

TECHNĒ AND *POLITEIA* REVISITED: PRAGMATIC PATHS TO TECHNOLOGICAL REVOLUTION

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I. TALK ABOUT REVOLUTION IS EASY, BUT REVOLUTION IS HARD

"Talk about revolution is easy," Marx Wartofsky warned us during his presidential address to the Society for Philosophy and Technology meeting in Bordeaux in 1989, "but revolution is hard." Compared to the technological revolutions that replaced wood with steel and steel with synthetics, he predicted, the next one will be much more difficult; to get there we will have to politicize technology.

But what does it mean to politicize technology? If that is how the activists among us are going to mount the next technological revolution (or how the determinists among us are going to recognize it when it gets here), then perhaps it is high time we all got clear about what the idea means. The problem is that the very idea of politicizing technology invites a smorgasbord of interpretations.

It is worth remembering, for example, that some of the programs that have been billed as attempts to politicize technology have been less than felicitous. For the hardline "scientific" Marxists, for Stalin and his clones who dominated the technoscientific programs of the Soviet Union and its satellite states during the half century following the end of World War II, politicizing technology most often meant centralized control of just about everything by political hacks, and a relentless pursuit of what Langdon Winner has called "straight-line instrumentalism." These Marxists had read the part of their gospel that said that the hand mill gives you feudalism and the steam mill gives you industrial capitalism. And so they went forth to practice what they preached: since technologies tend to determine forms of political life, they chose and enforced the technologies that would yield the forms of political life that they knew in advance were the best for everyone concerned.

As we all know, however, these were not the only Marxists around. Some of the other ones, the softer Marxists who preferred the younger, pliable Marx to the older, tougher, intransigent one, viewed matters rather differently. Their "critical

theory," as Max Horkheimer put it, "rejects the kind of knowledge that one can bank on. It confronts history with that possibility which is always concretely visible within it."¹ Like their hardline cousins, the critical Marxists also wanted to politicize technology by altering its infrastructure, but they thought that they saw a good bit of play within the movements of history, and consequently, thought it advisable to roll with the punches.

Today Horkheimer's heirs tend to spend their time analyzing and criticizing communication, especially the communications media. Some of them write books on film studies and even produce programs for community access TV. Others, such as Jürgen Habermas, are struggling to get a broader sense of the ways that political communication takes place within technological societies and how it can be improved.

The critical theorists have produced excellent critiques of the media. They have also made valiant attempts to teach their students to look and listen critically. The problem, however, is that we who appreciate their work and use their texts in film and media courses do not seem to be making much headway toward technological revolution. Advertisers spend billions of dollars each year to influence the way we think, whereas most of us who teach film and media courses tend to have budgets in the mid-to-high two digits. Even public television is threatened with extinction in the American hinterland because, according to the current Speaker of the House of Representatives, it is "leftist and elitist." Despite the best efforts of the critical Marxists and those of us who are sympathetic with their work, it is the new philistines—from Howard Stern and Rush Limbaugh to Rupert Murdoch—who increasingly control the media of communication. Apparently, the next technological revolution will not be broadcast on television -- either public or private.

Wartofsky's view, which he presented to us with tantalizing brevity, is that to politicize technology means to democratize technology. To democratize technology, in its turn, he told us, means first the sharing of power and second the "education, in a major way, of the scientific and technical understanding of the public to the extent that some forms of democratic participation in scientific-technical policy-making becomes feasible and useful, and not simply an empty populist piety."²

Few today would deny that these are worthy objectives, even though some might be tempted to question the sequence of Wartofsky's steps to revolution. I myself would suggest that education is always education for power-sharing, and, failing that, what passes for education is little more than either indoctrination, on the one hand, or haphazard self-expression, on the other. In the absence of public education, it now seems more obvious than ever, we run the danger of getting a kind of talk-radio populism that is long on opinion and short on discrimination. I shall have more to say about this in a moment.

In his essay "*Technē and Politeia*," published about a dozen years ago, Langdon Winner presented yet another version of politicized technology. Instrumental technology, he argues, especially the technology of the military-industrial complex, has become a *de facto politeia*. It is as if we have backed ourselves into a "second" constitution, he suggests, "one that stands parallel to and occasionally overlaps the constitution of political society as such." For Winner, "the important task becomes, therefore, not that of studying the 'effects' or 'impacts' of technical change"—a social scientific approach that he thinks is committed to a passive stance—but of "evaluating the material and social infrastructures that specific technologies create for our life's activity." ³

What the critical theorists want to do with the communications media, Winner wants to do with decentralized solar energy. This is just one of his examples of a politicized technological infrastructure which, when multiplied many times over by similar examples, would precipitate a technological revolution that would usher in a new dawn of democracy, freedom, and justice. Change the technological infrastructure in certain ways, Winner promises, and you will change the ways that people relate to one another. Change the ways people relate to one another, and you have your technological revolution. The way to keep technology from becoming autonomous, he seems to say, is first to recognize how and which technologies determine which forms of life, and then to manage those technologies by choosing the ones that are appropriate to your political ends. We thus get a technological revolution by politicizing technology, and politicizing technology means choosing among possible technologies so that things go our way.

Even though this recipe seems plausible enough, there do seem to be a few loose ends. First, who gets to choose the technologies? And if we decide that it is we enlightened philosophers of technology who get to do the choosing, then how do

we get other people to agree that the goals of our technological revolution are worthwhile? And even if this can be accomplished, how do we overcome the enormous momentum exhibited by the current infrastructure? How do we change the infrastructure that changes the political situation that precipitates the revolution? Wartofsky certainly had it right: talk about revolutions is easy; revolutions are hard.

In the United States of the 1990s, politicizing technology is often confused with technologizing politics, in the worst of senses. It has come to mean infomercials, talk radio (in which uninformed harangues are regarded as the full equivalent of informed debate), and so on. The great techno-prophet Marshall McLuhan warned us some 30 years ago that one of the first casualties of the electronic revolution would be civility. Electronic media, he argued, would create the new form of interaction that he called "the global village." But unless educational reforms accompany the rise of the new communications technologies, the electronic village will have the same defects as the old pre-industrial ones: it will be a place where rumor and disinformation are rampant and where people are less interested in creative debate about matters of common interest than they are in the titillating effects of sticking their noses into everyone else's business. The new electronic village would turn out to exhibit the very features that led both Plato and Aristotle to treat democracy as a defective form of political association. Perhaps Plato and Aristotle were correct. Or, to shift from Greek to Hebrew, it now appears that even the garden of eden we once thought the Internet to be now has its serpents and its original sinners.

Leaving aside the failed program of the scientific Marxists, let us assume that Wartofsky and Winner and the critical theorists are correct. Let us suppose that we need a technological revolution, that such a revolution would politicize technology, and that politicizing technology means making our technological infrastructure more user-friendly. What is the next step? Do the mainstream methods of philosophy offer us any help in getting our revolution under way?

II. PRAXIS PHILOSOPHIES TAKE US BEYOND ANALYTIC PHILOSOPHY TO THE THRESHOLD OF TECHNOLOGICAL REVOLUTION

Analytic Philosophy: It is now more or less admitted, even by its practitioners, that analytic philosophy has been either unwilling or unable to develop

a robust philosophy of technology. It therefore has little to say about technological revolution.

Several characteristics of analytic philosophy have contributed to this situation. First, the primary interest of analytic philosophy is by definition spoken, written, or "conceptual" language, whether in its ideal or its ordinary configuration. Even Wittgenstein, who during his later career adopted a view of language as instrumental, never seemed to get beyond his preoccupation with language to a consideration of the role of other sorts of instruments within human life. Even in Wittgenstein's rich and suggestive discussion of slabs and bricks, for example, non-linguistic artifacts seem to function as little more than props for a discussion of language. It may well be, as John Dewey remarked, that language is "the tool of tools." But for a robust philosophy of technology, it is hardly the only tool.

Second, although Wittgenstein and his followers have attempted to undercut such assumptions, much of the rest of analytic philosophy has remained solidly within the tradition of "substance-accident" or what some have called "spatial" metaphysics. This commitment is not always apparent, since some of the practitioners of this view express themselves indirectly by means of "propositional" analyses. But substance-accident metaphysics, I suggest, is too rigid to respond to the dynamism of the contemporary technological milieu, and especially to the functional subtleties and multiple taxonomies spawned by electronic technologies. Put another way, it is fair to say that substance-accident metaphysics is not inimical to a robust philosophy of technology as long as it is not taken literally, but only as one functional metaphor among many. Unfortunately, however, because of their strong commitment to correspondence theories of truth, the tendency of most substance-accident philosophers seems to be to get at the literal truth of literal propositions that correspond to literal states of affairs. (Of course commitment to substance-accident metaphysics and the scientific realism that usually accompanies it is not unique to analytic philosophy, nor is it held by all analytic philosophers. On one side, Wittgensteinians have tended to reject such views. On the other side, it is a feature of philosophical critiques of technology mounted by some neo-Heideggerians.)

Third, and perhaps most important, analytic philosophy has tended either to ignore or to deprecate the role of the body in intelligent behavior. As Hilary Putnam has pointed out, there is high irony in the fact that current analytic philosophy,

which is the grandchild of logical positivist scientizers, has become the most metaphysical of current philosophical schools. In their preoccupation with "possible world" semantics, some ideal language philosophers seem blissfully ignorant of the technologies that influence lives in this world. In their preoccupation with speech acts, some ordinary language philosophers appear myopic with respect to the technologically embodied matrix in which illocutionary acts are performed and by which they are colored. And even some social and political philosophers who have been trained in the analytic mode suffer from this narrowness of vision. It is possible, for example, to read hundreds of pages of discussion about the role of Rawls's "veil of ignorance" as an instrument for enhancing social justice without ever once encountering a discussion of the many and varied ways in which the embodied situatedness of human beings affects their self-perception, and therefore the preconditions for their entering into the type of contract in which a veil of ignorance might prove a significant tool.

It is not the point of this exercise to discredit or demean any of the various schools of analytic philosophy. My point instead is to distinguish the pure atmosphere in which most analytic philosophers work from the world in which they and most of us live our lives. John Dewey thought the work of abstraction essential to the enlargement of knowledge: "Artificial simplification or abstraction," he wrote, "is a necessary precondition of securing ability to deal with affairs which are complex, in which there are many more variables and where strict isolation destroys the special characteristics of the subject-matter" (LW 4:173).⁴ At the same time, however, he warned us, we err "when the results of an abstractive operation are given a standing which belongs only to the total situation from which they have been selected" (LW 4:173-74). William James expressed the same view, with considerably more flair, when he compared the work of abstraction and analysis to the air above an aquarium. If the air were not there to oxygenate the water, the fish could not live. The air may be *what* the fish eventually breathe. But it is not *where* or *how* they live or breathe, and it must be transformed before they can breathe it. It is necessary to their existence in the sense that it is required, but it is only one of the factors that sustain them.

Praxis Philosophies: Praxis philosophers have taken a major step beyond the analytic tradition and toward the development of a robust philosophy of technology. They have, in my view, taken us to the doorstep of requisite technological revolution. Martin Heidegger, Maurice Merleau-Ponty, Don Ihde,

Hubert Dreyfus, Albert Borgmann, and many others have substantially broadened the scope of philosophical discourse in ways that continue to enrich our understanding of the technological dimensions of our environment. These philosophers have gone beyond the analysis of spoken and written language (and its corresponding concepts) to consider the work of the gestalt psychologists, the role of the body in situating and anchoring human activity, and the function within human life-worlds of myriad instruments, from Merleau-Ponty's hat-feathers, to Ihde's dental picks, to Heidegger's hammers.

As admirable as their contributions have been, however, I believe that the praxis philosophers have carried us only to the threshold of technological revolution. They have stopped short of illuminating the next step.

The work of Martin Heidegger richly illustrates this point. It is well known that Heidegger's critique of technology exhibited two quite distinct stages. In the first stage, represented by his 1927 *Sein und Zeit*, Heidegger "existentializes" Husserlian phenomenology by jettisoning foundationalism and the transcendental ego and by emphasizing and exploring the notion of human situatedness, or *Dasein*. Within this situatedness Heidegger provides a brilliant analysis of the deep fissure that divides two types of technological response to the world. On one side of the chasm there is a background of familiarity and competence, a background of tools and artifacts that have been assimilated within our quotidian lives in ways that have made them virtually transparent in use. As a part of the background, Heidegger's hammer is no longer consciously engaged, but just used. On the other side of the divide there are tools in use, "ready to hand," that is, involved in activities that require conscious instrumental engagement and where intelligent, authentic work gets done.

The early Heidegger thus masterfully undercuts the traditional problems associated with skepticism and spatial metaphysics, and he gives new urgency to an analysis of the role of the body in human action. Here is Don Ihde's gloss on the concept of *Dasein* in *Sein und Zeit*: "The human being always finds himself or herself *already bodily in* a situation, *in* a World. Moreover, this existential 'in' becomes the primitive for all other 'ins' which could be abstracted or derived from it. The geometrical 'in' as a dot within a circle is a derivative 'in.' Heidegger's analysis is to be the explication of the dimensions of that being-in-a-situation." ⁵ So

much for spatial metaphysics, disembodied egos, and the problem of "other minds," too.

Many of Heidegger's interpreters, including Ihde, have read the first, early Heidegger as inverting the traditional model according to which theory is treated as superior to practice, knowledge to action, and science antecedent to technology. I have no desire to quarrel with this reading, but rather to suggest that, although it is correct, it does not furnish the requisite conditions for a technological revolution.

Well known difficulties arise when we come to the work of the second, or later Heidegger: the post-war Heidegger of the "Letter on Humanism," "The Question Concerning Technology," "The Turning," and most notably the notorious *Spiegel* interview.

The second Heidegger seems intent on re-inverting his earlier inversion by recourse to a romanticism in which all technē is reduced to or arrogated to poetry in the narrow sense of word-craft. In his hands, the terms "essence," "accomplishment," and even "produce" take on meanings that are primarily associated with thinking in almost a Parmenidean vein, and not with practice. In his "Letter on Humanism," for example, Heidegger writes,

The essence of action is accomplishment. To accomplish means to unfold something into the fullness of its essence, to lead forth into this fullness—*producere*. Therefore only what already is can really be accomplished. But what "is" above all is Being. Thinking accomplishes the relation of Being to the essence of man. It does not make or cause the relation. Thinking brings this relation to Being solely as something handed over to it from Being. Such offering consists in the fact that in thinking Being comes to language. Language is the house of Being. In its home man dwells. Those who think and those who create with words are the guardians of this home. Their guardianship accomplishes the manifestation of language and maintains it in language through their speech. Thinking does not become action only because some effect issues from it or because it is applied. Thinking acts insofar as it thinks. Such action is presumably the simplest and at the same time the highest, because it concerns the relation of Being to man.⁶

I am unable to find even a hint of technological revolution in this passage which so finely distills Heidegger's later view of technology. As I have said, however, I do find evidence that Heidegger has re-inverted what he so skilfully inverted in his early work. Some, including Richard Bernstein and George Steiner, have suggested that texts such as this one offer a key to Heidegger's now notorious political and ethical disasters. "Despite Heidegger's own appreciation of Aristotle's *Ethics*," writes Bernstein, "he never does justice to what distinguishes *praxis* from *poiēsis*, or *phronēsis* from *technē*—to what Hannah Arendt calls the human condition of plurality—the basic condition of both action and speech." ⁷

Although I think that Bernstein's assessment is essentially correct, I would give the matter a somewhat different spin. My own suggestion is that Heidegger's political and ethical failures were due to his peculiar failure of nerve. He thought he saw the way to proceed beyond the threshold of technological revolution, and he acted by focusing his hope on the "truth" of a totalizing political movement. But in doing so, he failed in two important ways. First, he failed in his attempt to make a clean break with the tradition of western metaphysics. Seen in retrospect, his early work now seems more an *analysis* of the notion of practical situatedness than a *showing* of how practical situatedness can be intelligent: more an *analysis* of authenticity than a *demonstration* of how claims to authenticity can be tested. At the very least, as Marcuse pointed out, the treatment of situatedness and authenticity in *Being and Time* explicitly precludes any putative isolation of Heidegger the professor from Heidegger the morally accountable person. ⁸

Second, Heidegger failed to realize the intrinsic connections between methods of scientific technology and the methods of democracy, taking both in their best and most robust senses. Heidegger may well have attempted to politicize technology, but it is my hope that few of us would wish to follow the path he chose.

In short and in retrospect, the early Heidegger now seems to have treated the practical as a subject for analysis, for which he could find no appropriate outlet among existential, in this case political, concerns. In his later work, as I have just suggested, there seems to be a reinversion of what he had earlier inverted. Heidegger's technological malaise leads him during his later period to an almost pathological fear of technological nihilism and consequently to hold that thinking and poetizing are more than adequate substitutes for other types of concrete productive activities—and this because the former harbor the hope of salvation from

the unthinkable consequences of the latter. Heidegger seems to have had a troubled vision of the yawning maw of a nihilistic technological milieu and then to have retreated to a defensive position that eventually proved to be tragically vulnerable.

Some, of course, have claimed that what I have called the failure of the later Heidegger is not so much failure as it is a retreat from political activity. My own response would be to paraphrase Dewey: there are at least some situations, among which is the public disappearance of tens of thousands of one's neighbors, in which to be apolitical is to be a moral failure.

Seen in this light, there is deep irony in the work of the later Heidegger. Romanticism, as it is usually described, involves a heightened sense of nature and emotion. But a full sensory involvement in inquiry is precisely what is lacking in Heidegger's later work. His romanticism remains internal, idealistic, and confessional in its approach to the problems of technology. It seems unencumbered by the dose of naturalism that tends to keep romanticisms healthy. His romanticism involves the celebration of an aesthetic moment, but that moment never becomes fully cognitive and is therefore unable to make a fruitful entrance into the public sphere. If we learn anything from Heidegger, it is that the path to technological revolution lies neither in politicizing technology with the help of anti-democratic totalizers nor in the romantic hope that a god will come to save us.

Paranthenically, I remind you that, despite brilliant analyses of perception and embodiment, even Merleau-Ponty—who spent years grappling with the problem of how to politicize technology or what he called "work"—ultimately retreated into a kind of idealism that viewed all political practices as more or less equally valuable parts of Being.

The patrimony of the praxis philosophers then—especially Heidegger and Merleau-Ponty—includes brilliant analyses of perception, of the embodied situatedness of human beings, of behavioral and gestalt psychology, and of the ways in which tools measure the contours of our life-worlds. They have explored the ways in which technology is embedded not only within experimental science, but within culture as a whole. But their program remains primarily an analytic one. They have taken us to the threshold of technological revolution, but beyond their retreats into romanticism or idealism, they have left us few suggestions concerning what might constitute the next step.

III. PRAGMATIC PATHS TO TECHNOLOGICAL REVOLUTION

If praxis philosophies have brought us to the threshold of technological revolution but have not been able to illuminate the next step, then where does that leave us? Is our best option now to turn to the idealisms of the eastern Asian philosophies, as Michael Zimmerman recently suggested during a panel sponsored by this society?

Although it has been virtually ignored in some quarters, American pragmatism is coming to be recognized in others, such as in the work of Jürgen Habermas, as consolidating and advancing what is best in both analytic and praxis philosophies.

I am aware that some, including Don Ihde, view pragmatism as one of the praxis philosophies. It is true that there are some remarkable similarities between the work of Dewey and Mead, on the one hand, and Heidegger and Merleau-Ponty, on the other. The pragmatic instrumentalism of Dewey and Mead during the first decades of this century exhibited a number of ideas that would be taken up by Heidegger and Merleau-Ponty several decades later. There is a rejection of the spatial metaphysics of the western substance-accident tradition; there is a novel emphasis on the role of the body in human experience; there are discussions of the situatedness of human beings within their life-worlds; there is an appreciation for the role of non-linguistic tools in human life; there is a social behaviorism not unlike that found in the work of Merleau-Ponty; and there is an appreciation for the temporal aspects of human existence. Further, Dewey even anticipated by several decades Heidegger's discussion of *zuhandenheit* and its background of "competence and familiarity," along with Merleau-Ponty's treatment of instrumental space and knowing as prehensile rather than spectatorial.

Merely to stress the priority of these features of Dewey's work, however, would be to miss the larger point; some of his other insights push beyond the contributions of the praxis philosophers in ways that have still not been fully appropriated by philosophers of technology. I shall limit my discussion to three of these features.

1. First, if praxis philosophies (with the possible exception of what I have called the "re-inversions" of the later Heidegger and the later Merleau-Ponty) tend to

invert the traditional relation between theory and praxis, then Dewey's instrumental pragmatism recasts the relationship altogether. As I have indicated, praxis philosophies tend to privilege practice over theory, and to demonstrate that theory derives from practice. Praxis philosophies may thus be called philosophies of action.

Despite the claims of some of its critics, however, pragmatism is not in the last analysis a philosophy of action. In a richer sense even than has been developed by the critical theorists, pragmatism is a philosophy of production. To put the matter a bit differently, it is a philosophy of "warranted assertion" in the broadest sense in which assertions are a part of art, history, and law, as well as the technosciences. It is interested not simply in action, but in operationalizing outcomes with a view to the production of *habits* of action. Its concern focuses on the checks and cues that validate the results of the interaction of thinking and practice as it comes to be worked out in the realm of existential affairs. Pragmatism thus regards the question of primacy regarding theory and praxis as a "chicken and egg" question. The three pragmatists of the classical period— Peirce, James, and Dewey—exhibit surprising unanimity on this matter: the goal of inquiry is not action, but the construction of new and more refined habits, tools, goals, and meanings, in short, new and more refined products. The term "more refined" is operationalized, contextualized, and provisionalized.

Nowhere did Dewey express the matter of the pragmatic alternative to praxis philosophies more clearly than in his Gifford Lectures, published in 1929 as *The Quest for Certainty*. "In reaction against the age-long depreciation of practice in behalf of contemplative knowledge," he wrote, "there is a temptation simply to turn things upside down. But the essence of pragmatic instrumentalism is to conceive of *both* knowledge [or theory] and practice as means of making goods—excellencies of all kinds—secure in experienced existence" (LW 4:30 n.1).

In the hands of the pragmatists, then, theory and practice become equal partners as phases of inquiry. Working together, they orient themselves not just to the analysis of the past or present, but to plans for the future. Like good business partners, they are always negotiating with one another about the feasibility, design, cost, and marketability of potential products. Theory keeps an eye on practice, making sure that options are kept open, that imagination enters into the design stage, and that potential products are coherent with the larger goals of the firm.

Practice keeps an eye on theory, making sure that design and production goals are not too ambitious or too fanciful, that products correspond to the needs of the market, that inventories of products and spare parts are maintained, and that the cash flow is sufficient to start the next project. Together, theory and practice engage in a conversation that constantly adjusts means to ends-in-view, and ends-in-view to the means at hand. The goal of the partnership is not merely action, but production. The goal of the partnership is continual adjustment to changing situations by means of the development of enhanced tools and new products.

2. In addition to recasting the relationship between theory and practice, Dewey's pragmatism offers a second advance over praxis philosophies. Whereas a primary focus of praxis philosophies has been on an analysis of situated perception, Dewey's focus was on inquiry. It is true that for the pragmatist inquiry embeds situated perception. But inquiry is more than situated perception. New ways of feeling and seeing are often the impetus, and even more often the outcome, of inquiry. But they are only a part of its overall program. Inquiry also involves the active development of new and better tools for the articulation of problems, for the formulation and testing of ideas and other artifacts, and for the integration of results within the stable platforms that remain outside of a particular sequence of inquiry because they are behaviorally unproblematic.

In other words, pragmatic instrumentalism gives new emphasis to the time vector within inquiry. It is one thing for Marx to say *that* human beings are the makers of their world and to *predict* what kind of world they should make. It is one thing for Merleau-Ponty to tell us that human beings are "condemned to meaning" and to say that they adjust through time. But it is quite another, as Merleau-Ponty's critic Pierre Hervé pointed out, to go beyond the phenomenology critique, and prophesy with respect to work and production—and then to advance concrete suggestions about how to test its outcomes. Pragmatism focuses on outcomes without suffering the defects of popular forms of consequentialism, and it advances the view, which it claims is derived from inquiring experience, that the norms of inquiry are produced within inquiring activities themselves, and not introduced from outside it.

Whence arise the norms by means of which we judge our tools and products, including those that are political? Dewey addresses this question in the introduction to his 1916 *Essays in Experimental Logic*. Just as in the case of

agricultural practice, they are formed not *by* farming, but *from* farming. *Ceteris paribus*, the norms of politicizing technology are not formed *by* the process of politicizing technology, but arise *from* the process of politicizing technology. Norms arise neither from the iron laws of history, nor even from specific hardware technologies. They arise through the interaction of theory and practice as it provides intelligent answers to perceived problems.

3. This leads me to my third and final point of difference between pragmatic instrumentalism and the praxis philosophies. This point may also help to clarify the previous one. A central feature of Dewey's work—a feature that is noticeably missing from the praxis philosophies as I know them—was his philosophy of education. An outgrowth of his own groundbreaking work in psychology, Dewey's instrumental educational program was specifically designed to revolutionize technology by democratizing it, but in a different sense than I have discussed up to this point.

Specifically, Dewey defined democracy as "belief in the ability of human experience to generate the aims and methods by which further experience will grow in ordered richness" (LW 14:229). Democracy is therefore not so much the maintenance of an historical institution, or even work toward a fixed goal, as it is a method of education. Dewey wanted to convince us that methods of democracy, like the methods of the technosciences in their broadest sense, involve "the faith that the process of experience is more important than any special result attained, so that special results achieved are of ultimate value only as they are used to enrich and order the ongoing process. Since the process of experience is capable of being educative, faith in democracy is all one with faith in experience and education" (LW 14:229).

What does Dewey mean by experience in this connection? He tells us that it is "that free interaction of individual human beings with surrounding conditions, especially the human surroundings, which develops and satisfies need and desire by increasing knowledge of things as they are. . . . Need and desire— out of which grow purpose and direction of energy—go beyond what exists, and hence beyond knowledge, beyond science [as a body of knowledge]. They continually open the way into the unexplored and unattained future" (LW 14:229).

In Dewey's view, then, there are many paths to technological revolution—a revolution that would democratize technology by introducing into political and social life the techniques that have proved so successful in the various technosciences. These paths to the democratization of technology are committed neither to any particular institution, to any particular historical practice, nor to any particular set of beliefs. Neither are they committed to any predetermined goal. Because of their intimate relationship to science and education, they do not seek any particular result. They consist instead of the application of methods of adjustive inquiry that have proven successful in the various technoscientific disciplines, and in education (insofar as they have been tried out), but that have yet to be applied in most areas of human life. Such methods are open-ended in terms of their potential for their own (methodological) self-development and self-correction.

For Dewey, productive education is neither indoctrination, on the one side, nor haphazard self-expression, on the other. It instead involves cooperation between teacher and learner in ways that alter and enrich the experience of both. It is this feature of education—not just in the schools but in a lifelong curriculum—that makes it potentially revolutionary.

In the broad sense in which Dewey uses the terms, therefore, there is ultimately no difference between technologizing politics and politicizing technology, since technology is for him the name of the method of inquiry which, when applied to political association, enriches and makes worthwhile the life of each associated individual and therefore enriches the associated whole. And it is only as such political associations themselves become richer and more meaningful that our forms of technological life achieve balance.

For Dewey, the paths to technological revolution, and therefore both the politicizing of technology and the technologizing of politics, lead through the school house and the school board, through the local newspaper and the national journal of opinion, and through various levels of government. They lead through the workplace, through the places where religious and civic groups gather, and through the courts. They lead to more, not less technology, once technology is understood as the intelligent production of new tools, including conceptual and ideational ones, for dealing with problematic situations. They lead not to the cheap talk about individualism that is most often a cover for retreat from common action, but to a

true individuality that enables children and adults alike to undertake a lifelong quest to develop their capacities to the fullest extent, whatever those capacities may be.

To politicize technology in Dewey's rich sense is thus to technologize politics in a richer sense than we have heretofore seen. For Dewey, technology is a rich blend of theory and practice that eventuates in new and improved tools for living and out of which new norms develop. It involves improved taxonomies of perception as inquiring skills are improved. And its methods are synonomous with the methods of the sciences and the methods of democracy. Linguistic and other types of analysis, together with practice of all sorts, constitute *phases* of inquiry, but are neither separately nor conjointly its equivalent. For Dewey, technology has to do with ideals and goals and ends-in-view in so far as they are transformed by means of intelligence. For Dewey, differentiation between tangible and intangible tools is a functional, not an ontological matter. When such differentiation is required, it does not exist *in re* but in inquiry.

What I find so attractive in Dewey's work is his deep commitment to three ideas about technological revolution, or what in a 1939 essay he called "political technology." The first is that technological revolution is not a matter of distinguishing technologies from the ways in which we use them, because our technologies *are* the ways we use them. The second is that there are no recipes for technological revolution, nor could there be. Technological revolution is not a goal but a process that takes on new dimensions and new import at each stage of its development and whose outcome can therefore never be predicted. And the third is that talking about revolution is easy, but making one is the most difficult and necessary task before us.

IV. ADDENDUM

I wrote this in early 1995. Later in the year, at an American Philosophical Association meeting, several leading thinkers representing the earliest work in philosophy of technology commented on the past twenty years—and more specifically on the work of the Society for Philosophy and Technology, including its future. (See PHIL & TECH 1:1-2, Fall 1995.)

As I conclude, I want, briefly, to tighten up the relevance of my remarks to the work of the Society for Philosophy and Technology.

In terms of recent work in our field, this is certainly the best of times. I mention here the recent publication of Paul Durbin's recent wonderful, meaty, book *Social Responsibility in Science, Technology, and Medicine*.⁹ Durbin skillfully articulates the many senses in which scientists, engineers, and others with technical training have social responsibilities. He then goes on to lay out trenchant analyses of current techno/social problems and to construct complex and insightful suggestions of how they can be approached. Throughout his book, he demonstrates what he takes to be the weaknesses of technological pessimisms. Among his targets are those I would identify as the jeremiadic marxist pessimism of Marcuse, the pious calvinist pessimism of Ellul, the piecemeal (but inevitably witty) new-left pessimism of Winner, the moderately luddite neo-heideggerian pessimism of Borgmann, and the romping fundamentalist luddite pessimism of Rifkin.

Following a path blazed by his spiritual mentor George Herbert Mead, Durbin argues a position that has also been taken up in the work of Habermas, namely that both utopian and dystopian thinking have been proven fanciful and unproductive: that human progress, when it occurs, is piecemeal, painstaking, and the result of human beings continually educating themselves through communication with one another. And following a path blazed by another of his intellectual heroes, John Dewey, Durbin argues that ethics is inextricably linked with social problem-solving and that activism is a *sine qua non* of intelligent technology.

Another cause for celebration within our society is Carl Mitcham's recent book *Thinking Through Technology*.¹⁰ In my view, Mitcham has written the best ever critical overview of the history, current issues, and prospects of our field of study. Mitcham's central argument is that there are two overarching and competing views of the philosophy of technology that need to be reconciled, namely the philosophy of *technology* as articulated by engineers, and the *philosophy* of technology as articulated by humanists. He issues a call for a broadened and deepened humanistic philosophy of technology that would take the concerns of engineers more seriously. Along the way he provides helpful taxonomies of technological objects, activities, and attitudes.

There are still other reasons to consider this the best of times for our field. I call attention to new study groups and new fields of study, and the renewed attention to older fields of study, that fall within the scope of the interests of this society. Of particular note is the work being done at the University of Alberta by Eric Higgs and

Andrew Light (in concert with Eric Katz, at the New Jersey Institute of Technology) on environmental issues, and the new Society for Philosophy and Geography, whose first meeting was sponsored by our society. I mention also the new initiatives now being undertaken by our society, including the new electronic journal in which my remarks appear. All this amounts to richer conversations, broader reaches, and a transfusion of energies into our society provided by some of its newer members.

And yet for our society, for our several nations, and for our global outlook as well, this is also the worst of times. I scarcely need mention the accelerated splintering of specialisms in the scientific-technical community that make it increasingly difficult for scientific-technological workers to communicate with one another, let alone to communicate their accomplishments and concerns to the wider public. I mention also the numerous national and global problems which many of the members of this society monitor and criticize at our meetings. Unchecked population growth, deforestation and desertification, topsoil depletion, the promises and perils of genetically altered food sources; these are just a few of the issues that make up the long list of current problems and difficulties.

At a more abstract level, but one that comprises issues that are no less important than the ones I have just mentioned, the basic constitution of the republic of technology is being assaulted from within and without. New and ever more sophisticated forms of luddism include the many varieties of fundamentalism—from creation science and other anti-scientific movements in the United States to the Islamic theocracies of the Middle-East and North Africa, some of whom are now developing nuclear weapons.

Where does all this leave us as the Society for Philosophy and Technology? I believe that it leaves us with definable but difficult tasks, a wonderful set of tools with which to confront those tasks, and multiple opportunities to make a difference, working both individually and together. It is my hope, and my expectation, that we will be able to rise to those opportunities.

NOTES

1. Max Horkheimer, "The Authoritarian State," *Telos*, Spring 1973, p. 11.

2. Marx Wartofsky, "Technology, Power, and Truth: Political and Epistemological Reflections on the Fourth Revolution," in *Philosophy and Technology*, vol. 9: *Democracy in a Technological Society*, ed. Langdon Winner (Dordrecht: Kluwer, 1992), p. 18.
3. Langdon Winner, *The Whale and the Reactor* (Chicago: University of Chicago Press, 1986), p. 55.
4. Standard references to John Dewey's work are to the critical edition, *The Collected Works of John Dewey*, edited by Jo Ann Boydston (Carbondale and Edwardsville: Southern Illinois University Press, 1969-1991), and published as *The Early Works* (EW), *The Middle Works* (MW) and *The Later Works* (LW). These designations are followed by volume and page number.
5. Don Ihde, *Instrumental Realism* (Bloomington: Indiana University Press, 1991), p. 49.
6. Martin Heidegger, "Letter on Humanism," reprinted in *Martin Heidegger: Basic Writings*, ed. and trans. David F. Krell (New York: Harper and Row, 1977), p. 193.
7. Richard Bernstein, *The New Constellation* (Cambridge: MIT Press, 1993), p. 124.
8. Victor Fariás, *Heidegger and Nazism* (Philadelphia: Temple University Press, 1989), p. 283.
9. Paul Durbin, *Social Responsibility in Science, Technology, and Medicine* (Bethlehem: Lehigh University Press, 1992).
10. Carl Mitcham, *Thinking through Technology* (Chicago: University of Chicago Press, 1994).