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THE SACRED AND PROFANE
INFORMATION MACHINE:
DISCOURSE ABOUT THE COMPUTER AS IDEOLOGY

L'historicisme de la réflexion sociologique contemporaine sur la modernité et son penchant prononcé pour les interprétations à caractère instrumental sont à l'origine d'un malentendu fondamental quant à la nature de la technologie moderne.

L'auteur procède à partir d'une perspective théorique toute autre et conclut par des résultats empiriques très différents aussi. Les écrits tardifs de Durkheim lui fournissent une théorie systématique pour rendre compte de la façon dont l'opposition sacré/profane structure les rites et les formes de solidarité dans l'existence ordinaire. La combinaison de cette approche avec la compréhension durkheimienne de la religion, plus idéationnelle et plus historique, nous donne un point de référence pour évaluer les limites d'une technologie moderne, encore prisonnière de préoccupations métaphysiques et religieuses. Après avoir établi cette mise en perspective générale, l'auteur analyse la presse-magazine populaire américaine spécialisée en informatique, depuis son apparition en 1944 jusqu'à celle des ordinateurs personnels des années 80. Il suggère que l'accueil et l'approche réservés à ces nouvelles machines ont été très influencés par la rhétorique eschatologique des formes élémentaires de la vie religieuse contemporaine.

I

Modern Science has imposed on humanity the necessity for wandering. Its progressive thought and its progressive technology make the transition through time, from generation to generation, a true migration into uncharted seas of adventure. The very benefit of wandering is that it is dangerous and needs skills to avert evils.

Afred North Whitehead (1925)

The gradual permeation by 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 random digital series. This series is 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 worldy activity to impersonal rational control, or of the disenchantment of the world that Weber warned would be the result?

On the answer to this portentious question much depends. Discourse about the meaning of advanced technology demarcates one of the central ideological pneumbra of the age. If the question is answered affirmatively, we are not only trapped inside of Weber's cage of iron but are bound by the laws of exchange that Marx asserted would eventually force everything human into a commodity form. Weber's question poses critical theoretical questions as well. Can there really exist a world of purely technical rationality? While ideologically compelling, the theory which underlines such a proposition may be scientifically incorrect. If every conception of individual action and social order (Alexander, 1982-83) must have a nonrational component —emotional, moral, or constitutive— then such a 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. In what follows I will argue against the scientific validity of Weber's conception of rationalization. I will do so by taking up a neo-Durkheimian frame (Alexander, 1988).

It is impossible for a society to be dominated by technical rationality because, as Durkheim expressed it so eloquently in what he called his "religious sociology", (Durkheim, 1964 [1898], 1963 [1912]), the mental structures of humankind cannot be radically historicized. In crucial respects they are unchanging. From the beginning of time human beings have experienced the need to invest the world with metaphysical meaning and to experience solidarity with objects outside the self. True, the ability to calculate objectively and impersonally is perhaps the clearest demarcation of modernity. But this remains one institutionalized complex (Parsons, 1951) of motives, actions, and meanings among many others. Individuals are capable of exercising scientific rationality in certain situations, but their action is not scientifically rational as such. Objectivity is a cultural norm, a system of social sanctions and rewards, a motivational impulse of the personality. It remains nested within deeply irrational systems of psychological defense and cultural systems of an enduringly primordial kind.

To argue that we moderns live in an "information society" (Lyotard, 1984) is, in turn, merely to adapt this rationalization perspective to an optimistic rather than critical point of view. This is not to deny that the production and channelling of information has become more central with postindustrial society. As a result of the introduction of the computer there has been the quickening in the substitution of information for physical energy that Marx quite aptly described as a shift in the organic composition of capital. Very considerable consequences have followed. The shift from manual to mental labor has transformed the class structure and the typical strains of capitalist and socialist societies. The increased storage capacity for information has strengthened the control of bureaucracies over the information which it needs always at hand.

But to speak of a society guided by information is to suggest that, for these and other reasons, society now works with the efficiency and rationality of a giant (presumeably thinking) machine. To speak in this way turns a provocative

analogy into a fact. In the first place, modern societies do not hum smoothly, as does the proverbially well-oiled machine. Equally important, the ideas that direct society are not cognitive repositories of verified facts, as their identification as bits of information would imply. They are symbols which have been shaped by deep emotional impulses and molded by meaningful constraints.

II

The first step toward this alternative conception of information technology is to reconceptualize its introduction in a way that is open to metaphysical terms. While Durkheim provided the general theoretical rubic for this task, it was Weber who provided the best indication of how this can be done in historical terms. 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 millenia. Whether heaven or nirvana, the great religions have promised human beings an escape from toil and suffering and a release from earthly constraints —if only they would conceive of the world in certain terms and strive to· act in certain ways.

In order to historicize this conception of salvation and to make it viable for comparative explanation, Weber developed the typology of this-worldly versus other-worldly paths to salvation, which he cross-cut by 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 and ascetic way. Compared to Buddhist or Hindu holy men, Puritans saints focussed 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 would be saved turning themselves into 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: 181-83), eventually came to dominate the world.

While Weber's religious theory is of fundamental importance, it has two substantial weaknesses. In the first place, 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 himself acknowledged that industrial society is shot through with "flights from the world", in which category he included such things as the surrender by moderns to religious belief or ideological fanaticism and the escape provided by eroticism or estheticism. While 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 in the work-a-day world itself. One 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 one be aware that outbursts of mystical "antinomianism" were a constant, reoccurring danger in Puritan life. The post-Puritan tradition of evangelical Protestantism, which developed in Germany, England, and the US 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 under-standings had not undermined the possibility of accepting an extra-mundane, divine telos for progress on earth. This mistaken effort to rationalize contem-porary discourse can be corrected by incorporating the more structural under-standings 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 directly experience mystical centers 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), 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 communion and strive to protect, the profane defines an image of evil from which human beings must be saved. This allows us to be even more true to Weber's understanding of theodic, even while we shift it onto the modern state. Secular salvation "religions" do not simply provide escape from earthly suffering in general but more specifically from evil. Every salvation religion has conceived not just god and earth, in other words, but also the devil.

It is in terms of these reconstructed arenas for symbolic discourse that our examination of the introduction of technology will proceed.

III

Expectations for salvation were inseparable from the technological inno-vations of industrial capitalism. Major inventions like the steam engine, railroad, telegraph and telephone (e.g., Pool, 1983) were hailed by elites and masses as vehicles for secular transcendence. Their speed and power, it was widely pro-claimed, would undermine the earthly constraints of time, space, and scarcity. In their early halcyon days, they become vessels for experiencing ecstatic release, instruments for bringing the glories of heaven down to earth. The technicians and engineers who understood this new technology were elevated to the status of worldly priests.

In this technological discourse, however, the machine has been not just god but also the devil. In the early years of the nineteenth century, Luddites lashed out at spinning machines as if they were the idols that the Hebrew fathers had condemned. William Blake decried "dark Satanic mills". Mary Shelley wrote *Frankenstein, or the Modern Promotheus,* about the terrifying results of Victor Frankenstein's effort to build the world's most "gigantic" machine. The gothic novel, the genre which Shelley began, presented a revolt against the Age of Reason, an insistance that dark forces were still brewing, forces which were often embodied by the engine of technology itself. It was, ironically, from such forces that the modern age .had to be saved. From that gothic revival to Steven Spielberg's wildly popular movie, "Star Wars", there is a direct line (Pynchon, 1984). Today's science fiction mixes technology with medieval Gothic themes, pits evil against good, and promises salvation from space, from time, and even from mortality itself.

The computer is the newest and certainly one of the most potent techno-logical innovations of the modern age, but its symbolization has been much the same. The culture structure of technological discourse has been firmly set. In theoretical terms, the introduction of the computer into Western society resem-bles the much more tumultuous entrance of Captain Cook into the Hawaian: it was an event "given significance and effect by the system in place" (Sahlins, 1981: 21) (1).

While there were certainly "routine" assessments of the computer in the period from 1944 to 1975 — assessments that talked about it in rational, scientific, and "realistic" tones — these paled in comparison to a transcendental and mythical discourse that we filled with the wish-fulfilling rhetoric of salvation and damnation. In Time's 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 of higher, even cosmic forces immediately suggested itself. *Time* described it as having been unveiled "in the presence of high officers in the Navy". The mass magazine promised its readers that the new machine would solve problems "on earth as well as those posed by the celestial universe" (T8/44).

The structure of this sacred status is elaborated in the years that follow. To be sacred, an object must be sharply separated from contact with the routine world. In the popular literature the distance which separated the computer from the lay public, and the mystery attendant on this, are continually recounted. In another one of the initial reports 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 conceptualized in exactly the same way, as an "isolated marvel" working in "the air-conditioned seclusion of the company's data-programing room". In unmistakable terms, *Time* elaborates 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 in this way because they are conceived to be possessed of mysterious power. The connection between computer and established centers of charismatic power is repeated in the popular literature time and time again. Occasionally, the 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* calls it "the real hero" of the occasion and describes it, like royalty, as "holding court in the computer lab upstairs" (11/49). Often, however, more direct references to the computer's cosmic powers and even to its extra-human status are made. About the first computer, *Popular Science* reported that "every-body'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 becomes more sophisticated, and still more awesome, references to godly powers are openly made. The new computers "render unto Ceasar by sending out the monthly bills and ... unto God by counting the ballots of the world's Catholic bishops" (T4/65). A joke circulates 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 —"infallable 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). While the Bible can be described as a "distillation of human experience", a leader of one national church asserted, computers are capable of correlating an even greater range "of experience about how people ought to behave". The conclusion which is drawn underscores 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 objectif is sacred and sealed off from the profane world, gaining access to its powers becomes a problem in itself. Priests emerge as intermediaries between divinity and laity. As one leading expert suggested, while there are many who appreciate the computer, "only specialists yet realize how these elements will all be combined and [the] far reaching social, economic and political impli-cations" (RD5/60). Typically, erroneous predictions about the computer are usually attributed to "non-specialists" (BW3/65). To possess the knowledge of computing, it is emphasized time and again, requires incredible training and seclusion. Difficult new procedures must be developed. In order to learn how to operate a new computer introduced in 1949, specialists "spent months literally studying day and night" (N8/49). The number of persons capable of undergoing such rigorous training is highly restricted. To forge "links between human society and the robot brain" (N9/49), "a new race of scientists" must be created. The "new breed of specialists [which] has grown up to tend the machines, *"Time* wrote fifteen 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).

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 (T4/65).

Is it surprising that, reporting on computer news another ten years later, *Time* (1/74) decided that 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 computer operators as sacred intermediaries are culture structures that had not changed in forty years.

The contact with the cosmic computer which these technological priests provided would, then, certainly be transformative of earthly life. Like the revolutionary technologies which had preceeded it, however, the computer embodied within itself both superhuman evil and superhuman good. As Levi-Strauss (1963) emphasizes, 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 Levi-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 dreadnaught" (PS10/44), a "portentous contrivance" (PS10/44), a "giant" (N8/49), a "math robot" (N8/49), a "wonderworking robot" (SEP2/50), the "Maniac" (SEP2/50), and the "Frankenstein-monster" (SEP2/50). In announcing the 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", describing 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 by analogizing to themselves 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" (N10/49) 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 "descendents" (N4/50) and in later years "families" and "generations" (T4/65) emerged as well. Finally, there were the developmental phases. "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" out of him (or her) (2).

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 which 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 destination "without one bit of help from the pilot" (PS1/55).

By 1960, public discourse about the computer had become truly millenial. "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 has almost begun. 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", its 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 task, most of them directed toward perfecting ourselves, creating beauty, and understanding one another" (Mc5/65) (3).

These 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 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 millenium 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 over thing at all times. They would allow every student 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 just the transcendental hopes but the fear and loathing generated by industrial society. *Time* once articulated this deep ambiguity in a truly Gothic way. From the front, *Time* wrote of the new generation of computers in 1949, there is a "clean, serene dignity". This was deceptive, for "behind there hides a nightmare of pulsing, twitching, flashing complexity" (9/49).

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, there is the fear of degration. "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" (ED1/71). Computers are inseparable from "the image of slavery" (USN11/67). It is because they are conceived of as objectifying human beings that computers present a concrete danger. In 1975, one popular author described his personal 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.

I have taken the computer story up to 1975. This was the eve of the "personal computer", the very name of which demonstrates how the battle between human and antihuman continued to fuel the discourse that surrounded its birth. In the decade of discussion that followed, while utopian and anti-utopian themes remained prominent (cf., Turkle, 1984: 165-196). Disappointement 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 the daily newspaper. This is routinization. We may, indeed, be watching this latest episode in the history of this technological discourse pass into history.

IV

Social scientists have looked at the computer through the framework of their rationalizing discourse on modernity. For Ellul (1964: 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, which intends to propose a postmodern theory, the same kind of extravagant modernizing claims are made. "It is common knowledge", according to Lyotard (1984: 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»" (*ibid.:* 5) that signals the decline of the "grand narrative" and will lead to a crisis of legitimation (e.g., *ibid.:* 66-67).

In this essay I have tried to refute such rationalistic theorizing by applying a neoDurkheimian framework. I have shown that technology is never in the social system alone. It is also a sign and possesses an internal referent. Technology is an element in the culture and personality systems; 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.

What is at stake is more than the accuracy or distortion of social scientific statements. The great danger that technology poses to modern life is not in the flattening out of human consciousness, 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 was to provide a distance from irrationality, if not the high ground of conscious rationality itself. A neo-Durkheimian cultural sociology can provide a similar distance and, perhaps, 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. In order to do so, we must gain some distance from the visions of salvation and apocalypse in which technology is so deeply embedded.

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NOTES :

(1) The data from which I draw in the following is a sample of the thousands of articles written about the computer from its introduction in 1944 to 1984. On the basis of the *Reader's Guide to Periodical Literature*, I selected for analysis 97 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), *McCalls'* (Mc) and *Esquire* (E). In quoting or referring to these sources, I will cite first the magazine, then the month and year, e.g., T8/63 indicates an article in *Time* magazine which appeared in August 1963. These sampled articles were not randomly selected, but chosen by their value relevance to the interpretative themes of this work. I would like to thank David Wooline, of Princeton University, for his assistance.

(2) Many of these anthropomorphic references, which originated in the "charismatic" phase of the computer, have since become routinized in the technical literature, for example, in such terms as memory and generations.

(3) Technological discourse has always portrayed a transformation that would eliminate human labor and allow human perfection, love, and mutual understanding, as the rhetoric of Marx's descriptions of communism amply demonstrate.

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