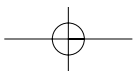
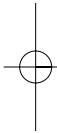
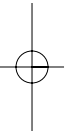


PART I

*Considering Aspects of Knowledge and Experience
for Developing Technological Literacy*



CHAPTER 1

What Is Philosophy of Technology?

Andrew Feenberg

Introduction

In this chapter I attempt to answer the question posed in the title from two standpoints, first historically and then in terms of contemporary options in the field, the various different theories that are currently under discussion.¹ But before I begin, I would like to clear up a common misunderstanding: philosophy of technology is *not* closely related to philosophy of science. Science and technology share a similar type of rationality based on empirical observation and knowledge of natural causality, but technology is concerned with usefulness rather than truth. Where science seeks to know, technology seeks to control. However, this is by no means the whole story.

Our image of premodernity is shaped by the struggles between science and religion in the early modern period. From those struggles we derive the notion that traditional societies restrict questioning of their basic customs and myths. In the premodern West, the principle of authority was the basis not just for church doctrine, but for knowledge of the world as well. Modern societies emerge from the release of the power of questioning against such traditional forms of thought. The eighteenth century Enlightenment demanded that all customs and institutions justify themselves as useful for humanity. Under the impact of this demand, science and technology become the new basis for belief. Eventually, technology becomes omnipresent in everyday life and scientific-technical modes of thought predominate over all others.² In a mature, modern society, technology is taken for granted much as were the customs and myths of traditional society. Scientific-technical rationality has become a new culture.

This culture is clearly “useful” in all its details in the sense the Enlightenment demanded, but it is now so all-encompassing that larger questions can be asked about its value. We judge our technological civilization as more or less worthy, more or less ethically justified, more or less fulfilling. Modernity itself authorizes, even demands such judgment. We need to understand ourselves today in the midst of technology and neither scientific nor technical knowledge can help us. Insofar as our society is technological at its base, philosophy of technology is its theoretical self-awareness. Philosophy of technology teaches us to reflect on what we take for granted most of all, that is, the rationality of modernity. The importance of this perspective cannot be over-estimated.

Greek Origins

The question of technology is raised at the very origins of Western philosophy, not as we pose it today of course, but at a metaphysical level. Philosophy begins in ancient Greece with the interpretation of the world in terms of the fundamental fact that humanity is a laboring animal constantly at work transforming nature. This fundamental fact shapes the basic distinctions that prevail throughout the tradition of Western philosophy.³ The first of these is the distinction between what the Greeks called *physis* and *poiēsis*. *Physis* is usually translated as nature. For the Greeks, nature creates itself, emerges from out of itself. But there are other things in the world, things that depend on humans to come into being. *Poiēsis* is the practical activity of human production. We call the beings so created artifacts and include among them the products of art, craft, and social convention.

The word *technē* (plural *technai*) in ancient Greek signifies the knowledge or the discipline associated with a form of *poiēsis*. For example, sculpture is a *technē* that creates out of stone; carpentry is a *technē* that builds from wood. Each *technē* includes a purpose and a meaning for its artifacts. For the Greeks, *technai* show the “right way” to do things in a very strong, even an objective, sense. Although artifacts depend on human activity, the knowledge contained in the *technai* is no matter of opinion or subjective intention. Even the purposes of artifacts share in this objectivity insofar as they are defined by the *technai*.

The second fundamental distinction is that between existence and essence. Existence answers the question of whether something is or is not. Essence answers the question of what the thing is. *That* it is and *what* it is appear to be two independent dimensions of being. In the

tradition of Western philosophy, existence has been a rather hazy concept. We know the difference between what exists and what does not, for example, as immediate presence or absence, but there is not much more to say. Most of the attention is given to essence and its successor concepts as developed by the sciences, because this is the content of knowledge.

These distinctions are self-evident. They form the basis of all philosophical thought in the West. But the relation between them is puzzling. The source of the puzzle is the Greek understanding of *technē*, the ancestor of modern technology. Strange though it seems, the Greeks conceived nature on the model of the artifacts produced by their own technical activity.

To show this, I analyze the relation between the two basic distinctions that I've introduced, *physis* and *poiēsis*, and existence and essence. The difference between existence and essence in *poiēsis* is real and obvious. The thing is present first as an idea and only later comes into existence through human making. For the Greeks the idea is not arbitrary or subjective but rather belongs to a *technē*. Each *technē* contains the essence of the thing to be made prior to the act of making. The idea, the essence of the thing, is a reality independent of the thing and its maker. Although humans make artifacts, they do so according to a plan and for a purpose that is an objective aspect of the world.

But the corresponding distinction between existence and essence is not obvious for natural things. The thing and its essence arise together and exist together. The essence does not have a separate existence. The flower emerges along with what makes it a flower: that it is and what it is "happen," in a sense, simultaneously. We can define a concept of the flower, but this is our notion, not something essential to the flower as a concept or plan is to artifacts. Indeed, the very idea of an essence of the things of nature is our construction. Unlike the knowledge that is active in *technē*, which participates in bringing into existence the objects it defines, the essences identified by *epistemē*, the science of nature, appear to be purely human doings to which nature itself would be indifferent. Or is it? Here is where the story gets interesting.

Although essences quite obviously relate differently to *physis* than to *poiēsis*, since Greek times philosophers have struggled to efface that difference in a unified theory. For Plato, who started the tradition on this path, the concept of the thing, its "idea," exists in some sense prior to the thing itself and allows it to exist and us to know it. This is exactly the pattern familiar from *technē*, but Plato does not reserve his theory for

artifacts; rather, he applies it to all being. He relies on the structure of *technē* to explain not only artifacts, but nature as well.

Plato understands nature as divided into existence and essence just as artifacts are, and this becomes the basis for Greek ontology. In this ontology there is no radical discontinuity between technical making and natural self-production because they both share the same structure. *Technē* includes a purpose and a meaning for artifacts. The Greeks import these aspects of *technē* into the realm of nature and view all of nature in teleological terms. The world is thus a place full of meaning and intention. This conception of the world calls for a corresponding understanding of man. We humans are not the masters of nature but realize its potentialities in bringing a meaningful world to fruition. Our knowledge of that world and our action in it are not arbitrary but are in some sense the completion of what lies hidden in nature.

What conclusion follows from these historical considerations on ancient Greek philosophy? I will be provocative and say that the philosophy of technology begins with the Greeks and is in fact the foundation of all Western philosophy. It was the Greeks who first interpreted being as such through the concept of technical making. This is ironic. Technology has a low status in the high culture of modern societies, but it was actually there at the origin of that culture and, if we believe the Greeks, contains the key to the understanding of being as such.

Modern Alternatives

I now leave these historical considerations and turn to the status of philosophy of technology in our era. At its inception, Descartes promised that we would become “the masters and possessors of nature” through the cultivation of the sciences, and Bacon famously claimed, “Knowledge is power.” Here technology no longer fulfills nature’s potentialities as it did for the Greeks, but rather it realizes human plans. Clearly we are in a different world from that of the Greeks. And yet we share with them the fundamental distinctions between essence and existence, and between the things that make themselves, nature, and the things that are made, artifacts. But our understanding of these distinctions is different from theirs. This is especially true of the concept of essence. For us essences are conventional rather than real. The meaning and purpose of things is something we create, not something we discover. The gap between man and world widens accordingly. We are not at home in the world, we conquer the world. This difference is related to our basic ontology. The question we address to being is not

what it is, but *how* it works. Science answers this question rather than revealing essences in the Greek sense of the term.

Note that technology is still the model of being in this modern conception. This was particularly clear in the Enlightenment when philosophers and scientists challenged the medieval successors to Greek science with the new mechanistic worldview. Eighteenth-century physical science identified the workings of the universe with a clockwork mechanism. Thus, strange though it may seem, the underlying structure of Greek ontology survived the defeat of its concept of essence.

In the modern context technology does not realize objective essences inscribed in the nature of the universe as does *technē*. It now appears as purely instrumental, as value-free. It does not respond to inherent purposes, but is merely a means serving subjective goals. For modern common sense, means and ends are independent of each other: "Guns don't kill people, people kill people." Guns are a means independent of the users' ends, whether it be to rob a bank or to enforce the law. Technology, we say, is neutral, meaning that it has no preference as between the various possible uses to which it can be put. This "instrumentalist" philosophy of technology is a spontaneous product of our civilization, assumed unreflectively by most people.

Technology in this scheme of things encounters nature as raw materials, not as a world that emerges out of itself, a *physis*, but rather as passive stuff awaiting transformation into whatever we desire. This world is there to be controlled and used without any inner purpose. The West has made enormous technical advances on this basis. Nothing restrains us in our exploitation of nature. Everything is exposed to an analytic intelligence that decomposes it into usable parts. Under this assumption, our means have become ever more efficient and powerful. In the nineteenth century it became commonplace to view modernity as an unending progress toward the fulfillment of human needs through technological advance.

But for what ends? The goals of our society can no longer be specified in a knowledge of some sort as they were for the Greeks. The Greeks lived in harmony with the world whereas we are alienated from it by our very freedom to define our purposes as we wish. So long as no great harm could be attributed to technology, this situation did not lead to serious doubts beyond in small circles of intellectuals. But as the twentieth century proceeds from world wars to concentration camps to environmental catastrophes, it becomes more and more difficult to ignore the strange aimlessness of modernity. This has led to a crisis of civilization from which there seems no escape: we know how to get there but we do

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Table 1.1 Alternative definitions for technology

Technology is:	Autonomous	Humanly controlled
Neutral	Determinism	Instrumentalism
(complete separation of means and ends)	(e.g. modernization theory)	(liberal faith in progress)
Value-laden	Substantivism	Critical theory
(means form a way of life that includes ends)	(means and ends linked in systems)	(choice of alternative means–ends systems)

not know why we are going or even where. It is because we are at such a loss that so many twentieth-century philosophers of technology became critics of modernity.

I want now to present the various alternatives so far discussed and others as well in a chart that puts order in the discussion.⁴

Technology is defined here along two axes reflecting its relation to values and agency. The vertical axis offers two alternatives: either technology is value neutral, as we typically assume in modern times, or it is value-laden as the Greeks believed and, we will see, as some philosophers of technology believe today. The choice between these views is not obvious. From a common-sense perspective a technical device is simply a concatenation of causal mechanisms. No amount of scientific study will find anything like a purpose in it. But perhaps common sense misses the point. After all, no scientific study will find money in a \$100 bill. Not everything is a physical or chemical property of matter. Perhaps technologies, like bank-notes, have a way of containing value in themselves as social entities.

On the horizontal axis technologies are signified as either autonomous or humanly controllable. To say that technology is autonomous is not of course to say that it acts alone. Human beings are involved, but the question is, do they actually have the freedom to decide how technology will be applied and develop? Is the next step in the evolution of the technical system up to human decision-makers or do they act according to a logic inscribed in the very nature of technology? In the latter case technology can rightly be said to be autonomous. On the other hand, technology would be humanly controllable if we could determine the next step in its evolution in accordance with intentions elaborated without reference to the imperatives of technology. The intersection of these two axes defines four types of theories.

Instrumentalism, the occupant of the box in which human control and value neutrality intersect, has been discussed above. This is the “standard” modern view according to which technology is a tool or instrument of the human species as a whole. As noted in the chart, this view corresponds to the liberal faith in progress that was such a prominent feature of mainstream Western thought until fairly recently.

Technology, on the determinist account, is rooted on the one side in knowledge of nature and on the other in generic features of the human species. This is why it can be described as neutral, as a rationally constructed tool serving universal human needs. Some determinists argue that technologies simply extend human faculties: the automobile extends our feet while computers extend our brains. It is not up to us to adapt technology to our whims but on the contrary, we must adapt to technology as the most significant expression of our humanity. Determinism is a widely held view in social science in which it supports the pretensions to universality of both capitalist and communist societies.

Substantivists attribute substantive values to technology in contrast with instrumentalism and determinism which view technology as neutral. The contrast here is actually more complex than it seems at first sight. The neutrality thesis to which instrumentalists and most determinists subscribe does admit that technology embodies a value but it is a merely formal value, efficiency. Using technology for this or that purpose would not be a specific value choice in itself, but just a more efficient way of realizing a preexisting value of some sort. A substantive value on the contrary involves a commitment to a specific conception of the good. According to substantivism, the values embodied by technology are the pursuit of power and domination. These values track technology like a shadow and show up in everything it touches. If technology embodies these value, it is not merely instrumental and cannot be used for the various purposes of individuals or societies with different ideas of the good. According to substantivism, insofar as we use technology we are committed to a technological way of life.

There are obvious relations between substantive theory of technology and determinism. In fact most substantive theorists are determinists as well. But the position I have characterized as determinism is optimistic and progressive. Both Marx (in the commonplace interpretations) and the modernization theorists of the postwar era believed that technology would save humanity. Substantive theory is not so optimistic and regards autonomous technology as threatening if not malevolent, rather than benign. Once unleashed technology becomes more and more

imperialistic, taking over one domain of social life after another. In the most extreme imagination of substantivism, a *Brave New World* such as Huxley describes in his famous novel converts human beings into mere cogs in the machinery. This is not utopia—the “no place” of an ideal society, but dystopia—a world in which human individuality has been completely suppressed. Here people become, as Marshall McLuhan once said, the “sex organs of the machine world” (McLuhan, 1964: 46).

Martin Heidegger was the most famous substantive theorist. He argued that the essence of modernity is the triumph of technology over every other value. He noted that Greek philosophy had already based its understanding of being on technical making and argued that this starting point culminates in modern technology. Where the Greeks took *technē* as the model of being in theory, we have transformed beings technically in practice. Our metaphysics is not in our heads but consists in the real technical conquest of the Earth. This conquest transforms everything into raw materials and system components, including human beings themselves (Heidegger, 1977a). Not only are we constantly obeying the dictates of the many technical systems in which we are enrolled, we tend to see ourselves more and more as devices regulated by medical, psychological, athletic, and other functional disciplines. Our bookstores are full of “operating manuals” for every aspect of life: love, sex, divorce, friendship, raising children, eating, exercise, making money, having fun, and so on. We are our own machines.

But, Heidegger argues, although we may control the world through our technology, we do not control our own obsession with control. Something lies behind technology, a mystery we cannot unravel from our technological standpoint. Where we are headed is a mystery too. The West has reached the end of its rope. Heidegger’s last interview concludes that “[o]nly a God can save us” (Heidegger, 1977b).

Heidegger’s views contrast sharply with the critical theory of technology. Critical theory agrees with substantivism that technology is not the unmixed blessing welcomed by instrumentalists and determinists. It recognizes the catastrophic consequences of technological development but still sees a promise of greater freedom in a possible future. The problem is not with technology as such but with our failure so far to devise appropriate institutions for exercising human control over it. We could tame technology by submitting it to a more democratic process of design and development.

The economy offers an encouraging parallel to this view of technology. A century ago mainstream political and academic thought conceived of

the economy as an autonomous power operating according to inflexible laws. Today we know the contrary, that we can influence the direction of economic development through democratic institutions. Critical theory of technology argues that the time has come to extend democracy to technology as well. It thus attempts to save the Enlightenment values that have guided progress for the last several hundred years without ignoring the resulting problems.

As can be seen from the chart, critical theory shares traits with both instrumentalism and substantivism. Like instrumentalism, critical theory argues that technology is in some sense controllable, but it also agrees with substantivism that technology is value-laden. This seems a contradictory position since, in the substantivist view, precisely what cannot be controlled are the values embodied in technology such as efficiency and domination. If this is true, the choices within our power would be like those we make in the supermarket between different brands of soap, that is, trivial and delusory. How then can we conceive the value-ladenness of technology such that human control matters?

The critical theorist Herbert Marcuse sketched an answer I have tried to develop in what I call a critical theory of technology. According to critical theory the values embodied in technology are socially specific and are not adequately represented by such abstractions as efficiency or control. Technology can frame not just one way of life but many different possible ways of life, each of which determines a different choice of designs and a different range of technological mediation. Does this mean that technology is neutral, as instrumentalism believes? Not quite: modern societies must all aim at efficiency in those domains in which they apply technology, but to claim that they can realize no other significant values besides efficiency is to overlook the tremendous social impact of differing design choices. What is worse, it obscures the difference between the current miserable state of technological societies and a better condition we can imagine and for which we can struggle. One must look down on mankind from a very great height indeed not to notice the difference between efficient weapons and efficient medicines, efficient propaganda and efficient education, efficient exploitation and efficient research! This difference is socially and ethically significant and so cannot be discounted as thinkers who share Heidegger's Olympian view sometimes claim.

Nevertheless, the substantivist critique of instrumentalism does demonstrate that technologies are not neutral tools. Means and ends are connected. Thus even if some sort of human control of technology is

possible, it cannot be understood on the same terms as instrumental control of particular devices. In critical theory, technologies are not seen as mere tools but as frameworks for ways of life. Thus we cannot agree with the instrumentalist that “[g]uns don’t kill people, people kill people.” Supplying people with guns creates a social world quite different from the world in which people are disarmed. We can choose which world we wish to inhabit through legislation.

This is not the sort of control over technology that instrumentalism generally claims we have. Its model of control is based on a restricted notion of use of individual devices, not choices between whole technological systems with different social consequences. This is a meta-choice, a choice at a higher level determining which values are to be embodied in the technical framework of our lives. Critical theory of technology opens up the possibility of reflecting on such choices and submitting them to more democratic controls. We do not have to wait for a God to save us as Heidegger expostulated but can hope to save ourselves through democratic interventions into technology.

But critical theory is not naïve about the difficulties that stand in the way of democracy. Technology gradually subverts the capacity for democracy even as it destroys the objective world. Thus the practical difference between substantivism and critical theory is not as great as it seems at first.⁵ Critical theory is relatively skeptical about the capacity of human beings to get technological civilization under reasonable control, but at least it does not exclude the possibility in principle as does substantivism. This is why it is necessary to talk not in terms of a utopian democracy of technique but more modestly of democratic interventions in technology.

What is meant by the concept of democratic interventions? Clearly, it would not make sense to hold an election between competing devices or designs. The voting public is not sufficiently concerned, involved, and informed to choose good politicians, much less good technologies. So, in what sense can democracy be extended to technology under current conditions? People affected by technological change ever more frequently protest or innovate. Where it used to be possible to silence all opposition to technical projects by appealing to Progress with a capital “P,” today communities mobilize to make their wishes known, for example, in opposition to nuclear power plants or toxic waste dumps in their neighborhood. In a different vein the computer has involved us in technology so intimately that our activities have begun to shape its development. Email, the most-used function of the Internet, was introduced by skilled users and did not originally figure in the plans of the designers at all. Similar

examples can be adduced from medicine, urban affairs, and many other domains in which technology shapes human activity.

Critical theory of technology detects a trend toward greater participation in decisions about design and development in examples such as these. The public sphere appears to be opening slowly to encompass technical issues that were formerly viewed as the exclusive preserve of experts. Can this trend continue to the point at which citizenship will include the exercise of human control over the technical framework of our lives? We must hope so, for the alternative is likely to be the eventual failure of the experiment in industrial society under the pressure of untrammelled competition and national rivalries. If people are able to conceive and pursue their intrinsic interest in peace and fulfillment through the political process, they will inevitably address the question of technology along with many other questions that hang in suspense today. We can only hope this will happen sooner rather than later.

Notes

1. This short chapter can give only a hint of the richness of the field. For a thorough account, see Mitcham (1994).
2. This is a summary of ideas developed in Habermas (1984). Although the usual contrast of premodern dogmatism with modern reflexivity is no doubt overdrawn, this is hardly the moment to drop it entirely. For a critique of this position, see Latour (1991).
3. The discussion in this section is loosely derived from Heidegger's (1973) history of being.
4. This chart is drawn from Feenberg (1999: 9).
5. For a comparison of Heidegger and critical theory, see Feenberg (2005).

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