Three Species of Technological Dependency

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Abstract
One can find from a survey of the work of three prominent philosophers of technology in the late twentieth century, a very different kind of metaphor for describing the powerful, but not fully determinative influence that technology has on our lives. These three theories each centre on a concept I call "technological dependency." The most prominent exponents of technological dependency are Marshall McLuhan, Herbert Marcuse and Jacques Ellul. Although there are similarities between their descriptions of the phenomenon of dependency, their discussions of this phenomenon are focused around very different sub-metaphors for describing the nature of the dependency. McLuhan portrays our relationship with technology as capable of becoming a form of addiction or habit, Marcuse portrays it as a form of bribery, and Jacques Ellul portrays it as a form of religious cultism.

Keywords: social studies in science and technology, autonomous technology, instrumentalism, Marcuse, Ellul, McLuhan

Introduction

At two conferences held in 1993 and 1994, some of the world's leading activists, thinkers and writers convened to discuss the struggle against "megatechnologies" and technocracy. In the wake of these two conferences the Jacques Ellul Society was formed to discuss the challenges facing this struggle (Mills 1997, 238). Ellul remains a seminal figure for many involved in the growing, but still politically marginal, resistance movements against modern technology in North America. Similarly, Andrew Feenberg has recently revitalized interest in the work of Herbert Marcuse with the publication of three books specifically addressing his views on technology: *Questioning Technology* (1999), *Transforming Technology: A Critical Theory Revisited* (2002), and *Heidegger and Marcuse: The Catastrophe and Redemption of History* (2004). Interest in Marshall McLuhan's work has recently experienced a renaissance in Canada with the creation by the public broadcaster of the province of Ontario and the National Film Board of Canada of a documentary about his views on technology and a series of television spots called "The McLuhan Probes" (Sobelman 2002). Each of these influential 20th century intellectuals share a preoccupation with a general problem they identify that exists between society and technology that prevents the majority of people from significantly challenging technologies and processes of technological change, and which threatens to relegate technological criticism perennially to the margins of political debate.

The notion of "autonomous technology" has become widely accepted in the philosophy of technology as an alternative to determinism as a way of conceiving the relationship between people and technology. However, this notion suffers from an image problem. For instance, Langdon Winner notes of the growing field of social studies in science and technology that many of the researchers in this field reject the notion "as a now discredited determinism, eclipsed by their own models of a dynamic multicentred process of social selection" (2003, 239). Many agree

that strict technological determinism is an unhelpful and extreme way of conceiving the relationship, but few wish to accept the other extreme of what Andrew Feenberg calls, "instrumentalism", with its naïve assumption that "that the subjects of action can be defined independently of their means" (63). He feels it is important that people recognize that all technology is "fundamentally biased toward a particular hegemony" (Feenberg 2002, 63). Words like "autonomous" and "bias" and "hegemony" still strike a chord that smacks enough of determinist themes to discourage social scientific researchers from feeling comfortable with such terms. I do not think this is merely a case of these researchers reaching for, as Winner puts it, "their preferred conceptual straw-man: technological determinism"(2003, 239). Instead, I think it grows from the use of misleading terminology like "autonomy", "bias", "hegemony", and phrases like "Technics-Out-of-Control" (Winner 1977), or "the 'media dictates culture' problem" (Kuhns 1971, 123) used for describing the relationship between people and technology.

One can find from a survey of the work of three prominent philosophers of technology in the late twentieth century, a very different kind of metaphor for describing the powerful, but not fully determinative influence that technology has on our lives. These three theories each centre on a concept I call "technological dependency." The most prominent exponents of technological dependency are Marshall McLuhan, Herbert Marcuse and Jacques Ellul. Although there are similarities between their descriptions of the phenomenon of dependency, their discussions of this phenomenon are focussed around very different sub-metaphors for describing the nature of the dependency. McLuhan portrays our relationship with technology as capable of becoming a form of addiction or habit, Marcuse portrays it as a form of bribery, and Jacques Ellul portrays it as a form of religious cultism. The following is an examination of these distinctive metaphors of technological dependency.

Technological Dependency

Carl Mitcham and Robert Mackey, in their early survey of the field of the philosophy of technology, point to three paradigmatic positions concerning our ability to "redirect" technology toward more humane or environmentally responsible ends. They describe these three positions as follows:

> If [Emmanuel G.] Mesthene is right that technology is physical possibility, then a redirection of technology requires only that we choose to realize the new end; a "recovery of nerve" is what is essential. However, if [Nathan] Rotenstreich is right, that technology is rooted in the authoritarian mentality, then any significant change in direction of technology would involve a general alteration in man's root attitude toward the world. Whereas if [Jacques] Ellul is correct, such redirection seems out of the question, because technology develops by its own intrinsic principles. (Mitcham and Mackey 1972, 30)

Mesthene's position is that it is simply a lack of moral will to do what we otherwise know is right, which prevents people from adequately rising to the task of addressing the challenges that technology presents. Rotenstreich's position parallels the hypothesis presented by the American historian Lynn White in his classic 1967 article in *Science* that a problematic Western metaphysical outlook is the real culprit behind many contemporary social woes, such as the environmental crisis. In stark contrast, Ellul's position argues that all people, regardless of their metaphysical outlooks, are enclosed "within the technical realm" that places certain practical restrictions on their ability to change fundamental aspects of that realm (Mitcham and Mackey 1972, 30).

These three basic positions represent the range of positions typically held by philosophers of technology when it comes to explaining the systematic failure of Western civilization to come to

proper grips with its technological excesses. I have argued elsewhere that the Lynn White position is the position held by a majority of prominent environmental philosophers (Gerrie 2003). However, in the field of the philosophy of technology, it is common to find a position like that of Jacques Ellul. The common feature of such a position is the notion of technological dependency.

The notion of technological dependency represents any kind of theoretical claim that there are features of technological practice as such, which systematically prevent critical ethical judgement of such practice from happening. If one believes that the biases of such features are strong enough to prevent any meaningful ethical assessment to occur, then one is a supporter of the notion technological determinism. However, if one believes there is some room for countervailing action, then one is simply a supporter of some specific form of dependency theory.

John McDermott describes technological dependency as being rooted in the naive belief that "Technology is a self correcting system. Temporary oversight or 'negative externalities' will and should be corrected by technological means" (McDermott 1977, 184). Dependency theorists explain the origins and power of beliefs, like this, and other manifestations of what has come to be called "the technological imperative." They also help explain the apparent "self-generating properties of modern technology" (Winner 2003, 239) noted by many modern critics of technology. Technology scholar Wilson Dizard points to four key observations about the nature of technological change made by Jaques Ellul, the second of which points to such self-generating properties and the problem of technological dependency:

> All technical progress exacts a price; that is, while it adds something on the one hand, it subtracts something on the other.
> All technical progress raises more problems than it solves, tempts us to see the consequent problems as technical in nature and prods us to seek technical solutions to them.
> The negative effects of technological innovation are inseparable from the positive. It is naïve to say that technology is neutral, that it may be used for good and bad ends; the good and bad effects are, in fact, simultaneous and inseparable.
> All technological innovations have unforeseen effects. (Dizard, 1985, 11).

These four basic observations about technology are also made by Marcuse and McLuhan, with 1, 3 and 4 constituting what Feenberg calls a "substantivist" outlook (Feenberg 1999 9). However, it is the second observation, which they also share, that serves as the basis for their discussions of the idea of dependency. Theories of dependency provide a more detailed explanation of how technological activity as such can "tempt" or "prod" us toward addressing problems created by technological progress with more technological activity. According to Marcuse Ellul and McLuhan, in a technological civilization the predominant response will be to approach social issues involving technology in ways that persistently avoid seeing these issues as opportunities to also bring established technological practices into ethical question.

In other words, in a highly technological dependent society, the tendency will be to deal with most problems through "technological fixes." Alan Drengson describes this approach as follows: "I call this attempt to repair the harm of a technology by modification, a technological fix. If, on the other hand, we question the very purpose and intent behind the technology (e.g. of insecticides) and thereby develop alternative approaches that might require modifying our values and goals, then we recognize the limits of the technological fix" (Drengson 1984, 260). Technological dependency manifests itself in the belief in what Drengson calls the "myth of the

technological fix" (1984) and as the chronic inability or unwillingness of people to ethically question the use of particularly problematic technologies, even in the face of mounting evidence that such technologies are critical parts of problematic forms of human behavior. It is the distinct theoretical explanations of this tendency to ignore what Winner calls the "painful ironies of technical choice" (2003, 239), which separate the theories of technological dependency of Marcuse, Ellul and McLuhan.

Three Images of The Nature Of Technological Dependency

Herbert Marcuse

According to Herbert Marcuse "A comfortable, smooth, reasonable, democratic unfreedom prevails in advanced industrial civilization" (Marcuse 1977, 107). His inclusion of the term democratic in this list is telling. Marcuse, a Marxist, was interested in explaining the lack of revolutionary consciousness in Western democratic societies. Orthodox Marxism had predicted that the more industrialized a society became, the greater the inherent contradictions between private owners and labor should become. For example, greater automation and efficiency should lead to downward pressures on wages and a widening gap between haves and have-nots. However, productivity increased rapidly in the West in the post-war period, but so did living standards for large numbers of people. Many working class people in Western societies seemed basically happy with the economic system and the abundance of goods that it could produce.

Marcuse tried to explain Marxist theory in a way that could explain the apathy of the Western working class but still make sense of the revolutionary spirit of the left and the notion of class conflict. What he came up with was a notion of the modern industrial economy as a vast bribe, which had the effect of keeping workers docile and accepting of the inherently unfair reality of private ownership. As he puts it, "This productivity mobilizes society as a whole, above and beyond any particular individual or group interests" (Macuse 1977, 108). The result is that "the productive apparatus and the goods and services which it produces 'sell' or impose the social system as a whole" (Marcuse 1977, 114).

According to Marcuse, the vast majority of people in a modern economy are, in a very real sense, "on the take." This means that most are co-opted by what came to be called, in the parlance of the sixties, "the system." However, the central image of payoff allows for an understanding of a degree of co-optation to enter into the analysis, which is in line with Marcuse's fundamental Marxist starting point. Obviously those who are most richly rewarded by the industrial system will have greater interest in the preservation of the system, especially those in political power. As Marcuse notes, "The government of advanced and advancing industrial societies can maintain and secure itself only when it succeeds in mobilizing, organizing, and exploiting the technical, scientific, and mechanical productivity available to industrial civilization" (Marcuse 1977, 108). People in roles of political leadership and other "vested interests", therefore, have a particular interest in keeping the system functioning "through the manipulation of needs" and "false needs" among the masses (Marcuse 1977, 108-109).

However, all individuals are fundamentally open, to some degree, to the lure of the productivity of the industrial system as a whole, as well as any of its particular blandishments and all individuals, therefore, can play some role in the support of that system. This conclusion leads Marcuse to raise the following fundamental question: "How can the people who have been the objects of effective and productive domination by themselves create the conditions of freedom" (Marcuse 1977, 111)? He notes that "all liberation depends on the consciousness of servitude, and

the emergence of this consciousness is always hampered by the predominance of needs and satisfactions which, to a great extent, have become the individual's own" (Marcuse 1977, 111). The result is that to the degree which we are controlled by "economic forces and relationships", "the struggle for daily existence", and "politics" we are under the sway of a form of "repressive satisfaction" (Marcuse 1977, 111).

We might all wish to avoid biting the hand that feeds us, but some of us have more to lose then others. Marcuse's analysis suggests a scale, which ranges from those who are almost completely outside "the system," such as primitivists and hippies living off the grid on communes, all the way to the political and industrial elites who benefit greatly from the productivity of the system. Marcuse singles out intellectuals for particular distrust. As he states,

> The interrelation between scientific-philosophical and societal processes, between theoretical and practical Reason, asserts itself "behind the back" of scientists and philosophers. The society bars a whole type of oppositional operations and behaviour; consequently, the concepts pertaining to them are rendered illusory or meaningless. Historical transcendence appears as metaphysical transcendence, not acceptable to science and scientific thought. The operational and behavioural point of view, practiced as "habits of thought" at large, becomes the view of the established universe of discourse and action, needs and aspirations. The "cunning of Reason" works, as it so often did, in the interests of the powers that be. (Marcuse 1977, 117)

Although the phenomenon of general societal dependency is explained by Marcuse's image, this image still allows for gradations of interest in the survival of the system, and hence for gradations of responsibility for the reinforcement and maintenance of dependency.

The idea that we all essentially are co-opted by the system and corrupted by its productive possibilities is what led so many of Marcuse's readers to the conclusion that "dropping out" was the only way to bring about real change. Marcuse was the darling of the counter-culture movements of the sixties, perhaps, because his outlook encouraged such an absolutely jaundiced view of society. Unfortunately, such a view also, in the end, left very little room for any kind of resistance of any practical value because seemingly only dismantling the entire industrial system would bring an end to its corrupting powers.

Jacques Ellul

At the core of Ellul's outlook on dependency is the idea of technology as cult. At times Ellul seems to suggest, like Lynn White Jr., that the essential battle to be fought is over the appropriate metaphysical/religious outlook to adopt. However, what makes Ellul position distinct from the Lynn White hypothesis is his contention that there is something in the nature of technology itself, at least in the complex form it takes in advanced industrial societies, that prevents awareness of the need to engage in a critical analysis of one's most fundamental metaphysical and ethical presuppositions. Ellul describes the unique challenge that modern people face as follows:

> But when technique enters into every area of life, including the human, it ceases to be external to man and becomes his very substance. It is no longer face to face with man but is integrated with him, and progressively absorbs him. In this respect, technique is radically different from the machine. This transformation, so obvious in modern society, is the result of the fact that technique has become autonomous. (Ellul 1977, 122)

The notion of the "autonomy of technology" is the way that Ellul designates his understanding of technological dependency.

According to Winner, Ellul held that "a certain mode of thought and action, a particular way of defining problems and responding to them, was adopted by society and then became the dominant pattern that governed universally from that time forward" (126). This response pattern also "strongly and automatically repulses any alternative mode of activity" (Winner 1977, 126). Winner goes on to describe the degree to which technological dependency extends in its social influence as follows:

> The profound depth of this tendency is I believe, best illustrated by the fact that even those who now acknowledge a problem in man's relations with nature often move from that insight to become unreconstructed technological systems builders on a potentially colossal scale. (Winner 1977, 129)

So how exactly does technology as a whole circumvent our human ability to reflect critically on ultimate ends? Ellul's position is essentially sociological and, somewhat ironically, relies on the negative critique of religion espoused by nineteenth century positivists, whose metaphysical or anti-metaphysical position he finds so abhorrent. One of his central assumptions is that religion can, as many sociologists suggest, serve as a social focus of human effort. But, according to Ellul, technology can also play this role. He suggests that "The enormous effort required to put this technical civilization into motion supposes that all individual effort is directed toward this goal alone and that all social forces are mobilized to attain the mathematically perfect structure of the edifice" (Winner 1977, 122). According to many sociologists of religion, religions typically play the role of providing a life project to which one could contribute one's individual efforts in the service of something greater than oneself. According to Ellul, the necessity of the ongoing "augmentation" of the technological system means that it can also take such as role, with the result being the development of a pious attitude that it is fundamentally "wrong for a man to escape this universal effort" (Ellul 1977, 123).

According to Ellul modern individuals are faced "with a choice of 'all or nothing.' If we make use of technique, we must accept the specificity and autonomy of its ends, and the totality of its rules. Our own desires and aspirations can change nothing" (Ellul 1977, 124). According to Ellul technology, like a complex religious belief system, can only function as an interconnected system of beliefs and practices which one must accept as a whole. A second feature of contemporary industrial society also supports its ability to take on the role of a cult-like religion. Ellul describes this feature as follows:

> The second consequence of technical autonomy is that it renders technique as sacrilegious and sacred (*Sacrilegious* is not used here in the theological but in the sociological sense.) Sociologists have recognized that the world in which man lives is for him not only a material but also a spiritual world; that forces act in it which are unknown and perhaps unknowable; that there are phenomena in it which man interprets as magical; that there are relations and correspondences between things and beings in which material connections are of little consequence. This whole are is mysterious. (Ellul 1977, 124)

This numinous quality of technologies and technical knowledge augments the ability technology conceived as a whole to take on the role of a cult because it can tap into the same kind of awe that is the primitive source of religion. He notes as follows: "It has been said that modern man

surrounded by techniques is in the same situation as prehistoric man in the midst of nature" (Ellul 1977, 130). But this suggests a third feature of technology that would make it particularly difficult to cast the light of ethical criticism on it. According to Ellul "The sacred is what man decides unconsciously to respect" (Ellul 1977, 125). Unlike the revealed religions, with their scriptures, overt dogmas and self-conscious apologetics in the face of religious competitors, technology as a religion operates primarily at a subconscious level and is therefore more like a cult than a public religion.

According to Ellul, technology is essential mysterious to anyone who is a non-expert in any of its facets but it has one more feature that makes its effect on our lives particularly difficult to detect. Although technology is like nature for the prehistoric person, a mysterious force, technology also "denies mystery a priori. The mysterious is merely that which has not been technicized" (Ellul 1977, 125). So technology can play, and according to Ellul has played, an important role in the assault on religious belief. He obviously has in mind the role that technological progress has played in helping support various forms of criticism of established religious customs and beliefs. The result is that technology, because it can be the source of a largely unconscious sense of respect, can play the role of a religion in providing a source of values, but it is also deadly to its overt competitors in this area.

The result is technological dependency. Ellul argues that "every civilization has rules of precise conduct, which are covered by the term *morality* in either its French or its Anglo-Saxon meaning. They determine what is good and what is bad and, consequently, admit or reject a given innovation" (Ellul 1977, 126). But when technology takes on important features of religion it circumvents our critical abilities because everything technological is imbued with an aura of the sacred. The result is, according to Ellul, that "Man is scandalized when he is told that technique causes evil; the scourges engendered by one technique will be made good by still other techniques. This is society's normal attitude" (Ellul 1977, 125).

In this new religion "scientists and worshippers of technology" will be very reluctant to reject any forms of technological power (Ellul 1977, 134). They will, instead, unconsciously defend the fundamental values of a "religion of technology" (Noble 1999). Therefore, according to Ellul, one must conclude that it is extremely unlikely that scientists will be capable "of any but the emptiest platitudes when they stray from their specialities" (Ellul 1977, 135). The more regular mode of most people, Ellul suggests, is to avoid questions of an overtly religious nature, such as questions concerning one's metaphysical presuppositions or core values. As Ellul puts it, "None of our wise men ever pose the question of the end of all their marvels. The 'wherefore' is resolutely passed by" (Ellul 1977, 136). There will also be a strong moral inducement to demonize those who overtly reject any forms of technological progress. Ellul puts this point as follows:

> But what good is it to pose questions of motives? Of Why? All that must be the work of some miserable intellectual who balks at technical progress. The attitude of the scientists, at any rate, is clear. Technique exists because it is technique. The golden age will be because it will be. Any other answer is superfluous. (Ellul 1977, 136)

In the end, the religion of progress as described by Ellul, would seem to pose a very serious threat to the autonomy of its adherents, because like real religions it will be capable of galvanizing extremely powerful emotional sentiments and a sense of awe and gratitude on the part of its adherents. However, unlike real religions it will be largely immune to any form of self-criticism.

Marshall McLuhan

For McLuhan, dependency involves a "subliminal and docile acceptance" of technology (McLuhan 1977, 103). The root of this docile attitude is a form of unconsciousness towards our technological activities and their effects. The problem is not one of false consciousness or false needs, but a lack of consciousness at all. The result is that "a man is not free if he cannot see where he is going" (103). The origin of numbness is a result of the nature of technology as McLuhan defines it. According to McLuhan all technologies are "extensions of some human faculty—psychic or physical" (McLuhan 1967, 26). And so in the same way that most people are normally unaware of thought when they are thinking, or of their hands when they are grasping, or of their mouths when they are speaking, they are normally unaware of their technologies in their regular use. In most natural and unmediated human activities one's focus is on the task itself and one's goals and not the means (the various parts of our body or mind) being used to achieve these goals. This means that it is precisely the tools with which we are most familiar that we will be most blind too.

For McLuhan there seem to be two causes of this normal lack of awareness. The first is the result of the simple intimacy that is an integral characteristic of technologies according to McLuhan. All technologies, as extensions of our physical and mental selves, literally represent extensions of our own bodies or mind. McLuhan's suggestion is that in our technological actions, just like in our unmediated actions, we are normally unselfconscious of the various parts of our functioning body and mind.

What McLuhan is suggesting is the mundane fact that in any human practice, trying to maintain an intense self-conscious awareness of how one is doing what one is doing is a guaranteed way to inhibit the effective achievement of the goal of the practice. McLuhan's use of imagery from the field of psychology might simply be a literary person's way of communicating this point. As McLuhan puts it,

> The principle of numbness comes into play with electric technology, as with any other. We have to numb our central nervous system when it is extended and exposed, or we will die. Thus the age of anxiety and of electric media is also the age of unconsciousness and of apathy. (McLuhan 1977, 106)

As McLuhan points out on many occasions, it is only when technologies have passed from normal use that they typically become objects of conscious appreciation, such as when they become objects in museums. It is for this reason that McLuhan likes to compare attempts at understanding the ethical impact of technologies to an attempt at driving a car by way of the rear-view mirror (McLuhan 1967, 100).

However, there is one further source of a possible lack of awareness to our technologies, which might make the neurological imagery of McLuhan not so far-fetched. According to McLuhan it is also the habitual nature of most technological activities that contributes to our lack of awareness of these activities. As he puts it, "It is this continuous embrace of our own technology in daily use that puts us in the Narcissus role of subliminal awareness and numbness in relation to these images of ourselves. By continuously embracing technologies, we relate to them as servomechanisms" (105). All technologies involve us in routine forms of practice. From the primitive pounding mill of village life, to the procedures of airways management in the modern societies, routine procedure is the name of the game when it comes to technology. And this very routine character of most technological practice can, according to McLuhan, contribute to a lack of awareness of the implications of such practice. As anyone who has a bad habit knows, one of

the most difficult parts of the battle against such a habit is simply trying to maintain awareness that one is doing it.

McLuhan takes this notion of habit and of technology to an absolute extreme. According to McLuhan, "Socially, it is the accumulation of group pressures and irritations that prompt invention and innovation as counter irritants" (106). In the same way that processes of technological innovation can lead to useful instruments that solve specific problems, such a process has also lead to the ultimate general instrument for the solution of problems, the process of technological innovation itself as a universal tool. McLuhan goes to great lengths to emphasize this point. He cites in at least four places Alfred North Whitehead's statement: "The greatest invention of the nineteenth century was the invention of the method of invention" (McLuhan 1962, 45, 176; McLuhan 1967, 187; McLuhan 1988, 383). However, if the process of technological innovation can become a method it also can become a form of habitual technological practice of the type discussed by McLuhan. The exercise of this habit would obviously contribute to the technological irritants calling for further exercise of this habit. It also could, conceivably in a highly technological society, reduce the opportunity for seeking to deal with the problems thrown up by technology via the simple ethical reconsideration of some of one's technological actions. One can hear the complaint against the growing power of habitual practice in McLuhan's frequent use of the image of the sleepwalker or somnambulist (Marchand 1990, 229) to describe the most common response to the impact of technology on the lives of modern people. This image of somnambulist has also been used by Langdon Winner (2004).

However, this description leaves open the possibility that our particular extensions and their effects will be perceivable by others who are not regular users. The practical recommendation of McLuhan then, would be a familiar one. Any decision-making processes involving a technology must involve as wide participation of stake-holders as possible. Instead of implicating everyone in a "system" or a "faith", McLuhan suggests that our entanglement in technology is much more specific and individual. However, as many recovering addicts attest to working with others together to deal with one's addiction can be a very good way of coming to grips with a dependency. McLuhan's image of dependency, therefore, holds out the hope that existing systems of democratic participation might have the possibility of addressing technological dependency. As he states: "With our central nervous system strategically numbed, the tasks of conscious awareness and order are transferred to the physical life of man, so that for the first time he has become aware of technology as an extension of his physical body...with such awareness, the subliminal life, private and social, has been hoisted up into full view, with the result that we have 'social consciousness' presented to us as a cause of guilt feelings" (McLuhan 1977, 106). McLuhan's hoped that at some point the sheer intensity of our technological involvements will begin to force us to look more closely and deliberately at them in detail.

Conclusion

The phenomenon of technological dependency helps explain the systematic and widespread inability of the vigorous consideration of the ethical limitation of technology to occur. Marcuse's explanation for this phenomenon is that powerful incentives of the industrial system conspire to prevent actions that will limit the expansion of this system, whereas at the level of individual technologies, the obvious benefits of such technologies discourage inquiry into the less obvious harms. Ellul's explanation for this phenomenon is that most modern people are scandalized at the thought of criticizing technology and are easily intimidated and cowed by the arcane wisdom of the high priests of high technology. McLuhan sees technological practice as being so axiomatic

and habitual in nature that it becomes, in effect, second nature. And like all habits, technological practices can inherently distract us from other kinds of activity, such as ethical reflection.

All three images provide useful explanations of particular manifestations of technological dependency and the necessity for addressing the various types of dependency. However, the positions of Marcuse and Ellul allow for the designation of certain privileged groups of individuals who can be thought to be especially responsible for the continuation of technological dependency. For Marcuse, it is the industrial and commercial elites who are still the primary beneficiaries of the continued operation of "the system." For Ellul, it is the scientific high priests who are the ultimate beneficiaries of the feelings of reverential awe that have been instilled in the masses. This differential aspect of their images of dependency could possibly undermine a proper appreciation of the immense depth and pervasiveness of technological dependency, which both of their theories also posit. It also creates opportunities for the vilification of those who can be classified as elite and those who cannot, which could, in certain circumstances prevent possible awareness of the full breadth of technological dependency. For these two reasons, I find McLuhan's image of technology as habit to be the most intriguing.

McLuhan's outlook on dependency has the advantage of not encouraging us to become distracted in the complexities of social and political conflict to the detriment of understanding the role that technology plays in such conflict. Instead, it provides a compelling rationale for increased engagement of everyone in a process of discourse about technological decisions. McLuhan's notion of dependency is, therefore, more in tune with the "multicentred process of social selection" (Winner 2003, 239) that is the preferred subject of investigation of many contemporary researchers in the field of social studies in science and technology. The problem for such researchers does not ultimately reside only in the overt forms of power of particular elite groups, such as industrialists or scientists. Instead, the danger lies clearly in the nature of technological practice itself. Therefore, it makes sense for people with different technological dependencies to share with each other in order for each side to benefit from the unique perspective of other people about the effects of one's technological actions of which one is unaware or unwilling to recognize.

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