

FOUR EFFECTS OF TECHNOLOGY

Larry A. Hickman, Southern Illinois University at Carbondale

During the brief space allotted me I want to discuss four effects of contemporary technology that I term: a) the sleepwalker effect, b) the transparency effect, c) the black box effect, and d) the splintering effect. It is doubtful that any of these technological effects are per se unique to contemporary technology, but at the same time it seems fairly clear that each has been substantially exacerbated by our current technological practices.

My working background assumptions, on behalf of which I am prepared to argue at length but will not do so in this paper, are two. First I believe that there are good grounds for rejecting what I regard as the Luddism, pessimism, and romanticism that seem to infect much thinking about technology, even among some of the members of the Society for Philosophy and Technology. My grounds for rejecting these tendencies are neither optimistic nor pessimistic: they are hopeful. I believe that we must keep a critical eye on the future and confront emerging situations with the best and most realistic attitude that we can muster. And second, I believe that the various forms of technological determinism that have been a central feature of many philosophical and sociological treatments of technology are not only debilitating, but counterproductive: they lead to the withering of the type of hope that can lead to the production of novel and positive consequences.

THE SLEEPWALKER EFFECT

1. This effect has several dimensions. It is important, for example, that we continue to keep records that afford a continuing analysis of our technological environment, even in the face of attempts based in ideology, purported economic exigency, distraction by other interests, or general insouciance, to neglect or terminate such activities. Max Horkheimer, speaking of his experiences during the 1930s, reminded us that publics sometimes behave like "catatonic patients who make known at the end of their trance that nothing has escaped them" (1986, 290). This particularly poignant, and optimistic, remark references itself in

several directions at once. It draws attention to the tendency of publics to engage in an almost narcotic-like tendency to ignore developing situations that will at some later time come to have momentous importance for them. But it also holds out the hope of an awakening in which both data and direction can be redeemed. As an example of this effect I call attention to the recent dismantling of the U.S. Congressional Office of Technology Assessment. The agency, one of Congress's smallest with only a \$22 million annual budget and fewer than 200 employees, closed its doors on September 30, 1995. It was the only non-partisan office available to members of the U.S. Congress for the preparation of research reports on matters of techno-scientific controversy. It was overseen by equal numbers of Democrats and Republicans, and was "prohibited from recommending a single policy after a study, being required instead to lay out different policy options and projecting what the consequences of each might be." The attack on the agency was led by Representative Connie Mack, Republican of Florida. The stated grounds for its termination were those of economic exigency. Members of Congress must now rely on partisan think-tanks for their techno-scientific information, thus further polarizing the political scene in the U.S. The Office of Technology Assessment had also played a major role in nonpartisan college and university education through the activities of members of its staff, speaking at conferences and seminars.

It is important that efforts toward techno-scientific measurement and innovation, and especially record-keeping, continue, despite myopic legislators and soporific publics. Insights and innovations produced during times of public sopor or torpor have historically in fact turned out to benefit such publics, once disasters or public emergencies issue a wake-up call. As one example, I mention the whaling records of the 1870s and the following decades. At one time these records were considered arcane and of interest only to historians of that industry, but now they are being used by researchers to measure the ebb and flow of the Antarctic ice pack. I might also mention other, more extensive research that has been done, despite a relatively soporific public, on global warming (my use of the term "soporific" seems warranted, given the fact that beach-front development continues even as I write). A clear example of the rhythms of public dozing and waking can also be found in the case of the Mir space station, of which little was heard during times of uneventful performance, but which has now received startled attention during a series of minor crises. I might also mention in this connection the federally inspired research on solar energy encouraged during the

Carter administration, dismantled by the Reagan-Bush administrations, and now revived with increasingly impressive results. The list of examples of this phenomenon is long. Going back to the nineteenth century, I ask you to recall the work of Sylvester Graham. Graham argued for the production and consumption of whole grain breads at a time during which white spongy breads were made by pumping carbon dioxide into cold dough, dough which, in its turn, was made of flour bleached with chlorine (Giedion 1948, 201-8). And going back a few more years, to late fifteenth century Spain, I draw your attention to the dismantling (by Christian Spaniards, on religious and moral grounds) of the public baths built by the Moors. These public baths had provided for the mental and physical hygiene of even the poorest of their citizens.

It is not my intention to claim that everything researched and recorded by techno-scientists will have lasting or important effect, and therefore one to which our various publics should be attentive. I claim only that we cannot afford the luxury of pruning back on selected redundancies and techno-scientific safety nets, such as the Office of Technology Assessment, for the sake of the factors mentioned above—constricting ideologies, purported economic exigency, distraction by other interests, and general insouciance.

THE TRANSPARENCY EFFECT

2. If the sleepwalking effect has to do with situations in which something is wrong but tends to go unnoticed until it is too late, then the transparency effect has to do with situations in which everything is working well, but where we just fail to attend to it properly. That is, we fail to keep it tuned up.

This complex effect has to do with areas of our experience that we have habitualized, of which, therefore, we are not directly conscious. This effect is closely related both to the previous effect and also to the effect that follows, what I term the "black box" effect. Even though we are not asleep, there may be great areas of our experience that have become transparent to us, or which we fail to recognize for reasons other than their opacity. This is in fact a function of learning and the formation of new habits. One of the points of habitualizing behavior is to render certain aspects of our experience "autonomous" or "transparent." Thinking about typing as we type impairs performance, as does thinking about a racket swing or a golf club swing during a game of racquetball or

golf. But there are dangers associated with the transparency effect. Sometimes what has become transparent needs to be renewed or "tuned up." Robert Pirsig's novel, *Zen and the Art of Motorcycle Maintenance*, in part, is about this technological effect. Pirsig's characters ride their motorcycles off into the back roads of upstate New York, without extra sparkplugs or pliers, to "get away from technology." They become even more aggravated with "technology" when one of their bikes fails to start. "Technology," they complain, has let them down once again.

One example of the transparency effect, taken from recent events, is the public health debacle of the Bush administration years that led to the return of rubella. In this case, federal funding for rubella vaccinations was phased out on the grounds that it was too expensive. When public health officials warned of an incipient epidemic among school children, the Bush administration agreed to undertake a "study" of the situation. Several years later, rubella was once again a high profile public health problem. Its victims were then being treated at the cost of thousands of dollars per capita instead of the \$20 or so it would have cost for a vaccination.

On a generous reading, the actions of the bush administration might be understood as an honest application of an out-dated concept of science, according to which techno-scientific problems disappear forever once they are "solved." A more critical approach to scientific-technological problems would have been to recognize that fallibilism must enter into the equation, and that decisions made in the techno-scientific sphere involve social costs. More specifically, a more critical scientific-technology would have recognized that (a) the rubella virus had not ceased to exist just because the incidence of rubella had diminished, and (b) public health considerations cannot forever be subsumed to considerations of tax cuts and private enrichment. As I have already indicated, there was no shortage of adequate warnings by public health officials and others that rubella was well-positioned for a comeback. On a less generous reading, of course, one might see the actions of the Bush administration as exhibiting more than a little "mean spiritedness" with respect to the health of a segment of the population which was not considered a natural constituency.

An artifact—and I use the term in its broadest of senses, to include hypotheses and public attitudes as well as tangible objects—can be transparent, to

one of the senses, while at the same time in high definition to another of the senses. It is in just this sense that a metaphor may be dead in one context and quite lively in another.

Take, for example, the concrete and tile benches in Antonio Gaudi's Guell Park in Barcelona. They exist in high definition visually, but they are transparent to a sitter's backside. This is because Gaudi constructed them from molds made by having workmen sit down in wet plaster. The benches feel so good that one just forgets about them as benches. One is free to enjoy their bright colors. Consider, by way of contrast, Frank Lloyd Wright's chairs. These seem designed to have a high visual definition to which everything else is sacrificed.

What one would normally expect to be transparent with respect to seating—namely the comfort of the chair— was apparently of little interest to Wright. This is a case of what I call "visual reductionism," and it is only one type of the reductionism that tends to accompany the transparency effect. Others include economic reductionism, ideological reductionism, and so on. At least on one reading of the situation, the rise of rubella during the Bush administration was a result of a transparency resulting from the much higher definition of economic and ideological factors. The investing classes were comfortable, so the problems faced by other segments of the population were, for the most part, ignored.

THE BLACK BOX EFFECT

3. This effect has to do with opaque areas of our techno-scape that are either intentionally or unintentionally designed into the system. The black box effect is related to the first two effects, but differs significantly from them. It is not that something has become habitualized or made autonomous, and then allowed to run amok because we haven't kept an eye on changes in envioning conditions. It is also not that things are working so well that we just forget to attend to them properly. Rather, it is that increasing portions of our experience are opaque to everyone except specialists. There was a time when anyone with a modest tool kit could work on a model "T" Ford, or, later, a Volkswagen "Bug." These days have past because so much of automotive technology now is opaque to the end user.

This has both an upside and a downside. It means that our lives are in

some ways simpler and more convenient, since the sophistication of the tools and instruments we use has, to use Albert Borgmann's term "disburdened" us. But Borgmann does not like such disburdenment. He thinks that release from certain "focal things and practices" is ultimately debilitating because it cuts us off from a wider participation in "Being" (Borgmann 1984, 4-5). But I would argue that disburdenment, to a great extent, is necessary for the increased pluralism of interests and activities called for and celebrated by other writers, such as Don Ihde (1993, 56-71). One of the reasons Aristotle thought the artisan illiberal was the relative amount of time and effort consumed in artisan activities, as opposed to "free" or "liberal" discourse.

But, if the upside of disburdenment is more time, more opportunities to engage a wider world of experience, and thus the possibility to relate more harmoniously to a complex world of experience, there is also a downside. The downside of disburdenment is that we have to depend on one another to a greater extent, and others, even specialists, do not always prove to be dependable. This point opens up a whole area for discussion—namely the ways in which patterns of social organization change as a result of increasing interdependency. I suspect that both the U.S. militia movement and the current debates about who and what should be allowed on the Internet are aspects of this phenomenon. This phenomenon also seems to be related to the activities of the alleged "Unabomber." That case is particularly ironic with respect to the problematic role of specialists within a technological society. The Unabomber Manifesto, which rails against technological control, was allegedly written by someone who shrank his world to such minuscule dimensions that he could enjoy complete control over it, right down to the manufacture of the screws that held his bombs together. It now seems that the Unabomber was not so much opposed to control as he was to cooperation.

The black box effect also has interesting implications for architecture. Are there areas of our architecturally-built-up environment that are opaque to us because they are designed and maintained by specialists? To a great extent the answer to this question depends on the degree to which the public takes an interest in its architectural environment. This issue brings us quite close to the question of what we mean by democracy, and what we mean by the role of the expert, or specialist, in an industrial democracy. To take one example, long before it became a part of public knowledge, specialists knew that asbestos insulation posed a health risk. The internal documents of the companies that manufactured asbestos

insulation materials have made that fact clear enough. This is still an important and pressing issue. Recent issues of architectural trade publications (cf. *Learning by Design* March 1997) continue to discuss the subject.

The black box effect, because it is a phenomenon that is increasingly important within our culture, requires that we depend on one another to an ever greater extent. Consequently, it also requires that we raise the stakes in terms of informing ourselves, in our role as members of the public who use products manufactured and distributed by those who have the keys to the black boxes. Additionally it requires that we raise the stakes in terms of demanding greater accountability and even greater public sanctions when the key-keepers violate the public trust. This leads us to the fourth technological effect.

THE SPLINTERING EFFECT

4. This effect has to do, at least in part, with communication between specialists. The demands of overspecialization have produced a situation in which professionals in fields such as medicine and physics and philosophy, to name a few, have difficulty communicating with one another. What does this mean for science and technology reporting and for education? What does it mean for the future of our built-up environment? This situation has given rise to several problems. For one thing, if these specialists can't talk to themselves, then it is highly unlikely that they will be able to talk across disciplines or to the public. As a consequence, publics are poorly informed about the status and use of the arts and sciences. The rise of various religious fundamentalisms seems related both by way of cause and of effect to this phenomenon. It is important that we have good science reporting, but this is increasingly difficult to accomplish for a variety of reasons. The late Carl Sagan, for example, suffered from a kind of snobbery associated with this type of scientific fragmentation. Sagan could not be a "real scientist" if he had a popular television show, or at least that was the way the argument went. Moreover, if specialists can't talk to themselves, then cooperative ventures within the arts and within the sciences, even within specific disciplines, become ever more difficult.

It is perhaps at this point that the importance of the role of philosophy becomes clear, despite the recent, and to my mind premature, reports of its death. John Dewey, for example, viewed the philosopher as a kind of liaison officer, or

perhaps a translator, able to cross boundaries and help specialists communicate with one another. The philosopher has no specific subject matter, Dewey argued, unless it be inquiry itself. He or she instead is committed to methods of amelioration of existing conditions, and to the discovery of new possibilities for individual and social growth. He or she thus has a unique role to play as liaison officer, or bridge builder, if you will.

Dewey's claim, that it is not a certainty of content but a sure-footed method that motivates the philosopher, is worth more careful scrutiny. Commenting on the rise of Christian fundamentalism during the 1920s and 1930s—a phenomenon which is a feature of our current cultural landscape—Dewey suggested that fundamentalists may have misnamed themselves, since a true fundamentalist would search for fundamentals, and not just claim a favorite view as finally authoritative. Although he understood the fundamentalists' need for security, he had scant sympathy for their chosen method of attaining it. "Until they have been reborn into the life of intelligence," he wrote, "they will not be aware that there are a steadily increasing number of persons who find security in methods of inquiry, of observation, experiment, of forming and following working hypotheses. Such persons are not unsettled by the upsetting of any special belief, because they retain security of procedure" (Dewey 1983, 7).

To return to a field I have already discussed, it is increasingly important that architects be able to talk to other specialists whose work will determine the future of our built-up environment. I call your attention once again to the problem of asbestos. A recent issue of *Learning by Design* (March 1997, 13) reports that of the 110,000 school buildings in the United States, one in eight is classified by architects as needing "immediate" structural attention. More than one-third of them evidence serious deterioration and maintenance problems. Here is Delbert Gaines, an industrial hygienist with Brown and Root: "If the asbestos-contaminating material is in good condition, and it can be properly managed, why take it out?" In short, specialists now suggest that if asbestos is still in good condition, it can be encapsulated with sealants or enclosed with sheetrock or similar materials. In other words, sometimes the danger lies in removing the material, not keeping it in place. The natural assumption, of course, would be to pull out the asbestos. Overcoming the splintering effect, new information comes to the fore.

Another area in which the splintering effect is becoming apparent is the Internet. I mention two forms of splintering that are already in evidence. First, there is the splintering off of various segments of the population from participation in the Internet's wider public sphere because of lack of skills or resources with which to access the Internet. The profound disparity that exists in the United States with respect to per capita spending for school children, for example (because schools are still in large measure funded by local property taxes), cannot fail to work to the disadvantage of those children to whom computerized instruction is not available.

Second, there is the splintering of larger publics into specialized interest-specific communities which are now developing within cyberspace. The Internet, it should be remembered, is not a form of mass communication, but rather a type of communication that is best characterized as point-to-point. Will we see smaller and smaller communities that reinforce their own eccentricities, all the while seeking to insulate themselves from the methods and forces that serve to promote the coherence of the wider community?

There are of course many other "effects" of technology. In addressing these four, the sleepwalker effect, the transparency effect, the black box effect, and the splintering effect, I hope to open a dialogue that will both allow these four to be analyzed and sharpened, and generate discussion about others that I have not mentioned.

REFERENCES

- Borgmann, Albert. 1984. *Technology and contemporary life*. Chicago: University of Chicago Press.
- Dewey, John. 1983. *The middle works*. Vol. 15 of *The collected works of John Dewey, 1882-1953*, edited by JoAnn Boydston. Carbondale and Edwardsville: Southern Illinois University Press.
- Giedion, Siegfried. 1948. *Mechanization takes command*. New York: Oxford University Press.
- Horkheimer, Max. 1986. *Critical theory*. New York: Continuum.
- Ilde, Don. 1993. *Postphenomenology*. Evanston: Northwestern University Press.
- Pirsig, Robert. 1974. *Zen and the art of motorcycle maintenance*. Evanston: Northwestern University Press.