

The Dialectic of Technology: Commentary on Warner and England¹

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ABSTRACT Warner and England (1995) make a welcome argument for a technological science perspective for sociology based on a theory of humans as technological agents and an epistemology that includes ethical values. As with any sociological perspective, however, Warner and England's comments help to focus on and understand some aspects of social life and not others. This commentary provides a complementary focus by emphasizing the dialectical relationship between human agency and technological agency. Furthermore, I argue that a dialectical view is necessary for grounding Warner and England's theoretical argument and for acting on their ethical argument. Implications of a dialectical perspective for the meaning and politics of technology are explored. The paper concludes with a discussion of the suitability of "science" as a metaphor for sociology.

Introduction

"We are becoming the servants in thought, as in action," Galbraith (1971:7) wrote in *The New Industrial State*, "of the machine we have created to serve us." The fear of technological domination that Galbraith expressed now is widespread in Western and nonWestern societies alike and probably with good reason. Development of scientific and technological knowledge has, for all the good it has done, led as well to nuclear proliferation, environmental decline, increased social inequality, wrenching transformations in the character of work and everyday life, and a lost sense of security in the workings of the social and natural worlds (Berry 1977; Erikson 1994; Sachs 1992; Schnaiberg 1980). Consequently, many have come to question the value of science's positivist underpinnings and its faith in the promise of progress based on universal, value-free truths. These contemporary uncertainties are the essence of the current post-modern critique of Western thought.

Warner and England's (1995) paper confronts these uncertainties with an ambitious attempt to recast the sociological endeavor. Their solution is not to abandon the promise of technology. Instead, they argue that technology should be recognized as nothing more than the knowledge and materials for gaining our desired ends—the "how to" of life—and that human agents create it. The principal problem they see is that, under positivism, sociologists have excluded the consideration of values and ethical principles from the prac-

¹ I acknowledge the helpful advice of Diane B. Mayerfeld on earlier drafts of this paper.

tice of science. If it is recognized that technology is something that human agents create, and if a commitment is made to creating it with moral principles concerning the social effects of technology firmly in mind, we can build a sociology that is both based on better science and more oriented toward the practical problems of society. The basic business of sociology, then, should not be merely studying society but also the conscious attempt at building a better one. They suggest calling this approach a "technological science perspective for sociology."

There is much to admire in this formulation, which resonates strongly with the practical orientation of sociology's founding scholars in the 19th century. Rural sociology in particular, with its stronger practical commitment than sociology at large, will find much of value in Warner and England's argument. They have made an important contribution to building a sociology that sees values not as a problem of social research but rather as the whole point of doing social research.

As well, the article makes an important point that, while not original to Warner and England, is worth repeating: It is useful to think of social organization as a kind of technology, which they term social technology.² The machines and physical knowledge the word technology usually refers to they term material technology. Social and material technologies, though clearly different in their media, are both tool-sets for human agents.

In keeping with the spirit of their argument, I would like to consider Warner and England's own theory as a kind of technology. It is a "how-to," too. Yet, like any technology, it cannot do all things. For all its conceptual power, it does not help answer all the questions sociologists have about technology. Indeed, Warner and England conclude their article with a forthright discussion of some of these limitations. I want to further that discussion and describe another sociological perspective on technology that Warner and England's theory does not encompass. Moreover, the perspective I will describe is a necessary complement to Warner and England's own views. By itself, Warner and England's perspective could be misleading.

A theory is a technology, in Warner and England's sense of the term, that provides a lens for viewing the world. It is a refractive medium for focusing attention and a set of frames in which to place that medium. Like any such framed medium, it gains its power as much from what it ignores as from what it focuses upon—by eliminating, in the words of Erikson (1989:511), from its "... line of vision all other details that might interfere with that concentration" There is nothing wrong in this selective concentration, as long

² For example, see Swidler's (1986) account of culture as a mental "toolkit" or Bourdieu's (1977) theory of culture as "practice."

as it is recognized that viewing the whole landscape of social life requires many lenses. Technological science should, in other words, be regarded as *a* perspective for sociology, not *the* perspective. Warner and England, given their evident commitment to pluralism and recognition that there are limits to their argument, are not likely to want it otherwise.

Technology as a dialectic

While useful for invigorating a sense of choice or sense of technological possibilities, Warner and England's agent-oriented view of technology as a *how-to* de-emphasizes the power of technology over us. This is the most significant limitation of Warner and England's perspective. It does not exclude the possibility of this power, to be sure, but Warner and England's technological science does not offer conceptual tools for understanding the dynamics of technology's independent power. At least, there is quite a bit more to those dynamics than a *how-to* conception of technology can capture. Warner and England's epistemological foundation is based on the following premise: What is distinctive about social phenomena is that humans have agency. But technology too is an agent. Granted, it does not have will, intentionality, or choice. Yet technology certainly has the ability to induce change in the world around it, including the social world.⁵

This ability, of course, is just what has worried so many before and after Galbraith. Technology is not only a *how-to*; it is also a *you-have-to*. Humans make technology, to be sure. Yet technology also makes humans—it shapes conditions of their lives in ways that humans both intend and do not intend, anticipate and do not anticipate, control and do not control. A philosophical wag once asked, if God is all-powerful, can God create a stone that God cannot lift? A parallel question often asked is whether humans can create technologies that they do not fully control. Mary Shelley in *Frankenstein* and Stanley Kubrick in *2001: A Space Odyssey* both answered unequivocally yes, we can—and many social scientists have agreed (Heilbroner 1994; Schnaiberg 1980; Westrum 1991; Winner 1977).

The problem has always been, though, where and how the line can be drawn between technological agency and technological determinism, or what is often called the technological imperative. Such a line certainly needs to be drawn. At best, technological determinism is an unhelpful doctrine for, if followed out to its logical extremes, it leaves no room for independent human action, making

⁵ There is an implicit disagreement here about how to define agency. Warner and England equate agency with "the ability to choose between alternative actions," implying that intentionality is essential to it. I conceive of agency more broadly, seeing it in the Aristotelian sense of being a "source of change."

human agency a theoretical impossibility. Thought itself—including the idea of technological determinism—consequently becomes nothing more than the product of a universal machine. Some critics of technology have found this formulation rhetorically attractive in arguing that technology has taken over our lives and have consequently ignored determinism's full implications. At worst, determinism mocks any positive effort to alter or to resist the anticipated course of human events, making the technological imperative the technological inevitable. "Get big or get out" was the advice of a U.S. Secretary of Agriculture to farmers, a classic example of what Merton (1957) called a self-fulfilling prophecy. Bukharin brought a similar approach to the service of the "inevitable" coming of the Soviet communist state (Hoffman 1972).

Although they do not say so explicitly, Warner and England's technology-as-human-agency perspective presents a clear alternative to the determinism of the technological imperative. Yet as helpful as their perspective is for reminding us of our own capabilities (and responsibilities), it does not assist in envisioning what might be termed the dialectic of technology. Technology does have a significant degree of independent power over us; that is why studying technology is so important. Indeed, studying technology's independent role is itself part of the process of giving humans more agency. For this reason, Warner and England's perspective needs dialectical balance. In order to give humans the agency in technology that Warner and England want, the current lack of as much of it as desired must be acknowledged.

Are machines our servants or are we servants of our machines? Both are true; technology is a two-way street, a dialectic. Just as society constructs technology, so too does technology construct society. I claim no particular originality in suggesting this. Many sociologists have made similar points (Bourdieu 1977; Giddens 1984; Marx 1972; Massie 1993; Westrum 1991). Moreover, a close reading of Warner and England shows that they are fully aware of the dialectic of technology.⁴ But a how-to conception of technology, for all its utility, obscures the way that the how-to can come to *dictate* the how-to and thus become a have-to. Yes, there are human choices to be made in technology, yet these choices create the context in which people make other choices. This context consequently limits the range of choices presented to us. You can not take the bus to the next town to go shopping if there is no bus. In fact, most Americans are unlikely to take the bus to shop even in their own towns (many of which have good bus systems), given that most commerce is no longer centrally located in U.S. cities and towns. Even if you can envi-

⁴ See, for example, their discussion of Giddens' structuration theory and the closely-related work of Bourdieu.

sion another way that shopping could be organized, and even if you recognize that driving promotes environmental and community degradation, you may find yourself virtually forced to drive to shop in America. The how-to side of technology gives us choice, but the have-to side limits choice, underscoring the significance of the choices we do make.

A counter argument is that since the have-to results from choice, it is a form of choice—a form of how-to—not a limit on it. After all, American towns could build more centrally and put in better bus systems, if town planners so choose. But as much as one might like one's town to do just that, you will still be confronted with the need to do your shopping today. A crucial part of the dialectic of technology is when technology as how-to knowledge becomes technology as infrastructure, in this case the existing layout of roads and community investment in buses. Thus, technology becomes a kind of *social* structure. Moreover, it may not be easy for an American town to change (although by no means impossible). There are many property owners, both residential and commercial, who have invested in low-density land use patterns. If a town does not continue to pave and plow their roads and maintain their long sewage and electric lines, these property owners are sure to make a loud noise, and that leaves less money around for that better bus system. Financial and environmental resources are limited. Consequently, a how-to put into practice inevitably limits choice, at least to some extent, and becomes a constraining have-to.

Furthermore, human choice is not the same as human agency. Technology shapes human action in part through the kind of choices it presents and the kind of choices it does not. The National Rifle Association was, of course, dangerously misleading with its well-known slogan that "guns don't kill people; people kill people." There is a clear association between the availability of guns, particularly handguns, and the murder rate, as is well-known (although perhaps not well-known enough). Thus, our available how-tos guide us into certain courses of action and away from others.

Technology as meaning

One of the foundations of Warner and England's technological science perspective, their technology for understanding technology, is its implicit use of a rational choice model of human behavior. The assumption that people strive to get what they desire, that they seek the means—the how-to's—for their perceived ends, has a powerful ability to clarify human action. But here as well limitations exist.

The limitation most relevant to this discussion is that such an approach tends to shift attention to the means side of the equation,

to the techniques of human agents. Warner and England correctly note that the rationality of human agents is bounded by what they know and do not know and that they consequently face unanticipated consequences. People do not always know everything they need to know to get what they want nor do they always get what they want. Still, Warner and England leave the origins of people's goals unexamined, as is typical of rational-choice approaches (Elsster 1989). Their focus on *how* people can do the things they want to do passes over the equally (or even more) important question of how they decide what ends are worth pursuing in the first place. Furthermore, it sidesteps the question of how individuals come to understand what a how-to even is—the how-to of how-to's. These questions take us to the crucial issues of meaning and culture.

All technological knowledge is perceived through the cultural and theoretical lenses social actors, just like sociologists, use to make sense of their worlds. These lenses provide metaphors people live by (Lakoff and Johnson 1980), metaphors used to understand our how-to's and our ends—or what might be termed our "why-to's." To the extent that these metaphors of meaning—these mental how-to's of how-to's and why-to's—are shared, there is culture. Through culture, people gain a shared context for understanding technology. Warner and England's technological science appears to exclude the study of this context when they write that: "Technological science deals with a particular problem-set that, at some time, has interrupted the normal flow of activity" (Warner and England 1995:613) Yet the cultural context that guides the normal flow of activity is also an important problem in the study of technology. To understand human agency, the cultural presuppositions that guide it must be known.

A dialectic-of-technology approach has an important point to offer here about the origin of cultural guides. The how-to's and have-to's of technology help shape the why-to's, the actors' desired ends, while shaping the range of choices. Technology helps construct the meanings social actors find in their lives, just as individuals construct meaning in technology. By structuring the character of experience, the means affect and sometimes even justify the ends. The tendency to see technology as "value-free" has obscured this dialectic. Yet it is necessary to look no further than Weber's (1958) famous account of the rise of the spirit of capitalism to see how, once in place, the technological apparatus of a society guides the spirit of its life. Indeed, as Tierney (1993) has shown, technology may create wholly new cultural spirits, such as the rise of "convenience" as a central value of modernity—a clear example of means becoming ends, of means becoming meaning.⁵

⁵ As part of their post-positivist epistemology, Warner and England do, of course,

Technology as politics

Who gets to make these technological choices? Warner and England make it clear that the question of the sociopolitical interests of the users and sponsors of technology is the central ethical issue for their technological science perspective.

Yet it is important to emphasize that their approach does not account for the full dynamics of technology and social power.⁶ Technology empowers, Warner and England write, and from their perspective that is true. It helps people reach desired outcomes (and at the same time shapes the notions of what the outcomes should be). How-to power, however, takes on a different appearance when it is seen dialectically as both the product of and the means of social power. It may empower some and disempower others. This is another way in which a how-to becomes a have-to.

Warner and England are aware of this potential and make a distinction in their paper between technical and sociopolitical interests. The latter distort or defeat efforts to act on technical interests and reach desired outcomes. From a how-to perspective of technology, this may solve the problem. A how-to/have-to perspective, however, would see technology as inherently political—precisely because of how technology controls us and how people attempt to guide the technological structures which do that. The sociopolitical is not a distortion of technology from this perspective but is instead part of what technology is. The politics of technology even applies to the very construction of technology as technology, knowledge as knowledge, something that studies of indigenous and local knowledge have demonstrated (Feldman and Welsh 1995; Kloppenborg 1991).

There is definitely human agency behind technology. Indeed, this is probably the most important place to remember that, for this is ultimately why technology is so political. Yet here again it is important to recognize the dialectical character of the relationships. A purely how-to model of technological politics does not illuminate the have-to aspects of it—how technology also unavoidably commands us and becomes a ready means of social control. Social structure is a technology, Warner and England write. But it is also true that technology is a social structure.

Technology thus amplifies and extends the social power of its sponsors and users by constraining the choices of those who do not control it. It does more, however. The available range of technologies constrains the exercise of power as much as it grants it.

consider the question of ethics and values in making technological choices. But their theory gives no account of the origin of these ethics and values and, more specifically, the role of technology in shaping them.

⁶ By social power, I mean the ability to impose one's will upon another.

A technology is a "have to" for both those who are subject to it and for those who sponsor it and use it. The patterns of human agency that will be chosen by powerful social interests will be selected from the range of choice that technology presents. As technology is a social structure, *inter alia*, the same dialectics of structure described by Giddens (1984) and Bourdieu (1977) apply to it as well.

The how-to/have-to approach to understanding technology has some close parallels in Foucault's concept of power-knowledge (Foucault 1979). The inevitable politics of knowledge, however, does not mean that all hope of building a useful sociology should be abandoned, as Foucault appears to suggest. The general post-modern conclusion that knowledge cannot be separated from power nor technology from interests is only a dilemma if the positivist premise of a value-free sociology is retained. Rather, Warner and England are completely correct that this conclusion only underscores the moral importance of the sociological task.

Sociology as a science

Should that task be seen as a scientific one, as Warner and England suggest? Many have argued, with some reason, that the whole problem with modern sociology has been the way it has sought legitimacy in the word "science" and as well has sought to guide its actions by this metaphor. This is the reason, say some, that sociology attempted to operate on the fiction of being value-free in the first place. So why bring back the word—and why as well give such a prominent place to such a mechanical and scientific sounding term as technology—in making the case for a "technological science" perspective for sociology?

Warner and England's argument is that the problem was never with science and technology; rather, it was with the positivistic manner in which sociologists viewed them. Can these really be separated, however? Technology, science, positivism—these are all central metaphors for a common cultural outlook, one side of the great dialog that Snow (1969) called the two cultures, the other side being the humanities. Indeed, Warner and England's argument stays within much of the cultural tradition of positive technological science. Their use of a technological metaphor for all of social life; their faith that technology is, except when distorted by politics, essentially good; the rigid human-nature boundary they use in developing their notion of agency; their use of reproducibility for judging knowledge claims—all of these are of a cultural piece with the notion of sociology as a positivist science. Perhaps that is why they like the sound of words such as technology and science for describing what they propose. To be sure, they abjure

the notion that science can or should be value-free, an important modification of the positivist tradition. Yet rather than a rejection of positivism, their work seems more a reformation of it—what might be called ethical positivism.

And that's not a bad thing. Sociology at its best is a realm somewhere between a science and a humanity—a place of dialog between the two cultures Snow described. Although I do not embrace the phrase technological science for describing what sociologists and rural sociologists ought to do, I do embrace the way Warner and England's ethical positivism makes their technological science just such a place of dialog.

I am also grateful for the way their paper renews our focus on the role of human agency in both material and social technologies. Although in this commentary the argument has been that technology also has agency over us, that it is a form of social structure, we neglect the human agency side of the dialectic at our peril. Technology can be used as a dialectical source of guiding, and even improving, agency. Indeed, if the role of human agency is not emphasized and encouraged in creating the technologies of our lives, there may soon be no dialectic of technology—only a dismal imperative of technology.

A true technological imperative is for sociology, as a humane science, to lend its assistance to the dismal imperative's demise. As Winner (1986:10) wrote: "The interesting puzzle in our times is that we so willingly sleepwalk through the process of reconstituting the conditions of human existence . . ."—a phenomenon Winner called technological somnambulism. Warner and England, to their great credit, are trying to wake us up.

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