2

The computer as sacred and profane*

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The gradual permeation of the computer into the pores of modern life deepens what Max Weber called the "rationalization of the world." The computer converts every message – regardless of its substantive meaning, metaphysical remoteness, or emotional allure – into a series of numerical bits and bytes. These series are connected to others through electrical impulses. Eventually these impulses are converted back into the media of human life.

Can there be any better example of the subjection of worldly activity to impersonal rational control? Can there be any more forceful illustration of the disenchantment of the world that Weber warned would be the result? Much depends on the answer to this portentous question, for discourse about the meaning of advanced technology demarcates one of the central concerns of social theory. If the answer is yes, we are not only trapped inside of Weber's cage of iron but also bound by the laws of exchange that Marx asserted would eventually force everything human into a commodity form.

This query about the rationalization of the world poses theoretical questions, not just existential ones. Can there really exist a world of purely technical rationality? Although this question may be ideologically compelling for critics of the modern world, I will argue that the theory underlying such a proposition is not correct. Because both action and its environments (Alexander 1982–1983, 1988a) are indelibly interpenetrated by the nonrational, a pure technically rational world cannot exist. Certainly the growing centrality of the digital computer is an empirical fact. This fact, however, remains to be interpreted and explained.

* First published in 1992 as "The promise of a cultural sociology: technological discourse and the sacred and profane information machine," in N. Smelser and R. Munch (eds.), *Theory of Culture*, Berkeley, University of California Press, pp. 293–323.

Taking meaning seriously

Contemporary sociology is almost entirely the study of social elements from the perspective of their place in the social system. The promise of a cultural sociology is that a more multidimensional perspective can be attained. From this multidimensional perspective, social elements would no longer be seen naturalistically, as things that can exist, in and of themselves, without the mediation of cultural codes. Events, actors, roles, groups, and institutions, as elements in a concrete society, are part of a social system; they are simultaneously, however, part of a cultural system that overlaps, but is not contiguous with, the society. I define culture as an organized set of meaningfully understood symbolic patterns. It is because of their location in such an organized set that every social interaction can also be understood as a text (Ricoeur 1971).

Only if these analytical transformations are made, can the thickness of human life (Geertz 1973), its dimensionality and nuance, enter into the language of social science. Dilthey (1976) prepared us to respect this density by insisting that all social action rests upon the reservoir of our inner experience of life. Because we experience the world rather than simply behave in it, the world is meaningful. As social scientists, we must describe the world's inner life or we will fail to describe "it" at all. We cannot, moreover, handle the problem of meaning cavalierly, taking its character for granted as something obvious and shifting our attention to this meaning's cause or effects. Rather, we must willingly inhabit the world of meaning itself.

To try to inhabit this world does not mean orienting ourselves to the idiosyncratic attitudes of individuals. This is the "getting into the actor's head" approach advocated by microtheorists such as symbolic interactionists. Because culture is an environment of every action, to inhabit the world of meaning is, rather, to enter into the organized sets of symbolic patterns that these actors meaningfully understand.

If we begin with the notion that culture is a form of language, we can make use of the conceptual architecture provided by Saussure's semiotics, his "science of signs." Though they perhaps are not as tightly organized as real languages (but see Barthes 1983), cultural sets have definite code-like properties. They are composed of strongly structured symbolic relationships that are largely independent of any particular actor's volition or speech. Cultural codes, like linguistic languages, are built upon signs, which contain both signifier and signified. Technology, for example, is not only a thing, a signified object to which others refer, it is also a signifier, a signal, an internal expectation. The relation between signifier and signified, Saussure insists, is "arbitrary." When he writes (1964) that the former "has

no natural connection with the signified," he is suggesting that the meaning or nature of the sign – its name or internal dimension – cannot be understood as being dictated by the nature of the signified, that is, by the sign's external, material dimension.

If the meaning of the sign cannot be observed or induced from examining the signified, or objective, referents, then how is it established? By its relation to other signifiers, Saussure insists. Systems of signs are composed of endless such relationships. At their most primitive, these relationships are binary. In any actual system of cultural sets, they become long strings, or webs, of interwoven analogies and antitheses, what Eco (1979) calls the "similitude of signifiers" that compose the "global semantic field." Structural anthropology has illustrated the usefulness of this architecture, most famously in the work of Lévi-Strauss (1967) and most usefully in the work of Sahlins (1976, 1981).

Yet, even at its most socially embedded, semiotics can never be enough. By definition it abstracts from the social world, taking organized symbolic sets as psychologically unmotivated and as socially uncaused. By contrast, for the purposes of cultural sociology, semiotic codes must be tied into both social and psychological environments and into action itself. I will term the result of this specification *discourses*, in appreciation of, though not identification with, the phenomena conceptualized by Foucault. Discourses are symbolic sets that embody clear references to social system relationships, whether defined in terms of power, solidarity, or other organizational forms (cf. Sewell 1980; Hunt 1984). As social languages, they relate binary symbolic associations with social forms. In doing so, they provide a vocabulary for members to speak graphically about a society's highest values, its relevant groups, its boundaries *vis-à-vis* conflict, creativity, and internal dissent. Discourse socializes semiotic codes and emerges as a series of narratives (Ricoeur 1984) – myths that specify and stereotype a society's founding and founders (Eliade 1959; Bellah 1970), its critical events (Alexander 1988b), and utopian aspirations (Smith 1950).

In their theories of premodern cultures, classical sociologists constructed powerful models of how this social construction of semiotic codes can proceed. They did so in terms of their theories of religion. Thus, drawing from primitive totemism, Durkheim (1963) argued that every religion organizes social things into both binary relations and deeply felt antitheses between sacred and profane. Because sacred objects have to be protected, the "society" maintains a distance between them and other objects, either routine or profane. Actors not only try to protect themselves from coming into contact with polluted (Douglas 1966) or profane (Caillois 1959 [1939]) objects, but also seek a real, if mediated, contact with

the sacred. This is one primary function of ritual behavior (Turner 1969; cf. Alexander 1988c).

While Weber's better-known theory of religion overlaps with Durkheim's, it is historically and comparatively specific. Given the emergence of a more formal and rationalized religion, the goal of believers becomes salvation from worldly suffering (Weber 1946a). Salvation creates the problem of theodicy, "from what" and "for what" one will be saved. Theodicy involves the image of God. If the gods or God is immanent, worshipers seek salvation through an internal experience of mystical contact. If God is transcendent, salvation is achieved more ascetically, by correctly divining God's will and following his commands. Each of these mandates can be pursued, moreover, in either a this-worldly or an other-worldly direction.

While Durkheim and Weber generally limited the application of these cultural theories to premodern religious life, it is possible to extend them to secular phenomena. This possibility is clarified when we define religions as types of semiotic systems, as discourses that reveal how the psychological and social structuring of culture proceeds.

In this section I have briefly sketched a model for examining the cultural dimension of social life. I hope merely that this discussion provides an introduction to what follows. Before examining the construction of the computer as a cultural object in the postwar world, however, I look at a range of earlier sociological treatments of technology to sense the difficulties that a more culturally sensitive approach must overcome.

Sociological accounts of technology: the dead hand of the social system

Considered in its social system reference, technology is a thing that can be touched, observed, interacted with, and calculated in an objectively rational way. Analytically, however, technology is also part of the cultural system. It is a sign, both a signifier and a signified, from which actors cannot entirely separate their subjective states of mind. Social scientists have not usually considered technology in this more subjective way. Indeed, they have not typically considered it as a cultural object at all. It has appeared as the material variable *par excellence*, not as a point of sacrality, but as the most routine of the routine; not a sign, but an antisign, the essence of a modernity that has undermined the very possibility for cultural understanding itself.

In the postmodern era, Marx has become infamous for his effusive praise in the Communist Manifesto of technology as the embodiment of scien-

tific rationality. Marx believed that modern industrial technique, as the harbinger of progress, was breaking down the barriers of primitive and magical thought. Stripped of its capitalist integument, Marx predicted, advanced technology would be the mainspring of industrial communism, which he defined as the administration of *things* rather than *people*. Despite the central role he gives to technology, for Marx it is not a form of knowledge, even of the most rational sort. It is a material variable, a "force of production" (Marx 1962). As an element of the base, technology is something actors relate to mechanistically. It is produced because the laws of the capitalist economy force factory owners to lower their costs. The effects of this incorporation are equally objective. As technology replaces human labor, the organic composition of capital changes and the rate of profit falls; barring mitigating factors, this falling rate causes the collapse of the capitalist system.

While neo-Marxism has revised the determining relationship Marx posits between economy and technology, it continues to accept Marx's view of technology as a purely material fact. In Rueschemeyer's recent work on the relation between power and the division of labor, for example, neither general symbolic patterns nor the internal trajectory of rational knowledge are conceived of as affecting technological growth. "It is the inexorability of interest and power constellations," Rueschemeyer (1986, pp. 117–18) argues, "which shape even fundamental research and which determine translations of knowledge into new products and new ways of production." We would expect modern functionalism to view technology very differently, but this is true in an only limited sense. Of course, Parsons (1967) criticized Marx for putting technology into the base; functionalists have always been aware that technology belongs in a more intermediate position in the social system. They have, however, never looked at it as anything other than the product of rational knowledge, and they have often conceived of its efficient causes and specific effects in material terms.

In *Science, Technology, and Society in Seventeenth-Century England*, Merton emphasizes the role that Puritanism played in inspiring scientific inventions. Within the context of this inventive climate, however, the immediate cause of technology was economic benefit. The "relation between a problem raised by economic development and technologic endeavor is clear-cut and definite," Merton argues (1970, p. 144), suggesting that "importance in the realm of technology is often concretely allied with economic estimations." It was the "vigorous economic development" of the time that led to effective inventions, because it "posed the most imperative problems for solution" (p. 146). In Smelser's (1959) later account of the Industrial Revolution, the perspective is exactly the same. Methodist

values form a background input to technological innovation, but they are not involved in the creation or the effects of technology itself. Innovation is problem driven, not culture driven, and the immediate cause is economic demand. The effect of technology is also concrete and material. By resolving strain at the social system level, innovation allows collective behavior to leave the level of generalized behavior – wish fulfillment, fantasy, utopian aspirations – and return to the more mundane and rational attitudes of the everyday (Smelser 1959, pp. 21–50).

Critical theory, drawing from Weber's rationalization theme, differs from orthodox Marxism in its attention to the relation between technology and consciousness. But whereas Weber (for example, 1946b) viewed the machine as the objectification of discipline, calculation, and rational organization, critical theorists reverse the causal relation, asserting that it is technology that creates rationalized culture by virtue of its brute physical and economic power. "If we follow the path taken by labour in its development from handicraft [to] manufacture to machine industry," Lukács writes (1971, p. 88), "we can see a continous trend toward greater rationalization [as] the process of labour is progressively broken down into abstract, rational, specialized operations." This technologically driven rationalization eventually spreads to all social spheres, leading to the objectification of society and the "reified mind" (p. 93). Lukács insists that he is concerned "with the *principle* at work here" (p. 88, original italics), but the principle is the result of technology conceived as a material force.

This shift towards the pivotal ideological role of technology, without giving up its materialist conceptualization or its economic cause, culminates in Marcuse's later work. To explain the reasons for "one-dimensional society," Marcuse actually focuses more on technological production *per se* than on its capitalist form. Again, that technology is a purely instrumental, rational phenomenon Marcuse takes completely for granted. Its "sweeping rationality," Marcuse writes (1963, p. xiii), "propels efficiency and growth." The problem, once again, is that this "technical progress [is] extended to a whole system of domination and coordination" (p. xii). When it is, it institutionalizes throughout the society a purely formal and abstract norm of rationality. This technological "culture" suppresses any ability to imagine social alternatives. As Marcuse states (p. xvi), "technological rationality has become political rationality."

New class and postindustrial theories make this critical theory more nuanced and sophisticated, but they do not overcome its fatal anti-cultural flaw. Gouldner accepts the notion that scientists, engineers, and government planners have a rational worldview because of the technical nature of their work. Technocratic competence depends on higher education, and the

expansion of higher education depends in the last analysis on production driven by technology. Indeed, Gouldner finds no fault with technocratic competence in and of itself; he takes it as a paradigm of universalism, criticism, and rationality. When he attacks the technocrats' false consciousness, he does so because they extend this rationality beyond their sphere of technical competence: "The new ideology holds [that] the *society's* problems are solvable on a technological basis, with the use of educationally acquired technical competence" (1979, p. 24, italics added). By pretending to understand society at large, the new class can provide a patina of rationality for the entire society. Gouldner also emphasizes, of course, that this very expansion of technical rationality can create a new kind of class conflict and a "rational" source of social change. This notion, of course, is simply the old contradiction between (technological) forces and relations of production, dressed in postindustrial garb. When Szelenyi and Martin (1987) criticize Gouldner's theory as economistic, they have touched its theoretical core.

This is not to deny that technological production has become more central with the advent of postindustrial society. There has been a quickening in the substitution of information for physical energy, which Marx described as a shift in the organic composition of capital, with dramatic consequences. The shift from manual to mental labor has transformed the class structure and the typical strains of capitalist and socialist societies. The increased capacity for storing information has strengthened the control of bureaucracy over the information that it constantly needs. But the sociological approaches to technology, which we have examined in this section, extend much further than such empirical observations. The stronger version of Marxist and critical theory describes a technologically obsessed society whose consciousness is so narrowed that the meaningful concerns of traditional life are no longer possible. The weaker versions of functionalist and postindustrial theory describe technology as a variable that has a merely material status and orientations to technology as cognitively rational and routine. From my point of view, however, neither of these positions is correct. The ideas that inform even modern society are not cognitive repositories of verified facts; they are symbols that continue to be shaped by deep emotional impulses and molded by meaningful constraints.

Technological discourse and salvation

We must learn to see technology as a discourse, as a sign system that is subject to semiotic constraints and responsive to social and psychological

demands. The first step to this alternative conception of modern technology is to reconceptualize its introduction so that it is open to metaphysical terms. Ironically, perhaps, Weber himself provided the best indication of how this can be done.

Weber argued that those who created modern industrial society did so in order to pursue salvation. The Puritan capitalists practiced what Weber (1958) called *this-worldly asceticism*. Through hard work and self-denial they produced wealth as proof that God had predestined them to be saved. Weber (1963) demonstrated, indeed, that salvation has been a central concern of humankind for millennia. Whether it be heaven or nirvana, the great religions have promised human beings an escape from toil and suffering and a release from earthly constraints – only if humans conceived of the world in certain terms and strove to act in certain ways. In order to historicize this conception of salvation and to allow comparative explanation of it, Weber developed the typology of this-worldly versus other-worldly paths to salvation, which he interwove with the distinction between ascetic and mystical. The disciplined, self-denying, and impersonal action upon which modernization depended, Weber argued, could be achieved only by acting in a this-worldly, ascetic way. Compared to Buddhist or Hindu holy men, the Puritan saints focused their attention much more completely on this world. Rather than allowing themselves the direct experience of God and striving to become vessels of his spirit, they believed that they would be saved by becoming practical instruments for carrying out his will. This-worldly salvation was the cultural precursor for the impersonal rationality and objectivism that, in Weber's view (1958, pp. 181–183), eventually dominated the world.

While Weber's religious theory is of fundamental importance, it has two substantial weaknesses. First, Weber conceived the modern style of salvation in a caricatured way. It has never been as one-sidedly ascetic as he suggests. This-worldly activity is permeated by desires to escape from the world, just as the ascetic self-denial of grace is punctuated by episodes of mystical intimacy. In an anomalous strain in his writing about modernity (Alexander 1986), Weber acknowledged that industrial society is shot through with "flights from the world," in which category he included things such as the surrender by moderns to religious belief or ideological fanaticism and the escape provided by eroticism or aestheticism. Although Weber condemned these flights as irresponsible, however, he was never able to incorporate them into his sociology of modern life. They represented a force with which his historicist and overly ideal-typical theory could not contend.

In truth, modern attempts to pursue salvation in purely ascetic ways have

always short-circuited, not only in overtly escapist forms but also in the everyday world itself. We would never know from Weber's account, for example, that the Puritans conceived of their relationship to God in terms of the intimacies of holy matrimony (Morgan 1958); nor would we be aware that outbursts of mystical "antinomianism" were a constant, recurring danger in Puritan life. The post-Puritan tradition of evangelical Protestantism, which developed in Germany, England, and the United States in the late eighteenth and early nineteenth centuries, was distinguished by its significant opening to mystical experience. One of its cultural offshoots, the modern ideology of romantic love (Lewis 1983), reflected the continuing demand for immediate, transformative salvation in the very heart of the industrial age.

This last example points to the second major problem in Weber's religious theory, its historicism. Weber believed that a concern with salvation could permeate and organize worldly experience only so long as scientific understanding had not undermined the possibility of accepting an extramundane, divine telos for progress on earth. As I suggested previously, this mistaken effort to rationalize contemporary discourse can be corrected by incorporating the more structural understandings of Durkheim's religious sociology. Durkheim believed that human beings continue to divide the world into sacred and profane and that even modern men and women need to experience mystical centers directly through ritual encounters with the sacred. In the modern context, then, Weber's salvation theory can be elaborated and sustained only by turning to Durkheim. The fit can be made even tighter if we make the alteration in Durkheim's theory suggested by Caillois (1959 [1939]), who argued that alongside sacred and profane there was a third term, *routine*. Whereas routine life does not partake of ritual experience, sacred and profane experiences are both highly charged. Whereas the sacred provides an image of the good with which social actors seek community and strive to protect, the profane defines an image of evil from which human beings must be saved. This conception allows us to be more true to Weber's understanding of theodicy, even when we shift it onto the modern state. Secular salvation "religions" provide escape not only from earthly suffering in general but also more specifically from evil. Every salvation religion has conceived not only God and death, in other words, but also the devil.

The sacred and profane information machine

While there were certainly "routine" assessments of the computer from 1944 to 1975 – assessments that talked about it in rational, scientific, and

"realistic" tones – they paled in comparison to the transcendental and mythical discourse that was filled with wish-fulfilling rhetoric of salvation and damnation. In a *Time* magazine report on the first encounter between computer and public in 1944, the machine was treated as a sacred and mysterious object. What was "unveiled" was a "bewildering 50-foot panel of knobs, wires, counters, gears and switches." The connection to higher, even cosmic, forces immediately suggested itself. *Time* described it as having been unveiled "in the presence of high officers in the Navy" and promised its readers that the new machine would solve problems "on earth as well as those posed by the celestial universe" (T8/44).[1] This sacred status was elaborated in the years that followed. To be sacred, an object must be sharply separated from contact with the routine world. Popular literature continually recounted the distance that separated the computer from the lay public and the mystery attendant on this. In another report on the 1944 unveiling, for example, *Popular Science*, a leading lay technology magazine, described the first computer as an electrical brain whirring "behind its polished panels" secluded in "an air-conditioned basement" (PS10/44). Twenty years later the image had not changed. In 1965, a new and far more powerful computer was conceptualized in the same way, as an "isolated marvel" working in "the air-conditioned seclusion of the company's data-programming room." In unmistakable terms, *Time* elaborated this discourse of the sacred technology.

> Arranged row upon row in air-conditioned rooms, waited upon by crisp young white-shirted men who move softly among them like priests serving in a shrine, the computers go about their work quietly and, for the most part, unseen from the public (T4/65).

Objects are isolated because they are thought to possess mysterious power. The connection between computer and established centers of charismatic power is repeated constantly in the popular literature. Occasionally, an analogy is made between the computer and sacred things on earth. Reporting on the unveiling of a new and more sophisticated computer in 1949, *Newsweek* called it "the real hero" of the occasion and described it, like royalty, as "holding court in the computer lab uptstairs" (N11/49). Often, however, more direct references to the computer's cosmic powers and even to its extrahuman status were made. In an article about the first computer, *Popular Science* reported that "everybody's notion of the universe and everything in it will be upset by the columns of figures this monster will type out" (PS10/44). Fifteen years later, a famous technical expert asserted in a widely circulated feature magazine that "forces will be set in motion whose ultimate effects for good and evil are incalculable" (RD3/60).

As the machine became more sophisticated, and more awesome, references to godly powers were openly made. The new computers "render unto Caesar by sending out the monthly bills and . . . unto God by counting the ballots of the world's Catholic bishops" (T4/65). A joke circulated to the effect that a scientist tried to stump his computer with the question: is there a God? "The computer was silent for a moment. Then it answered: 'Now there is'" (N1/66). After describing the computer in superhuman terms – "infallible in memory, incredibly swift in math [and] utterly impartial in judgment" – a mass weekly made the obvious deduction: "This transistorized prophet can help the church adapt to modern spiritual needs" (T3/68). A leader of one national church described the Bible as a "distillation of human experience" and asserted that computers are capable of correlating an even greater range "of experience about how people ought to behave." The conclusion that was drawn underscored the deeply established connection between the computer and cosmic power: "When we want to consult the deity, we go to the computer because it's the closest thing to God to come along" (T3/68).

If an object is sacred and sealed off from the profane world, gaining access to its power becomes a problem in itself. Priests emerge as intermediaries between divinity and laity. As one leading expert suggested, while there were many who appreciated the computer, "only specialists yet realize how these elements will all be combined and [the] far-reaching social, economic, and political implications" (RD5/60). Typically, erroneous predictions about the computer were usually attributed to "nonspecialists" (BW3/65). To possess knowledge of computing, it was emphasized time and again, requires incredible training and seclusion. Difficult new procedures must be developed. To learn how to operate a new computer introduced in 1949, specialists "spent months literally studying day and night" (N8/49). The number of people capable of undergoing such rigorous training was highly restricted. The forging of "links between human society and the robot brain" (N9/49) called for "a new race of scientists." The "new breed of specialists [which] has grown up to tend the machines," *Time* wrote sixteen years later, "have formed themselves into a solemn priesthood of the computer, purposely separated from ordinary laymen [and] speak[ing] an esoteric language that some suspect is just their way of mystifying outsiders" (T4/65). The article predicted: "There will be a small, almost separate society of people in rapport with the advanced computer. They will have established a relationship with their machines that cannot be shared with the average man. Those with talent for the work will have to develop it from childhood and will be trained as intensively as the classical ballerina." Is it surprising that, reporting on computer news ten years later, *Time* (1/74)

decided its readers would be interested in learning that among this esoteric group of programmers there had emerged a new and wildly popular computer game called "the game of life"? The identification of the computer with God and of computer operators with sacred intermediaries signifies culture structures that had not changed in thirty years.

The contact with the cosmic computer that these technological priests provided would, then, certainly transform earthly life. Like the revolutionary technologies that preceded it, however, the computer embodied within itself both superhuman evil and superhuman good. As Lévi-Strauss (1963) emphasized, it is through naming that the cultural codes defining an object are first constructed. In the years immediately following the introduction of the computer, efforts to name this new thinking machine were intense, and they followed the binary pattern that Durkheim and Lévi-Strauss described. The result was a "similitude of signifiers," an amplified series of sacred and profane associations that created for technological discourse a thick semantic field. One series revealed dreadful proportions and dire implications. The computer was called a "colossal gadget" (T8/44, N8/49), a "figure factory" (PS10/44), a "mountain of machinery" (PS10/44), a "monster" (PS10/44, SEP2/50), a "mathematical dreadnought" (PS10/44), a "portentous contrivance" (PS10/44), a "giant" (N8/49), a "math robot" (N8/49), a "wonder-working robot" (SEP2/50), the "Maniac" (SEP2/50), and the "Frankenstein-monster" (SEP2/50). In announcing a new and bigger computer in 1949, *Time* (9/49) hailed the "great machines that eat their way through oceans of figures like whale grazing on plankton" and described them as roaring like "a hive of mechanical insects."

In direct opposition to this profane realm, journalists and technicians also named the computer and its parts through analogies to the presumptively innocent and assuredly sacred human being. It was called a "super-brain" (PS10/44) and a "giant brain" (N8/49). Attached to an audio instrument, it was described as "a brain child with a temporary voice" and as "the only mechanical brain with a soft heart" (N10/49). Its "physiology" (SEP2/50) became a topic of debate. Computers were given an "inner memory" (T9/49), "eyes," a "nervous system" (SEP2/50), a "spinning heart" (T2/51), and a "female temperament" (SEP2/50) in addition to the brain with which they were already endowed. It was announced that they were to have "descendants" (N4/50), and in later years "families" and "generations" (T4/65) emerged. Finally, there were the developmental phrases. "Just out of its teens," *Time* announced (T4/65), the computer was about to enter a "formidable adulthood." It might do so, however, in a neurotic way, for its designers had "made a pampered and all but adored child" out of him (or her).

The period of compulsive naming quickly abated, but the awesome forces for good and evil that the names symbolized have been locked in deadly combat to this day. Salvation rhetoric overcomes this dualism in one direction, apocalyptic rhetoric in another. Both moves can be seen in structural terms as overcoming binary opposition by providing a third term. But more profound emotional and metaphysical issues are also at stake. Computer discourse was eschatological because the computer was seen as involving matters of life and death.

At first, salvation was defined in narrowly mathematical terms. The new computer would "solve in a flash" (T9/49) problems that had "baffled men for years" (PS10/44). By 1950, salvation had already become much more broadly defined. "Come the Revolution!" read the headline to a story about these new predictions (T11/50). A broad and visionary ideal of progress was laid out: "Thinking machines will bring a healthier, happier civilization than any known heretofore" (SEP2/50). People would now be able to "solve their problems the painless electronic way" (N7/54). Airplanes, for example, would be able to reach their destinations "without one bit of help from the pilot" (PS1/55).

By 1960, public discourse about the computer had become truly millennial. "A new age in human relations has opened," a reigning expert announced (RD3/60). Like all eschatological rhetoric, the timing of this promised salvation is imprecise. It has not yet occurred, but it has already begun. It is coming in five years or ten, its effects will be felt soon, the transformation is imminent. Whatever the timing, the end result is certain. "There will be a social effect of unbelievable proportions" (RD3/60). "By surmounting the last great barrier of distance," the computer's effect on the natural world will be just as great (RD3/60). Most human labor will be eliminated, and people will finally be set "free to undertake completely new tasks, most of them directed toward perfecting ourselves, creating beauty, and understanding one another" (Mc5/65).

The convictions were confirmed in still more sweeping tones in the late 1960s and early 1970s. The new computers had such "awesome power" (RD5/71) that, as God was recorded to have done in the Book of Genesis, they would bring "order out of chaos" (BW7/71). That "the computer age is dawning" is certain. One sign of this millennium will be that "the common way of thinking in terms of cause and effect [will be] replaced by a new awareness" (RD5/71). That this was the stuff of which "dreams are made" (USN6/67) cannot be denied. Computers would transform all natural forces. They would cure diseases and guarantee long life. They would allow everyone to know everything at all times. They would allow all students to learn easily and the best to learn perfectly. They would produce

a world community and end war. They would overturn stratification and allow equality to reign. They would make government responsible and efficient, business productive and profitable, work creative, and leisure endlessly satisfying.

As for apocalypse, there was also much to say. The machine has always embodied not only the transcendental hopes but also the fear and loathing generated by industrial society. *Time* once articulated this deep ambiguity in a truly Gothic way. Viewed from the front, computers exhibit a "clean, serene dignity." This is deceptive, however, for "behind there hides a nightmare of pulsing, twitching, flashing complexity" (T9/49).

Whereas contact with the sacred side of the computer is the vehicle for salvation, the profane side threatens destruction. It is something from which human beings must be saved. First, the computer creates the fear of degradation. "People are scared" (N8/68) because the computer has the power to "blot or diminish man" (RD3/60). People feel "rage and helpless frustration" (N9/69). The computer degrades because it objectifies; this is the second great fear. It will "lead to mechanical men who replace humans" (T11/50). Students will be "treated as impersonal machines" (RD1/71). Computers are inseparable from "the image of slavery" (USN11/67). It is because they are seen as objectifying human beings that computers present a concrete danger. In 1975, one popular author described his computer as a "humming thing poised to rip me apart" (RD11/75). More typically the danger is not mutilation but manipulation. With computers "markets can be scientifically rigged . . . with an efficiency that would make dictators blush" (SEP2/50). Their intelligence can turn them into "instruments for massive subversion" (RD3/60). They could "lead us to that ultimate horror – chains of plastic tape" (N8/66).

Finally, there is the cataclysm, the final judgment on earthly technological folly that has been predicted from 1944 until the present day. Computers are "Frankenstein (monsters) which can . . . wreck the very foundations of our society" (T11/50). They can lead to "disorders [that may] pass beyond control" (RD4/60). There is a "storm brewing" (BW1/68). There are "nightmarish stories" about the "light that failed" (BW7/71). "Incapable of making allowances for error," the "Christian notion of redemption is incomprehensible to the computer" (N8/66). The computer has become the Antichrist.

The discussion so far has taken the computer story to 1975. This was the eve of the "personal computer," the very name of which demonstrates how the battle between human and anti-human continued to fuel the discourse that surrounded the computer's birth. In the decade of discussion that followed, utopian and anti-utopian themes remained prominent (for example,

Turkle 1984, pp. 165–196). Disappointment and "realism," however, also became more frequently expressed. In the present day, computer news has passed from the cover of *Time* to advertisements in the sports pages of daily newspapers. This is routinization. We may, indeed, be watching this latest episode in the history of technological discourse pass into history.

Conclusion

Social scientists have looked at the computer through the framework of their rationalizing discourse on modernity. For Ellul (1964, p. 89), it represented a phase of "technical progress" that "seems limitless" because it "consists primarily in the efficient systematization of society and the conquest of the human being." In the analysis of Lyotard, who proposes a postmodern theory, the same kind of extravagant modernizing claims are made. "It is common knowledge," according to Lyotard (1984, p. 4), "that the miniaturization and commercialization of machines is already changing the way in which learning is acquired, classified, made available, and exploited." With the advent of computerization, learning that cannot be "translated into quantities of information" will be abandoned. In contrast to the opacity of traditional culture, computerization produces "the ideology of communicational 'transparency'" (p. 5), which signals the decline of the "grand narrative" and will lead to a crisis of legitimation (pp. 66–67).

I have tried to refute such rationalistic theorizing, first by developing a framework for cultural sociology and second by applying it to the technological domain. In theoretical terms, I have shown that technology is never in the social system alone. It is also a sign and possesses an internal subjective referent. Technology, in other words, is an element in the culture and the personality systems as well; it is both meaningful and motivated. In my examination of the popular literature about the computer, I have shown that this ideology is rarely factual, rational, or abstract. It is concrete, imagistic, utopian, and satanic – a discourse that is filled, indeed, with the grand narratives of life.

Let us return, in conclusion, to the sociological understandings of technology I have recounted above. Far from being empirical accounts based on objective observations and interpretations, they represent simply another version of technocratic discourse itself. The apocalyptic strain of that discourse fears degradation, objectification, slavery, and manipulation. Has not critical theory merely translated this evaluation into the empirical language of social science? The same goes for those sociological analyses that take a more benign form: they provide social scientific translations of the discourse about salvation.

At stake is more than the accuracy or the distortion of social scientific statements. That the rationalization hypothesis is wrong does not make technology a benign force. The great danger that technology poses to modern life is neither the flattening out of human consciousness nor its enslavement to economic or political reality. To the contrary, it is because technology is lodged in the unreal fantasies of salvation and apocalypse that the dangers are real.

For Freud, psychoanalysis was a rational theory of the irrational, even while it did not promise an ultimate escape from unconscious life. Psychoanalysis aimed to provide a distance from irrationality, if not the high ground of conscious rationality itself. Cultural sociology can provide a similar distance and some of the same cure. Only by understanding the omnipresent shaping of technological consciousness by discourse can we hope to gain control over technology in its material form. To do so, we must gain some distance from the visions of salvation and apocalypse in which technology is so deeply embedded.

Note

1 The data are samples from the thousands of articles written about the computer from its introduction in 1944 up until 1984. I selected for analysis ninety-seven articles drawn from ten popular American mass magazines: *Time* (T), *Newsweek* (N), *Business Week* (BW), *Fortune* (F), *The Saturday Evening Post* (SEP), *Popular Science* (PS), *Reader's Digest* (RD), *U.S. News and World Report* (USN), *McCall's* (Mc), and *Esquire* (E). In quoting or referring to these sources, I cite first the magazine, then the month and year; for example, T8/63 indicates an article in *Time* magazine that appeared in August 1963. These sampled articles were not randomly selected but chosen by their value relevance to the interpretive themes of this work. I would like to thank David Wooline for his assistance.

References

Alexander, Jeffrey C. 1982–1983. *Theoretical Logic in Sociology*, 4 vols. Berkeley and Los Angeles: University of California Press.

1986. "The Dialectic of Individuation and Domination: Max Weber's Rationalization Theory and Beyond." In Sam Whimster and Scott Lash (eds.), *Max Weber and Rationality*. London: Allen and Unwin.

1988a. "Action and Its Environments." In Jeffrey C. Alexander (ed), *Action and Its Environments: Toward a New Synthesis*. New York: Columbia University Press, pp. 301–333.

1988b. "Culture and Political Crisis: 'Watergate' and Durkheimian Sociology." In Alexander (1988c), pp. 187–224.

(ed.) 1988c. *Durkheimian Sociology: Cultural Studies*. New York: Cambridge University Press.
Barthes, Roland. 1983. *The Fashion System*. New York: Hill and Wang.
Bellah, Robert. 1970. "Civil Religion in America." In R. Bellah (ed.), *Beyond Belief*. New York: Harper and Row, pp. 168–189.
Caillois, Roger. 1959 [1939]. *Man and the Sacred*. New York: Free Press.
Dilthey, Wilhelm. 1976. "The Construction of the Historical World in the Human Studies." In *Selected Writings*. New York: Cambridge University Press, pp. 168–245.
Douglas, Mary. 1966. *Purity and Danger*. London: Penguin.
Durkheim, Emile. 1963. *The Elementary Forms of Religious Life*. New York: Free Press.
Eco, Umberto, 1979. "The Semantics of Metaphor." In U. Eco (ed.), *The Role of the Reader*. Bloomington: Indiana University Press.
Eliade, Mircea. 1959. *The Sacred and the Profane*. New York: Harcourt, Brace, and World.
Ellul, Jacques. 1964. *The Technological Society*. New York: Vintage.
Geertz, Clifford. 1973. "Thick Description: Toward an Interpretive Theory of Culture." In C. Geertz (ed.), *The Interpretation of Cultures*. New York: Basic Books, pp. 3–32.
Gouldner, Alvin. 1979. *The Future of Intellectuals and the Rise of the New Class*. New York: Seabury.
Hunt, Lynn. 1984. *Politics, Culture, and Class in the French Revolution*. Berkeley and Los Angeles: University of California Press.
Lévi-Strauss, Claude. 1963. *Structural Anthropology*. New York: Basic Books.
1967. *The Savage Mind*. Chicago: University of Chicago Press.
Lewis, Jan. 1983. *The Pursuit of Happiness: Family and Values in Jefferson's Virginia*. New York: Cambridge University Press.
Lukács, Georg. 1971. "Reification and the Consciousness of the Proletariat." In G. Lukács (ed.), *History and Class Consciousness*, Cambridge, MA: MIT Press.
Lyotard, Jean-François. 1984. *The Postmodern Condition: A Report on Knowledge*. Minneapolis: University of Minnesota Press.
Marcuse, Herbert. 1963. *One-Dimensional Man*. Boston: Beacon.
Marx, Karl. 1962. "Preface to a Contribution to the Critique of Political Economy." In K. Marx and F. Engels, *Selected Works*, vol. I. Moscow: International Publishing House, pp. 361–365.
Merton, Robert K. 1970. *Science, Technology, and Society in Seventeenth-Century England*. New York: Harper and Row.
Morgan, Edmund. 1958. *The Puritan Dilemma*. Boston: Little, Brown.
Parsons, Talcott. 1967. "Some Comments on the Sociology of Karl Marx." In T. Parsons (ed.), *Sociological Theory and Modern Society*. New York: Free Press.
Ricoeur, Paul. 1971. "The Model of a Text: Meaningful Action Considered as a Text." *Social Research* 38: 529–562.
1984. *Time and Narrative*, vol. I. Chicago: University of Chicago Press.

Rueschemeyer, Dietrich. 1986. *Power and the Division of Labor*. Stanford: Stanford University Press.

Sahlins, Marshall. 1976. *Culture and Practical Reason*. Chicago: University of Chicago Press.

1981. *Historical Metaphors and Mythical Realities: Structure in the Early History of the Sandwich Islands Kingdom*. Ann Arbor: University of Michigan Press.

Saussure, Ferdinand de. 1964. *A Course in General Linguistics*. London: Owen.

Sewell, William, Jr. 1980. *Work and Revolution in France*. New York: Cambridge University Press.

Smelser, Neil. 1959. *Social Change in the Industrial Revolution*. Chicago: University of Chicago Press.

Smith, Henry Nash. 1950. *Virgin Land*. Cambridge, MA: Harvard University Press.

Szelenyi, Ivan, and Bill Martin. 1987. "Theories of Cultural Capital and Beyond." In R. Eyerman, L. G. Svensson, and T. Soderquist (eds.), *Intellectuals, Universities, and the State in Western Modern Societies*. Berkeley and Los Angeles: University of California Press, pp. 16–49.

Turkle, Sherry. 1984. *The Second Self: Computers and the Human Spirit*. New York: Simon and Schuster.

Turner, Victor. 1969. *The Ritual Process*. Chicago: Aldine.

Weber, Max. 1946a. "Religious Rejections of the World and Their Directions." In H. Gerth and C. W. Mills (eds.), *From Max Weber*. New York: Oxford University Press pp. 323–359.

1946b. "The Meaning of Discipline." In H. Gerth and C.W. Mills (eds.), *From Max Weber*. New York: Oxford University Press, pp. 253–264.

1958. *The Protestant Ethic and the Spirit of Capitalism*. New York: Scribners.

1963. *The Sociology of Religion*. Boston: Beacon Press.