The Meanings of Technology
Robert E. Innis
University of Massachusetts Lowell

I would like to focus my comments upon a theme and an ambiguity that paradoxically are at one and same time both central and peripheral to the solidly Deweyan take on technology that Larry Hickman charts in his latest book, *Philosophical Tools for Technological Culture: Putting Pragmatism to Work* (2001). Technology, as understood by Hickman, is not only the fundamental way or ultimate matrix in which meanings, in all their varieties and permutations as artifacts, are produced and situated by inquiring human beings. It is also the fundamental analytical (indeed normative) category for understanding the production of meanings that are both the stimulus to and the outcome of the general pattern of inquiry that makes up the method of intelligence proper to human beings. My concern, as is Hickman's, is both descriptive and normative. On the one hand, I want to address the descriptive or heuristic adequacy, or at least the comprehensiveness, of the choice of Deweyan conceptual tools that make up Hickman's analytical toolbox. On the other hand, I want to address the normative issues of just how we can best take the measure of technology, of how we can determine its rationality in the broadest sense of that term as fostering or enabling what John Dewey called an "ordered richness of experience."

I will rotate these four aspects in the course of my comments and try to keep them in play, often simultaneously: technology as *productive matrix* and as *analytical category*, and the intertwining of the *descriptive* and the *normative* dimensions in any attempt at putting pragmatism to work, which is Hickman's principal goal.

Hickman is certainly right to see, through Deweyan lenses, that technology, in a sense to be determined, defines a central feature of the human-nature, and human-human, transactions that lie at the heart of an evolutionary naturalism. Whether it defines the central feature remains to be seen. On Hickman's reading of Dewey, "Technology in its broadest sense is for him the name of the method of inquiry" (p. 183). What makes human inquiry technological is that it involves "a search for the means of control of consequences" (p. 156), where the control of consequences does not mean domination but rather *management*. This implies, of course, that problematic situations are amenable, quite generally, to human cognitional and practical control, that we can both grasp and master them. There is a claim about human knowledge, or intelligence, here. Whether, in light

of the findings of complexity theory, the claim can be cashed is another issue. Further, as Hickman reads Dewey, "The major human problem was improving intelligence, which he identified with technology" (p. 41), not with the improving of techniques. Rather than being a set of techniques, Hickman claims that Dewey "thought of technology as inquiry into techniques, tools, and artifacts" (p. 40). Technology, that is, is a reflective and methodical discipline. Techniques, on Hickman's account, are habitual and traditional ways of dealing with things. They involve, it is clear, both observational and material activities. Technology, Hickman claims—and claims Dewey claims—raises them to explicitness and subjects them to methodical control. It is on the basis of this distinction between technology and technique, as defined, that Hickman can claim, as I noted, that for Dewey technology is, in the final analysis, another name for the method of inquiry.

However, technology, as Hickman reads Dewey, can also be understood as "the intelligent production of new tools, including conceptual and ideational ones, for dealing with problematic situations" (p. 183). Here the "inquirential model" is joined with the "production model." It is not clear, at least to me, that they are equivalent. Tools, as Hickman broadly and contentiously uses the term throughout the book, includes "printed texts, photographs, films, videotapes, compact disks, and the Internet" (p. 122). These are, as he calls them, "artifacts." The class of technological artifacts has, further, the following types of members: tractors and televisions, individual habits, social habits that we call institutions, working hypotheses, sports skills, universities, political parties, pi, hammers, goals and plans, the future (p. 55). Moreover, in another enumeration, tools encompass books, newspapers, television, electronic networks, even disinformation and propaganda (p. 58). Now some of the items in this list certainly are, or embody, techniques—sports skills, for example, or individual habits (the flywheel and platform of life), or institutions such as universities and political parties. Other items are clearly tools, if we include also machines in a broad sense: hammers, tractors, televisions, maybe even electronic networks. Other items (including members of the first two classes) are clearly also artifacts: newspapers exist by reason of paper or electronic networks which carry them; tractors and televisions are material objects that do rather different kinds of work, but they are manufactured and not natural. They arise through a transformation of raw materials for a purpose, but the notion of raw material which Hickman uses throughout his book is perhaps not the most appropriate.

Techniques, tools, and artifacts in fact make up a kind of ascending series of more or less stable "spaces" within which human beings make—that is, produce—their world. But I am not sure that we should call an inquiry into them, or the processes by which and within which they arise, technology. The critical point here is that each space is, or relies upon, or is constituted by embodied knowledge. How are we to describe the kinds of knowledges embodied there? Is there, or must there be, a prime exemplar in accordance with which they are to be conceived? Hickman sometimes thinks that Dewey offers one and at other times thinks not. But, is Hickman right about Dewey? If not, how are we to think about Dewey's position on this issue? And, further, if Dewey is not totally right, to what analytical resources are we to turn?

According to Hickman, Dewey argued that, "One of the greatest of philosophical mistakes is the attempt to separate knowledge from the specific practice that gives rise to it in each particular situation" (p. 155). Now Hickman is certainly right in following Dewey's lead that there is a general pattern of inquiry, schematized classically in the famous chapter in Dewey's *Logic* (1938). Inquiry there is identical with what Hickman, glossing Dewey, calls frequently, and rightly, "the general method of intelligence." It is, Hickman claims, a general term covering multiple disciplines with "their own particular inquirential tools and methods, such as the physical sciences, engineering, the arts, the humanities, jurisprudence, and so on" (p. 42). If this is so, I find problematic what we gain by arguing that technology is "more or less interdefinable with what Dewey meant by 'inquiry'" (p. 42). Hickman clearly and justifiably points out that the general method of intelligence is "fed by, and feeds back into, the scientific disciplines, the arts, historiography, and law, as well as other cognitive undertakings" (p. 114). Look at Dewey's characterization of inquiry: "*the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constitutent distinctions and relations as to convert the elements of the original situation into a unified whole* (LW.12.108; emphasis in original). In full agreement with this delineation Hickman justifiably asserts that the technoscientific disciplines (why are they called that?) should not serve as "the pattern for all forms of inquiry" (p. 73). What is their role? Hickman answers: "If the technoscientific disciplines have exhibited greater success in the utilization of this method than have other disciplines, then that success is not due to any special or privileged place occupied by them. It is due instead to the fact that their material has tended to be less complex and more manageable than that of other disciplines" (p. 70). In fact, the methods of the technoscientific disciplines

"are only contained" in the general pattern of inquiry "as a part, and are not exhaustive of it" (p. 70).

I am of the opinion that Hickman, in spite of such disclaimers, has in effect done one of his major and lasting insights harm (at least rhetorically) by going on to insist that the deepest lesson of Dewey's theory of inquiry is that it is identical with technology, no matter how one wants to define it. Dewey's pragmatism is, more generally, a *productive* (or even instrumental) pragmatism, not a technological one. Hickman's book illustrates this in many helpful ways. Speaking of the productive pragmatist's view of progress, and attempting to dissociate it from Marxist, Arendtian, and aesthetic positions, Hickman writes: "Progress is rather a cycle of production: this includes the production of new significances, the production of new feelings, the production of new means of enjoying, and the production of new techniques of production" (p. 98). Having said this, Hickman then attempts to take away with the one hand what he has just given with the other (but we won't let him). "For the productive pragmatist, to be human is to be involved in technological production, to generate an increase over what nature has given, to reconstruct our very selves on a continuing basis. This is *one* [my emphasis] of the most important meanings of technology" (p. 98). However, generating an increase over nature and reconstructing our very selves on a continuing basis rather stretch (*pace* Michel Foucault) the meaning of technology and production as used in the preceding passage.

At the same time, these statements are important. They support in a felicitous and perhaps unwitting way Dewey's, and Hickman's, contention that technoscience *qua tale* is *not* a paradigm for all human activity. Hickman cites Dewey to the effect that technoscience is at most *instrumental* to "the enrichment of immediate experience through the control over action that it exercises" (LW.10.294). This enrichment makes up the consummatory phase of experiencing, which joins together scientific inquiry and aesthetic investigations. But there is something else. Hickman's citation of texts in which Dewey actually equates the method of intelligence with technology is, as far as I can tell, very sparse. One, however, in particular stands out—from Dewey's 1948 reply to Benedetto Croce—which nevertheless admits, I think, of a rather different construal than Hickman gives it. Dewey writes: "Not only is scientific inquiry as it is conducted a highly skilled technology, but the consummatory fulfillments that are characteristic of the esthetic phase of life-experience play a highly important part in attaining the conclusions reached in science" (LW.15.98). I think the focal point here is the

notion of "highly skilled," with the attendant notion—which is pure Deweyan continuation of a Peircean insight—that each cognitive mode has not only its own qualitative feel but is a distinctive "access structure" to the world, a distinctive way of both making and apprehending meaning. Technology, in this sense, to quote Hickman, "involves improved taxonomies of perception as inquirential skills are improved" (p. 183).   That Dewey recognized "an overarching strategic method of inquiry" (p. 67) does not contravene the possibility that each particular method *exemplifies* it in its own way and with different ends-in-view. Distinguishing pragmatism as a philosophy of *production* from a philosophy of *action*, Hickman strongly, and irrefutably, points out that the goal of inquiry is not action but "the construction of new and more refined habits, tools, goals, and meanings ... [the] development of enhanced tools and new products" (p. 180). The development of improved taxonomies of perception and the improvement of inquirential skills, however, leads, I think, not to a generalized notion of technology but to the "analysis of situated perception" which Hickman too quickly, and wrongly, hands over to the phenomenologists in order to save for Dewey "inquiry—or better put, ... inquiry in its robust sense as technology" (p. 181).

Inquiry, for Dewey, I would submit, is first and foremost itself situated in labile fields of felt perplexities, each with its own distinct quality. We are embedded, as well as embodied, in these fields. Hickman admits that "it is true that for the productive pragmatist technology embeds situated perception" (p. 181). Indeed, "New ways of feeling and seeing are often the impetus of inquiry, even more often its outcome." There is a threefold issue here. (1) Where do the new ways of feeling and seeing come from? (2) What is the difference between their being an impetus of or to inquiry and their being its outcome? (3) Which new ways of feeling and seeing should we inquire into, both critically and constructively, and what norms (personal and social) govern the inquiry?

First, where do the new ways of feeling and seeing come from? They are the inevitable deposits of the very processes of experiencing, rooted in what Dewey called "that free interaction of individual human beings with surrounding conditions, especially the human surroundings" (LW.14.229; cited p. 182). This interaction involves what Hickman calls "full sensory involvement in inquiry" (p. 175). I agree with Hickman that Dewey's model of the organism-environment transaction delineated in the indispensable "Unit of Behavior" article points to such an involvement. The organism does not so much respond to its surrounding field as respond into it, with which it is inextricably and multiply linked and in

which it is embodied. It relies on, or indwells, the field as a set of "subsidiaries," to use Michael Polanyi's terminology, which it must integrate into wholes, including the whole that is itself: that is, it must achieve both world-integration and self-integration. This process is first and foremost "tacit," in Polanyi's sense, or "acritical," with the fields of subsidiaries functioning as probes by which we adjust the ratios between ourselves and the world, which is only accessible through them. Polanyi's distinction between focal and subsidiary awareness and his great insight that where there are wholes there are meanings allows us to differentiate the types of indwellt artifacts in terms of their probal qualities and the powers they elicit and potentiate or engage and diminish: motoric, perceptual, intellectual, aesthetic, affective, and so forth. We *fuse* with our artifacts. This is, of course, not news to Hickman. His critical comments on the absence of the body in analytic philosophy are clear and pertinent (p. 162). He is well aware of the "many and varied ways in which the embodied situatedness of human beings affects their self-perception" (p. 162). Indeed, the "application of the methods of adjustive inquiry" is, as any Dewey-inspired thinker knows, no spectator sport. Polanyi's analysis of skills and the from-to structure of consciousness would be of great help here, as would his analysis of what he calls "the transmission of social lore." This process takes place behind the backs of the participants in this convivial enterprise. There is no ultimate point of view outside of the process from which we can survey just what it is we are engaged in or committed responsibly to doing. So, a proper answer to the first question is: New ways of feeling and seeing emerge from tacit, acritical acts of integration of subsidiaries into wholes, from our embodiment in a vast field of differentiated artifacts with their own distinctive qualities. Polanyi summarized our situation in the following manner.

All thought contains components of which we are subsidiarily aware in the focal content of our thinking, and…all thought dwells in its subsidiaries, as if they were parts of our body. Hence thinking is not only necessarily intentional, as [Franz] Brentano has taught: it is also necessarily fraught with the roots that it embodies. It has a *from-to* structure (Polanyi, *The Tacit Dimension,* 1967, p.x).

This is also the message of Dewey's *Art as Experience* (1958 [1934]), appropriately fleshed out.

Secondly, what is the difference between new ways of feeling and seeing being an *impetus* to inquiry and their being an *outcome*? They are an impetus when we are forced to explore the "perceptual logics" attendant upon the production of

new media in which we are embodied, such as what Hickman calls "the functional subtleties and multiple taxonomies spawned by electronic technologies" (p. 162). The task here is descriptive or phenomenological. What can a Deweyan approach say about (a) the transformation of the sensorium by new media, foregrounded by Walter Benjamin and the Critical Theorists, that is, transmutations introduced into its lived formal frames, and (b) about the contents "carried by" or "filling" the frames? Although Dewey does not have, strictly speaking, an explicit theory of embodiment—no Heidegger's hammer or Merleau-Ponty's feather—his theory of media substitutes finely. It is connected with his theory of quality, which also joins him at the deepest level to C. S. Peirce. What Dewey says about the work of art applies, I think, also to every tool, machine, or instrument:

Every work of art [likewise every tool, machine, or instrument] has a particular medium by which, among other things, the qualitative pervasive whole is carried. In every experience we touch the world through some particular tentacle; we carry on our intercourse with it, it comes home to us, through a specialized organ (*Art as Experience*, p. 195).

Further, as Dewey also noted:

> It is not just the visual apparatus but the whole organism that interacts with the environment in all but routine action. The eye, ear, or whatever, is only the channel *through* which the total response takes place. A color as seen is always qualified by implicit reactions of many organs, those of the sympathetic system as well as of touch. It is a funnel for the total energy put forth, not its well-spring. Colors are sumptuous and rich, just because a total organic resonance is deeply implicated in them (*Art as Experience*, p.122).

A *reflective* productive pragmatism would aim, first of all, at uncovering in acribious detail these intertwined lines of connection between the organism and its environment. An *aesthetic* productive pragmatism would recognize that each medium has different potencies and is adapted to different ends (*Art as Experience*, p. 226). "A medium," Dewey writes, "as distinct from raw material is always a mode of language and thus of expression and communication" (p. 287). In any act of expression "means are incorporated in the outcome" so much so that "esthetic effects belong intrinsically to their medium" (p. 197). There is

no extrinsically defined limit or frame for exploring the configurations of qualities carried by media of all sorts. Productive pragmatism is, thus, aesthetically (and politically) experimental, with no greatest upper bound. It actively seeks out new forms of feeling and seeing. A pragmatist aesthetics such as that being developed by Richard Shusterman belongs in the discussion here, with its turn toward the body and the development of "somaesthetics."

Thirdly, what about the issue of norms? How does a productive pragmatism take the measure—and not just describe—the world of technics? I accept fully the political and practical orientation of Hickman's approach, the emphasis on process rather than product—even for a productive pragmatism. For such a pragmatism process is our most important product. But what makes the process ultimately rational? In Hickman's words, "Whence arise the norms by which we judge our technological and technical products, including those that are political?" (p. 181). For productive pragmatism, on Hickman's analysis, "The norms of technology are produced as by-products of technological activities themselves, and not introduced from the outside" (p. 181). We cannot aim at them directly. Norms "arise through the interaction of theory and practice as it provides intelligent answers to perceived problems" (p. 181). Hickman fruitfully and precisely foregrounds and defends the connection between democracy and education and the attendant "belief in the ability of human experience to generate the aims and methods by which further experience will grow in ordered richness" (p. 182). This will clearly—and justifiably—"politicize technology" (p. 156). But, if we take Dewey's normative characterization of experiencing with all due seriousness, the politicization—and democratization—of technology involves first and foremost a concern with the production of the social frames of experiencing, with the production of social occasions of perception, in the extended sense. Here I think that Dewey's *Art as Experience* is not only central but perhaps the best, indeed indispensable, point of entry into his take on technology. Technology, in all its forms, exists within the circle of experiencing. While Hickman is certainly right that technology has no "essence," that "our technological artifacts *are* the ways we use them"—hence do not determine us *in the strict sense*—it must also be admitted that these artifacts also *use us* by subjecting us to *their* logic. Unless this were the case, I do not see how we could have a problem of technology to begin with—understood in any other way than political, that is, in terms of the distribution of power. But it is not just power over artifacts that is at issue. It is the power of artifacts themselves to enforce forms of valuing, choosing, and acting that neither enhance nor enrich the streams of experiencing nor plow rational furrows in nature.

Hickman is not only an anti-essentialist but also an anti-determinist. With these positions I concur. But by no stretch of the imagination can Albert Borgmann, as represented by *Holding on to Reality* (1999), be classified as a "text-type" determinist. What I would interpret Borgmann as doing (and doing well) is delineating the different semiotic and cognitive powers of the various meaning systems, both natural and artifactual, by which we access reality and then relating them to a central question, Just how do they further our hold on reality? Borgmann is no enemy of mediation or of the digital. But he is supremely aware—more than perhaps Hickman in this instance—that different types of information, and their attendant technologies, have different logics: perceptual, motoric, affective, social, political, semiotic. The logics must be kept in balance for a full human life. The massive and uncritical move to digital technologies of the new media type is for someone like Borgmann ambiguous at best, utterly pernicious at worst. The root of its perniciousness is, in effect, a reduction of the polymorphousness of consciousness and its intentional bonds to the world. Is this not precisely the critical point of Dewey's productive pragmatism as culminating in *Art as Experience* and its construction of a normative theory of experiencing? Borgmann's types of investigations (which are matched, for example, by Arnold Pacey in, *Meaning in Technology*, 1999) actually engage the microstructures of the "live creature's" worldly transactions and are, it seems to me, fully in accord also with the broad definition of language and meaning that Dewey offers in his *Logic* (1938). I would also like to note that Ernst Cassirer's semiotic schematization of sense-functions and form-worlds that arc from the expressive through the representational, to the "significational" allow us to get a handle on Borgmann's problem of explaining what is happening when we try to use higher-order abstract technologies to do lower-order concrete semiotic work. Ultimately, I think, along with Cassirer (and maybe even C. S. Peirce), that technology must be schematized within a semiotic frame, that is, in light of the fundamental structures of the life of signs, processes rooted in the material production of exosomatic organs, of divers dimensionalities, in which we are fatefully embodied. James Bunn explored this theme in a grotesquely neglected book, *The Dimensionality of Signs, Tools, and Models* (1981). A productive pragmatism, grounded in the logic of inquiry, can be enriched by a cultural and philosophical semiotics, grounded in the structures of semiosis and their material carriers. In this way the meanings of technology would invade the whole lived field of experience. But rather than looking at meaning-making as a kind of technology, technology would be seen as an essential (productive and constructive) dimension of a materially grounded and strife-ridden process of meaning-making

that arcs from the affective, through the perceptual, to the conceptual, scientific, and aesthetic.

Productive pragmatism goes over, as Hickman powerfully shows, into a politics of meaning. And it is there that pragmatism, as philosophical vision and liaison officer, indeed, as criticism of criticisms, offers us essential tools for putting *ourselves* to work. (See the Innis entries in the References below.)

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