

THE ENDURING DILEMMAS OF AUTONOMOUS TECHNIQUE

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In a key passage of *The Technological Society*, Jacques Ellul argues that technique has become autonomous as regards intervention by the human agents and institutions commonly supposed to guide its development. "Technique elicits and conditions social, political, and economic change," he observes. "It is the prime mover of all the rest, in spite of any appearance to the contrary and in spite of human pride, which pretends that man's philosophical theories are still determining influences and man's political regimes decisive factors in technical evolution."⁽¹⁾

As his critics read passages of this kind, they often conclude that Ellul has simply overlooked what is obvious. Anyone who asserts that technique -- what we Americans usually call "technology" -- is autonomous, must have failed to notice what is plainly true, namely, that all technologies are social, through and through. A closer look at them shows that they always contain a host of social and political choices whose detail and complexity is limited only by the observer's diligence in uncovering them. From this standpoint, Ellul's reading of modern history is dismissed because it appears insufficiently rigorous.

But a closer look at what Ellul is saying shows that he is fully aware of various claims that individuals, groups, and nations are consciously, actively engaged in making, shaping, choosing, and using technologies of various kinds. In fact, much of his writing is a dialogue with arguments of exactly that kind. Far from ignoring them, he engages voluntarist positions head on, showing that their claims about social choice and the kinds of reassurance they offer are woefully thin. For if one looks at the broader picture of how technique is welcomed and incorporated into society, one can hardly be confident that the origins, activities, and results of social choice about technology are firmly in anyone's grasp at all.

Today, the most common way of repackaging conventional claims that technology is something fully

chosen is to say that technologies are "socially shaped" or "socially constructed." This means that techniques, technical devices and technological systems are fully the product of social groups and reflect rather faithfully the needs, ideas, commitment, and deliberate projects of those social groups. Thus, for example, a recent book on missile guidance systems argues that the development of such devices is not the result of an autonomous trajectory of technical perfection, but rather a social product or social construction produced through the interaction of different groups with differing needs, ideas, political alliances, and strategies. Outcomes of this process are shown to be contingent, not necessary. In the world of guidance systems, the ideas about accuracy that prevail and the technical artifacts that realize them are social products that arise through complicated social processes. Hence, to speak of the autonomy of technique is wrong-headed because specific developments in hardware, software, and technical arrangements are the consequence of negotiations among social actors situated in a variety of institutional locations, exercising different degrees of power.

But the response of social constructivists to the idea of the autonomy of technology is almost always superficial, dealing with surfaces rather than deeper patterns. Ellul does not assert, for example, that technique springs from anything other than social aggregates and activities. What he asks us to notice is that in modern society, such groups are thoroughly enmeshed in the technical phenomenon, like fish in the surrounding sea, and that their every desire and project is focused upon the search for more efficient and effective ways of doing things. Whatever the situation of particular social actors or their relative power in making choices, their actions seldom show the kinds of independent motives or strong commitments expressed for their own sake, freely, outside the obsession for efficiency, productivity and the proliferation of technical means.

Indeed, if one studies the workings of research and

development organizations like the Draper Laboratory in Cambridge, Massachusetts, and the larger political and social arrangements of which Draper is a part, one comes to appreciate how the devices that steer missiles are the result of ongoing negotiations and shifting practical contingencies. At the same time, however, it is characteristic of those who work in the missile guidance business that they are among those in our culture most wholly given over to the search for human security within the realm of technological systems alone. The writings of Donald MacKenzie, the scholar who has documented this community most accurately, is himself given over to this viewpoint so completely that his book fails to take notice of social movements and political developments that ran counter to these social constructions -- the anti-nuclear weapons movements of the 1980's which were -- through the act of saying "No"-- extremely influential in helping to stop the nuclear arms race and bring an end to the cold war.⁽²⁾ Because these voices spoke outside the laboratory, because their contributions did not measure up to expert standards or sociologists' tidy reconstructions, their role in the drama was not counted. Only actions that took place within the framework of the technical cognoscenti and their political funding agencies deserved scholarly notice.

Studies of the social construction of technology are good at presenting narrow, internalist stories of technological development. But usually missing is any attention to larger social developments and more unusual possibilities for action, including the possibility that someone might step outside the games of technological construction to resist their trajectory and consequences. Missing, in other words, is any kind of social or political analysis that calls into question the narrowness of frameworks in which "choices" are typically made.

For many scientists, engineers and scholars, the almost universal denial of the claim that technique is or ever could be autonomous has become a standard alibi. In the United States this litany repeated in a seemingly inexhaustible stream of books, essays and lectures: "Technology is not autonomous, but is socially produced and socially used, all in ways that reflect a wide variety of social influences." As one recent book opines, "It is time to dismiss the sort of fatalism that Jacques Ellul and other determinists have preached; we cannot give up so easily Autonomous technology is an empty metaphor."⁽³⁾ One can almost hear the sighs of relief as this plea is faithfully repeated.

But what is the lesson to be drawn from the argument and all the evidence mustered to support it? In its more conventional versions, the message is that

society has already chosen the kinds of technology it uses and that this process of conscious choice gives "us" conditions that are basically agreeable. Yes, one can quarrel with specific projects and their consequences, but one cannot deny that people and human-made institutions decided what would take shape. Often the subtext of formulations of this kind is that everything that should be done is probably already being done. We are in good hands.

Another variant of this position, one that often comes from the left, insists that although technology is socially constructed, it is constructed by the wrong people with the wrong motives in mind. Other versions of similar technologies, produced by more enlightened social actors within a reformed social order would, by this logic, produce far better outcomes. But to conclude that technology is autonomous, merely deflects us from taking up the struggle to produce technologies and social institutions more favorable to freedom and justice. We are in the wrong hands.

Evidently, what an awareness of the social construction of technology is supposed to do is to liberate us from fatalistic errors. As MacKenzie argues, "The most pervasive and most paralyzing determinism of all is technological determinism. In our bleakest moments, the nuclear world has seemed to be a technological juggernaut out of control, following its own course independent of human needs and wishes."⁽⁴⁾ What one needs to realize, in MacKenzie's account, is that "Outside of the human, intellectual, and material networks that give them life and force, technologies cease to exist."⁽⁵⁾ Once we have acknowledged this, the world stands before us as a set of wide open options. Presumably, all one has to do is summon the will and imagination to choose the best ones.

But whether presented as conventional wisdom or left-wing moralizing, affirmations of voluntarism and social shaping are often accompanied by observations about worldly conditions that severely limit the scope of real options. Socially constructed technologies, it turns out, also demonstrate powerful historical tendencies that eliminate any choice beyond that of going with the flow of events. The same technological changes, said to be socially chosen, also seem to pour forth as if from a volcano. One's destiny becomes an intense struggle to keep up with the latest, most productive devices. Persons and groups must run as fast as they can to escape obsolescence. Hence, what the "more realistic" views of technological development hold out with one hand -- freedom to choose -- is taken away with the other, as stern assessments of our situation show how paltry our choices really are.

Within many contemporary fields of rapid technological development, it seems correct to say that new technologies are socially constructed and also galloping out of control. One need not be a philosopher or social critic to make conclusions of this kind. Such perceptions can be found, for example, in various fields of industrial production where new machine control technologies appear and disappear with a rapidity that astonishes even those most knowledgeable about their workings, origins, operation, and use. In firms at "the cutting edge" of technological development, the rule of thumb is: "If it works, it's obsolete"; that is, if an ensemble of hardware and software has been successfully installed and operated without too many problems, soon another system from some other place will arrive to boost efficiency and productivity. On a map of social activity it may be possible, with considerable effort and in retrospect, to chart where the change came from and who is responsible for making the breakthrough. But for many day-to-day understandings, metaphors very close to Ellulian ideas of autonomous technology are used to describe the lived experience of even the most expert and proficient engineers and technical managers. Those truly up to date talk about "Where the technology is going" and "Where the technology is taking us."

At the front lines of technological development in industry, the process of social construction generates extremely ephemeral constructs. It is possible to trace the changes observed to particular suppliers, designers and other social agents. But techniques and material artifacts are replaced so quickly that what seems most notable is a thoroughly unguided, socially directionless, highly dynamic process of which particular innovators, devices and ideas are fleeting moments. At the cutting edge of technical change, each field of development is said to have "a life of its own," one that quickly transcends any process of negotiation, design or choice of the sort that sociologists of technology hope to map. In the automobile industry as well as the computer technology and telecommunications industries, for example, it seems increasingly evident that, contrary to what the sociological view leads us to expect -- that eventually social actors and social groups achieve closure or consensus about what the form of a technology will be -- no closure on the shape of useful devices and systems occurs at all. What the insiders see are rapidly evolving ensembles composed of parts and pieces of technologies adopted in the recent past, blending with new generations of devices that arrive as if from nowhere with dizzying speed.⁽⁶⁾

Experiences of this kind are now thoroughly familiar to those who use personal computers. A machine bought now will be obsolete in another three

months. The 286 chip is succeeded by the 386, 486, Pentium, and so forth. Software developed for older generations of machines goes out of production and is "no longer supported" by those who sold it as something absolutely essential to one's livelihood a year or two earlier. This astonishing treadmill was noted last spring in the American cartoon strip "Doonesbury" by Gary Trudeau. In the first frame, a man who has just bought the very latest, most powerful PC tells a woman friend how proud he is of the new computer. She listens patiently. In the last frame the woman walks to the back of the central processing unit and points to a notice that says "Best if used by July 1994,"

The predicament noted in the cartoon is also present in Americans' beliefs about where society as a whole is headed and why. At a very deep level, citizens of the United States now understand that their future is not something deliberately chosen or created by concerted effort that follows a strong affirmation of any kind, for example the quest for a just society. Where will the future come from? Everyone knows. It is generated by our adaptation to a host of technological innovations that arise within the dynamic forces of an expanding global economy. This unquestioned assumption is fully evident in President Bill Clinton's technology plan and in the writings of his advisor, economist Robert Reich. The national mission is to be there first with the best, thereby encouraging technology-oriented transnational firms to locate their operations on U.S. soil. Such a future does not stem from a positive vision of political or social identity from which choices about technology will then be enforced. Neither does it come from any deep affirmation of civic ideals. The wellsprings of our destiny are located within the combined trajectories of basic scientific and technological fields that are now fundamental to the emerging enterprise networks emerging within a rapidly changing global, high tech economy.⁽⁷⁾ Those who deny the autonomy of technological development might pause to notice how strongly they themselves preach the necessity of adapting to technological and economic globalism. Is this not the phenomenon Ellul described, only now parading under a different label? Twenty years ago, a common slogan advised: "Think globally. Act locally." Today's slogan seems to be "Act globally. Don't worry about the thinking."

An especially brash vision of this situation is offered in Daniel Burrus' *Technotrends*, a book that depicts the future as an ongoing card game in which different players succeed or fail depending on which how well they understand their situation and how cleverly they place their technological bets. Basic to everyone's fortunes are some "Twenty Core Technologies Shaping

the Future." These include genetic engineering, advanced biochemistry, digital electronics, optical data storage, advanced video displays, advanced computers, distributed computing, artificial intelligence, lasers, fiber optics, microwaves, advanced satellites, photovoltaic cells, micromechanics, new polymers, high-tech ceramics, fiber-reinforced composites, superconductors, thin-film deposition, and molecular designing. Over time, innovations in these "core" technologies give rise to "new tools," useful techniques and devices that can be applied far beyond the controlled settings of the research and development labs. Examples of these tools include bar-code readers, digital interactive television, multisensory robotics, advanced compact disks, and scores of other late breaking products.⁽⁸⁾

Faced with rapidly breaking trends in the "core technologies" and their practical manifestations in the realm of "new tools," all individuals and groups must be prepared to seize the technological advantage, to identify and perfect new ways of doing things. Burrus insists that such adaptation requires us to recognize and affirm new "rules of the game." Whatever principles or rules of conduct may have guided your activity until now can only get you into trouble if you continue following those principles today.

Take, for example, the implicit rule that one ought to sustain and protect the ways of doing things, ways of living that have helped one flourish and prosper until now. Let us say you run a small business selling handmade bread. For decades that product has been the heart of your livelihood. You are, of course, inclined to continue making this fine bread in the manner that has succeeded until now. But that, according to technotrend watchers, is the path to disaster. The new rules of a dynamic technological era require that you identify exactly those practices and products that are most valuable to you and actively, deliberately liquidate them, eliminate them, phase them out. Why? Because some new technique for producing equivalent value more efficiently is out there somewhere just about to arrive. Either you willingly destroy your primary source of income and move on to a new way of producing, or somebody else will administer the coup de grace for you.

An example often discussed in this light is the predicament of I.B.M., a corporation long regarded as an invincible, industrial giant. But during the early 1990s the firm began to shrink rapidly, laying off tens of thousands of workers and trying desperately to avoid extinction in the dynamic world of computers and telecommunications. What happened, in Daniel Burrus' view, is that I.B.M. tried to preserve its main source of

wealth -- selling and servicing large mainframe computers -- long after the market had decided that small computers offered better use value. In this view, what I.B.M. should have done was to move to eliminate its dependence on mainframes and use its financial resources to look ahead to where the core technologies and associated innovations were leading. That is the only strategy that makes sense.

Thus, one can say that all technologies are socially produced and that technical devices reflect a broad range of social needs, desires, and projects. But underneath it all is a strong, widely shared perception that forces within the dispersed process of technological development will be decisive, regardless of the needs, norms, ideals, or fixed principles of any particular group. From that viewpoint, the notion of autonomous technology is not extreme, absurd or poorly related to actual fact. In the United States, maxims fully equivalent to Ellul's most pungent denials of the effectiveness of human choice are now upheld as shrewd business sense. There is no thought that it might be possible or desirable to control technological trends by the application of any strong, externally generated social ends. Everyone knows the best you can do is to recognize where "things are headed" and position yourself to flow with their ineluctable direction.

Adaptation to change of this kind is evident in just about every area of social life, including institutions once considered fairly conservative. Within colleges and universities, for example, traditional practices and standards of education are now under attack by entrepreneurs who claim that the old ways are outmoded, soon to be replaced by technologically embodied frameworks for teaching and learning.⁽⁹⁾ Today's students, we are told, are not well served by the kinds of deep reflection on ideas and through emersion in knowledge that old-fashioned educators insist upon. The global economy with its rapidly changing knowledge base requires that faster, more adaptable, lower cost ways of learning be developed.

So it happens that models of lean production and "just-in-time" process control (in which an industrial part is produced in small batches and arrives just in time for assembly) are now copied by colleges and universities. The goal is to educate people rather thinly on the first pass, giving them some basic intellectual tools that will enable them to be quick learners and problem solvers. Then they move out into the workplace for jobs that will become outmoded in a short time, typically a decade or less. At that point they can obtain new information and skills through brief training sessions, perhaps delivered by video via satellite transmission. This is sometimes called "just-

in-time" education. Fearing their own obsolescence, prodded by administrators concerned with cost-cutting and productivity, many university professors now supply training of this kind via satellite video transmission, electronic mail and other "interactive" media. Resistance to these techniques is reduced during times of academic downsizing (much like today's industrial downsizing) in which budgets are cut, faculties shrink and arguments for more efficient modes of teaching and learning seem appealing. Of course, such developments are always accompanied by choruses of ideological enthusiasm promising that a glorious renewal of education is in the works. What the students see as they stare into their video tubes is the dawning of a brighter day.

I mention this example of the likely penetration of seemingly autonomous technology into a particular institution not because it is the most important case (it is not), but because it is one I know very well. In contemporary higher education, one can see clearly how long-standing principles and deep-seated institutional commitments are betrayed by an uncritical embrace of techniques adapted wholesale from industry. The notion that we are educating the whole person, the conviction that a gradual unfolding of knowledge and imagination is good in itself -- ideals of that sort are fading quickly. Even those committed to education and scholarship as deeply rooted vocations do not recognize how great is the threat to their vocation, how soon the triumph of these beguiling innovations and of competing "educational service providers" will arrive.

So thorough is the penetration of technical novelty into American life that for a great many people, technology has become the very center of their self-understanding. In fact, there is now a strong anticipation -- even a yearning -- that human beings and technical devices will eventually merge within a single entity. Even radical feminist writers, eager to denounce patriarchal social arrangements and to urge political upheaval to secure justice and freedom for women, are charmed by the prospect of a human/machine cyborg, a revolutionary being wired in ways that transcend all boundaries of gender, class, race, and ethnicity. In fact, numerous fields of scientific and technical development are concerned with the interface between human biology and artificial devices. Biologists explore the map of the human genome and prepare ways to manipulate genes to cure illnesses and infirmities. Other disciplines explore ways of directly linking microelectronic components to the human nervous system. Already on the horizon as a multi-billion dollar contribution to the entertainment industry are prosthetic instruments that replace the lifeworld of everyday experience with "virtual reality" and disembodied "cyberspace."

The question about such developments is, of course, what humanity as a whole will make of them. Will the total alteration of human beings be embraced gleefully and pushed to its furthest extent? Or will these schemes meet resistance by those who cherish the human body in its unmodified possibilities as well as the horizons of experience given by the earth's biosphere and by less intrusive forms of culture -- including material culture -- as we have known them until now? Surely, this is the ultimate test of human autonomy in conflict with the autonomy of technique.

Near the conclusion of *The Technological Society* Ellul identifies this clash and its probable outcome. "Who is too blind to see," he wrote, "that a profound mutation is being advocated here? A new dismembering and a complete reconstitution of the human being so that he can at last become the objective (and also the total object) of techniques ... He is also completely despoiled of everything that traditionally constituted his essence. Man becomes a pure appearance, a kaleidoscope of external shapes, an abstraction in a milieu that is frighteningly concrete -- an abstraction armed with all the sovereign signs of Jupiter the Thunderer."⁽¹⁰⁾

Today's intellectual fashions, fully in tune with ones Ellul commented upon decades ago, staunchly deny the autonomy of technique and reassure us that, after all, technologies are merely social constructs. But the lived experience of people in America and Europe, as well as the character of their major social constructions, show the distinctive signs of an unlimited, totalizing, demanding, and enticing technique that infuses every corner of contemporary life and crowds out what few alternatives remain. The reason why the idea of autonomous technique must be studied and debated is that it asks us to confront world-altering developments and urgent ethical challenges that other ways of seeing do not notice and, in fact, often willfully disregard. As the most forceful twentieth century writer on this theme, Jacques Ellul described the dilemmas that surround the development of technique, noting the evasive response that greets evidence that human integrity is continually undermined by technical schemes. For those weary of facile answers and concerned about the absence of genuine choice within our technological milieu, Ellul's work provides both wisdom and honest counsel.

References

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