legitimacy as a profession rests on helping the sick.

What was at stake in this case? On the side of patients, clearly, the main concern was survival, but it would be an error to reduce the entire

movement to this one issue. Patients lived much of their lives in the world defined by medicine, yet the fact that they had an incurable disease seemed to disqualify them from attention and care. They did not accept this situation, but aimed to bring the organization of medicine into compliance with their human needs as participants in the medical world. To achieve this they proposed to transform experimental medicine into a standard form of care for the incurably ill, thus incorporating themselves fully into the system. That in turn implied a new ethical approach and corresponding design changes.

From the standpoint of researchers, the issue was posed differently. For them, experimentation was a means to knowledge, not medical care, limited by ethics out of respect for human rights. Since the patients shared both the cognitive goals of the researchers and their concern with the abuse of human subjects, compromise was possible. It required the translation of patients' ethical demands into appropriate technical form so that they could be satisfied in the course of knowledge production. Those demands were incorporated into the technical code of experimentation, i.e., formulated in technically rational terms as a guide to practice.

To achieve this, patients were drawn ever more deeply into the policy process and even the process of experimental design as they struggled to work out an acceptable compromise (Epstein, 1996). The outcome was the emergence of a new technical code supporting a significantly changed practice of experimental medicine that lay at the intersection of the participant interests of patients and the scientific concerns of researchers. Here we see the new role of ethics as a sort of switching post between the social and the technical.

DEEP DEMOCRATIZATION

Just as representative democracy deals effectively with space, so an equivalent form of representation can democratize temporally based technical power. But there are significant differences between representation in these two domains. Technical representation is not primarily about the selection of a trusted personnel, but involves the embodiment of social and political demands in technical codes. These codes crystallize a certain balance of social power. The problem of the loyalty of the representative, of his or her testimonial value, is far less significant in technical than in geographic representation. This is because entry into a technical profession involves socialization into its codes. A specialist who failed to represent the interests embedded in the code would be a technical failure

as well. No similar check on personal idiosyncrasy and self-interest applies in the world of ordinary politics.

This is not to say that technical personnel are free of idiosyncrasy and self-interest, but these faults take a somewhat different form than on Capitol Hill. Expertise has historically served class power. The bias in favor of representing the interests of a narrow ruling group is strongly entrenched. An undemocratic technical system can offer privileges to its technical servants that might be threatened by a more democratic system. These are not problems that can be solved by throwing the bums out as we occasionally do on election day. The investment in technical competence is too high, the opportunity cost of doing without it too great, for such an approach to make sense. Instead, the most important means of assuring more democratic technical representation remains transformation of the technical codes and the educational process through which they are inculcated.

This may explain why the most commonplace forms of struggle in the technical domain are the democratic rationalizations described in the previous chapter, the various controversies, appropriations, and dialogues that modify technical codes. Sociologists and historians have paid attention to these emerging phenomena, but their place in democratic political theory has been explored only occasionally and then primarily in terms of the role of hearings and lay panels in resolving controversies (Fiorino, 1989). The difficulty of explaining their democratic significance is no excuse for writing political theory today as though technical advance had ceased in 1776.

Habermas is as plagued by this allergy to technology as other political theorists, as I will show in the next chapter, but his approach in his most recent work has implications for the problem of technical representation. Unlike many theorists, Habermas squarely faces the fact that the modern state is *also* an administrative complex and not just a constitution made flesh in the form of elected bodies. Taking administration into account, as Habermas does more or less on the terms of systems theory, adds a welcome element of realism. If the word "technology" is substituted for "administration" in many contexts of his argument, the resulting paraphrase makes good sense and supports the position taken here. (The differences between technology and administration will be taken up in the next chapter.)

Habermas argues that the classical democratic idea of the state as the transparent self-reflection of the will of the "people" runs up against

the opacity of a vast administrative sector in modern societies. That sector is supposed to respond primarily to the norm of efficiency, but the complexity of its dealings is such that it necessarily transgresses the bounds of mere implementation. Administration is constantly obliged to go beyond the narrowly pragmatic choice of the most efficient means to explicitly legislated ends. As it engages with all sorts of inescapable issues that must be decided on normative grounds, its legitimacy comes into question. The medical example developed above is a clear case in point. The Food and Drug Administration was at the center of the controversy and could not escape its responsibilities by reference either to legislation or considerations of efficiency. State action, in this and many other instances, cannot be adequately conceived as the embodiment of the public will formulated in a central assembly, such as a legislature, capable of viewing and mastering the society as a whole. But how then can its decisions be legitimated?

Habermas's solution is participatory administration, administration open to influence from public inputs of one sort or another. These inputs would follow the fragmentary form of administrative action, intervening in specific cases as needed rather than proceeding deductively from general principles. Here is how he explains his position:

Insofar as the administration cannot refrain from appealing to normative reasons when it implements open legal programs, it should be able to carry out these steps of administrative law making in forms of communication and according to procedures that satisfy the conditions of constitutional legitimacy. This implies a "democratization" of the administration that, going beyond special obligations to provide information, would supplement parliamentary and judicial controls on administration from within. But whether the participation of clients, the use of ombudspersons, quasi-judicial procedures, hearings, and the like, are appropriate for such a democratization, or whether other arrangements must be found for a domain so prone to interference and dependent on efficiency, is, as always with such innovations, a question of the interplay of institutional imagination and cautious experimentation. Of course, participatory administrative practices must not be considered simply as surrogates for legal protection but as procedures that are *ex ante* effective in legitimating decisions that, from a normative point of view, substitute for acts of legislation or adjudication (Habermas, 1996: 440-441).

Technical decision-making, like state administration, often goes well beyond mere questions of efficiency to shape the social environment and life patterns of the citizens. It too has normative implications and requires legitimating mechanisms based on public inputs if it is to be incorporated into the framework of a modern democracy. These mechanisms must assure its representative character and remove the suspicion that decisions arise in pure arbitrariness or covert interests. As we already begin to see, short of some such development in the technical sphere, technology will become the object of increasing mistrust and contestation. Democratic rationalizations are examples of such participatory legitimations.

These considerations on representation take us far from the preoccupation with community that often characterizes reflection on democratizing technology. It seems to me necessary to get away from unrealistic notions like the use of national electronic town hall meetings to decide technological questions, or redesigning technology so it fits neatly into the local framework of real town hall decision-making. Such schemes delegitimize by implication the forms of intervention open to us today which are not usually based on the principle of majority rule in a community setting.

But we should not completely abandon concern for classical democratic controls in the technical sphere. Clearly, where local control is possible, it is desirable. However, I fear this will be the case much less frequently than Sclove would have us believe. It is reasonable to be guided pragmatically on questions of local control of administration. We have other less ambitious models than strong democracy of alternatives to technocratic control, such as the collegial organization of certain professionals. These collegial forms of organization of teachers and physicians have distant roots in the old craft guilds. Like vocational investment in work, collegiality has been replaced by capitalist management practically everywhere and survives only in a few specialized and archaic settings such as universities and hospitals. Even there it is increasingly threatened. Not the essence of technology but the requirements of capitalist economics explain this outcome (Braverman, 1974; Noble, 1984). Refined and generalized, collegiality might be part of a strategy for reducing the operational autonomy of management and creating systematic openings for democratic rationalizations. The recovery of collegial forms would be a significant step toward democratizing modern technically based societies.

There are other possibilities for electoral intervention. The summits of the technical bureaucracies could and should be chosen by conventional democratic means. Already stockholders elect the top managements of the enterprises they own. The boards of public corporations depend on elected officials. Electoral representation could be extended to offer citizenship to all participants in major technical institutions. In fact a radical version of this idea was proposed during the May Events under the name of "self-management." A disappointing vestige of the idea was realized by German and some Scandinavian unions, which won rights of "co-management," including participation of union representatives on boards of directors. But so far these reforms have had little impact on any advanced society.

I think there are two reasons for the relative failure of electoral control of technical institutions. In the first place, wherever some degree of control has been ceded, as in the case of German co-management, it is in a political context that admits of no major changes in technical codes. Thus co-management turns out mainly to be about preparing conventional labor negotiations, a useful function but not particularly relevant to democratizing technology.

It is not surprising that board membership is ineffective in a society where technical relations in production are uncontested. Indeed, the absence of such contestation is probably a condition for achieving board membership under capitalism. What is perhaps more worrisome is the lack of pressure to democratize public technical institutions in which everyone has a large stake, institutions such as utilities, medicine, and urban planning that are only loosely controlled by elected officials today, if at all. These institutions are not constrained by the logic of the market and could offer more receptive terrain for experimentation. But as Dewey foresaw, the dispersion of the technological citizenry, combined with a privatized culture and a media-dominated public process account for the passivity of a society which has not yet grasped how profoundly affected it is by technology. Only as that realization dawns are citizens likely to demand electoral checks on the policy-making bodies in control of technology.

Because technical leadership has a distinct place in the division of labor, it will always remain separate from the mass, and cannot be replaced by popular action. Nevertheless, the operational autonomy of experts and managers could be significantly reduced. Its maximization in the present system serves elite control. That control would be threat-

ened if technical authority was accommodated to the gradual enlargement of subordinates' tactical initiative. As we saw, this was precisely what many members of the middle strata demanded in the course of the May Events. As distinct from "strong" democracy, I will call a movement for democratization "deep" where it includes a strategy combining the democratic rationalization of technical codes with electoral controls on technical institutions. Such a deep democratization would alter the structure and knowledge base of management and expertise. The exercise of authority would come to favor agency in technically mediated social domains. Deep democratization promises an alternative to technocracy. Instead of popular agency appearing as an anomaly and an interference, it would be normalized and incorporated into the standard procedures of technical design.