

40. [Introduction] Mythinformation

Positive social change won't come about as an inevitable result of the increasing use of computers. However, this hasn't always been clear to those enamored of this century's "computer revolution"—such as those Langdon Winner takes to task in the essay reprinted here. For positive social change to take place it will have to be advocated and fought for. In order to fight for a goal, it is necessary to articulate it.

Winner begins by taking the rhetoric of the computer revolution at face value—asking what the social goals of this revolution will be, and whether regular elections will be held. He does this in order to point out the complete lack of a coherent social program on the part of self-styled computer revolutionaries. In the time since his article was written, issues such as free and open elections have become literal points of conflict in computer circles, as with ICANN. (This is discussed further in introducing the the essay by Raymond Williams (♢20).)

Winner later demolishes the mythology that "(1) people are bereft of information; (2) information is knowledge; (3) knowledge is power; and (4) increasing access to information enhances democracy and equalizes social power." Winner quotes J. C. R. Licklider as looking forward to "an information environment that would give politics greater depth and dimension than it now has." ICANN shows that a body steeped in the new technologies can still be profoundly undemocratic. On the other hand, the technologies of the Internet have also provided the ground on which resistance to ICANN has been assembled. An advocate of the computer revolution might therefore argue that increasing access to information has enhanced democracy and equalized social power; ICANN can't get away with the sort of crooked politics that might have been invisible in an earlier era. Counter-arguments to this are close at hand, however: the 2000 U.S. presidential election, for example, was the first in which the Internet was accessible to such large sections of the electorate, and also was the most crooked in recent history. Information about the unfairness of the election was made available on the Internet by the NAACP and others, but this information did not make the outcome any more fair.

The transitions accompanying computer technologies may have some democratizing potential—but this potential must be identified and worked toward. It will not be realized automatically. While Winner's essay is often viewed as a harsh critique of the new media field, it seems likely that new media pioneers such as Doug Engelbart and Ted Nelson would agree with its basic argument. Engelbart felt the stand-alone workstation (without connection to a network) was precisely the wrong direction for technological development, unlikely to empower groups and communities in any significant way—even as the computer press hyped its potential for individual empowerment. Nelson's "cybercrud" anticipated much of Winner's argument—if computer technologies and the companies that develop them are simply allowed to run along in their own direction, the result will not be empowerment for the average individual, nor will it be increased democracy for our culture. However, because both Engelbart and Nelson wrote so much about hope for the future, it is often forgotten that they believed this hoped-for future would not come about on its own.

The three concerns outlined at the close of this paper remain among the most-discussed new media issues in recent years: the surveillance state and accompanying self-surveillance now often called "panopticism" (see the introduction to Phil Agre's (♢51) essay in this volume), the alteration of patterns of human sociability (which largely still lack serious study, despite their common mention), and the mobility and unlocatability of power that is now often called "rhizomatic" (see introductions to essays by the Critical Art Ensemble (♢53) and by Gilles Deleuze and Félix Guattari (♢27)). Given that this essay was written when the Macintosh was new and most of today's new media was many technologic "generations" in the future, it seems evident that the central issues, and therefore the goals for which we might fight, are potentially visible through the continual swirl of product announcements and information-age hype. However, once we choose to look at these issues, sitting back and waiting with faith for the revolution may no longer seem a viable option.

—NWF

Another view of new media technology's relation to our social systems and beliefs through the lens of "revolution" is presented in Stuart Moulthrop's essay in this anthology (♢48).

An essay by Licklider—not the one Winner quotes, but one that deals with the computer as enhancing human thought and collaborative activity—is included in this book (♢05).

Further Reading

Jasanoff, Sheila, Gerald Markle, James Petersen, and Trevor Pinch, eds. *Handbook of Science and Technology Studies*. Thousand Oaks, Calif.: Sage, 1994.

Mumford, Lewis. *Technics and Civilization*. New York: Harcourt Brace and World, 1934.

Winner, Langdon. "Upon Opening the Black Box and Finding it Empty: Social Constructivism and the Philosophy of Technology." *Science, Technology and Human Values* 18(3): 362–378. 1993.

Original Publication

The Whale and the Reactor: A Search for Limits in an Age of High Technology, 98–117. Chicago: University of Chicago Press, 1986.

Mythinformation

Langdon Winner

Computer power to the people is essential to the realization of a future in which most citizens are informed about, and interested and involved in, the processes of government.
—J. C. R. Licklider

In nineteenth-century Europe a recurring ceremonial gesture signaled the progress of popular uprisings. At the point at which it seemed that forces of disruption in the streets were sufficiently powerful to overthrow monarchical authority, a prominent rebel leader would go to the parliament or city hall to “proclaim the republic.” This was an indication to friend and foe alike that a revolution was prepared to take its work seriously, to seize power and begin governing in a way that guaranteed political representation to all the people. Subsequent events, of course, did not always match these grand hopes; on occasion the revolutionaries were thwarted in their ambitions and reactionary governments regained control. Nevertheless, what a glorious moment when the republic was declared! Here, if only briefly, was the promise of a new order—an age of equality, justice, and emancipation of humankind.

A somewhat similar gesture has become a standard feature in contemporary writings on computers and society. In countless books, magazine articles, and media specials some intrepid soul steps forth to proclaim “the revolution.” Often it is called simply “the

computer revolution”; my brief inspection of a library catalogue revealed three books with exactly that title published since 1962.¹ Other popular variants include the “information revolution,” “microelectronics revolution,” and “network revolution.” But whatever its label, the message is usually the same. The use of computers and advanced communications technologies is producing a sweeping set of transformations in every corner of social life. An informal consensus among computer scientists, social scientists, and journalists affirms the term “revolution” as the concept best suited to describe these events. “We are all very privileged,” a noted computer scientist declares, “to be in this great Information Revolution in which the computer is going to affect us very profoundly, probably more so than the Industrial Revolution.”² A well-known sociologist writes, “This revolution in the organization and processing of information and knowledge, in which the computer plays a central role, has as its context the development of what I have called the postindustrial society.”³ At frequent intervals during the past dozen years, garish cover stories in *Time* and *Newsweek* have repeated this story, climaxed by *Time*’s selection of the computer as its “Man of the Year” for 1982.

Of course, the same society now said to be undergoing a computer revolution has long since gotten used to “revolutions” in laundry detergents, underarm deodorants, floor waxes, and other consumer products. Exhausted in Madison Avenue advertising slogans, the image has lost much of its punch. Those who employ it to talk about computers and society, however, appear to be making much more serious claims. They offer a powerful metaphor, one that invites us to compare the kind of disruptions seen in political revolutions to the changes we see happening around computer information systems. Let us take that invitation seriously and see where it leads.

A Metaphor Explored

Suppose that we were looking at a revolution in a Third World country, the revolution of the Sandinistas in Nicaragua, for example. We would want to begin by studying the fundamental goals of the revolution. Is this a movement truly committed to social justice? Does it seek to uphold a valid ideal of human freedom? Does it aspire to a system of democratic rule? Answers to those questions would help us decide whether or not this is a revolution worthy of our endorsement. By the same token, we would want to ask about the means the revolutionaries had chosen to pursue their goals. Having succeeded in armed struggle, how will they manage violence and military force once they gain control? A reasonable person would also want to learn something of the structure of institutional authority that the revolution will try to create. Will there be frequent, open elections? What systems of decision making, administration, and law enforcement will be put to work? Coming to terms with its proposed ends and means, a sympathetic observer could then watch the revolution unfold, noticing whether or not it remained true to its professed purposes and how well it succeeded in its reforms.

Most dedicated revolutionaries of the modern age have been willing to supply coherent public answers to questions of this sort. It is not unreasonable to expect, therefore, that something like these issues must have engaged those who so eagerly use the metaphor “revolution” to describe and celebrate the advent of computerization. Unfortunately, this is not the case. Books, articles, and media specials aimed at a popular audience are usually content to depict the dazzling magnitude of technical innovations and social effects. Written as if by some universally accepted format, such accounts describe scores of new computer products and processes, announce the enormous dollar value of the growing computer and communications industry, survey the expanding uses of computers in offices, factories, schools, and homes, and offer good news from research and development laboratories about the great promise of the next generation of computing devices. Along with this one reads of the many “impacts” that computerization is going to have on every sphere of life. Professionals in widely separate fields—doctors, lawyers, corporate managers, and scientists—comment on the changes computers have brought to their work. Home consumers give testimonials explaining how personal computers are helping educate their

children, prepare their income tax forms, and file their recipes. On occasion, this generally happy story will include reports on people left unemployed in occupations undermined by automation. Almost always, following this formula, there will be an obligatory sentence or two of criticism of the computer culture solicited from a technically qualified spokesman, an attempt to add balance to an otherwise totally sanguine outlook.

Unfortunately, the prevalence of such superficial, unreflective descriptions and forecasts about computerization cannot be attributed solely to hasty journalism. Some of the most prestigious journals of the scientific community echo the claim that a revolution is in the works.⁴ A well-known computer scientist has announced unabashedly that “revolution, transformation and salvation are all to be carried out.”⁵ It is true that more serious approaches to the study of computers and society can be found in scholarly publications. A number of social scientists, computer scientists, and philosophers have begun to explore important issues about how computerization works and what developments, positive and negative, it is likely to bring to society.⁶ But such careful, critical studies are by no means the ones most influential in shaping public attitudes about the world of microelectronics. An editor at a New York publishing house stated the norm, “People want to know what’s new with computer technology. They don’t want to know what could go wrong.”⁷

It seems all but impossible for computer enthusiasts to examine critically the *ends* that might guide the world-shaking developments they anticipate. They employ the metaphor of revolution for one purpose only—to suggest a drastic upheaval, one that people ought to welcome as good news. It never occurs to them to investigate the idea or its meaning any further.

One might suppose, for example, that a revolution of this type would involve a significant shift in the locus of power; after all, that is exactly what one expects in revolutions of a political kind. Is something similar going to happen in this instance?

One might also ask whether or not this revolution will be strongly committed, as revolutions often are, to a particular set of social ideals. If so, what are the ideals that matter? Where can we see them argued?

To mention revolution also brings to mind the relationships of different social classes. Will the computer

revolution bring about the victory of one class over another? Will it be the occasion for a realignment of class loyalties?

In the busy world of computer science, computer engineering, and computer marketing such questions seldom come up. Those actively engaged in promoting the transformation—hardware and software engineers, managers of microelectronics firms, computer salesmen, and the like—are busy pursuing their own ends: profits, market share, handsome salaries, the intrinsic joy of invention, the intellectual rewards of programming, and the pleasures of owning and using powerful machines. But the sheer dynamism of technical and economic activity in the computer industry evidently leaves its members little time to ponder the historical significance of their own activity. They must struggle to keep current, to be on the crest of the next wave as it breaks. As one member of Data General's Eagle computer project describes it, the prevailing spirit resembles a game of pinball. "You win one game, you get to play another. You win with this machine, you get to build the next."⁸ The process has its own inertia.

Hence, one looks in vain to the movers and shakers in computer fields for the qualities of social and political insight that characterized revolutionaries of the past. Too busy. Cromwell, Jefferson, Robespierre, Lenin, and Mao were able to reflect upon the world historical events in which they played a role. Public pronouncements by the likes of Robert Noyce, Marvin Minsky, Edward Feigenbaum, and Steven Jobs show no similar wisdom about the transformations they so actively help to create. By and large the computer revolution is conspicuously silent about its own ends.

Good Console, Good Network, Good Computer

My concern for the political meaning of revolution in this setting may seem somewhat misleading, even perverse. A much better point of reference might be the technical "revolutions" and associated social upheavals of the past, the industrial revolution in particular. If the enthusiasts of computerization had readily taken up this comparison, studying earlier historical periods for similarities and differences in patterns of technological innovation, capital formation, employment, social change, and the like, then it would be clear that I had chosen the wrong application of this metaphor. But, in fact, no well-developed comparisons of that kind are to be found in the writings on the computer

revolution. A consistently ahistorical viewpoint prevails. What one often finds emphasized, however, is a vision of drastically altered social and political conditions, a future upheld as both desirable and, in all likelihood, inevitable. Politics, in other words, is not a secondary concern for many computer enthusiasts; it is a crucial, albeit thoughtless, part of their message.

We are, according to a fairly standard account, moving into an age characterized by the overwhelming dominance of electronic information systems in all areas of human practice. Industrial society, which depended upon material production for its livelihood, is rapidly being supplanted by a society of information services that will enable people to satisfy their economic and social needs. What water- and steam-powered machines were to the industrial age, the computer will be to the era now dawning. Ever-expanding technical capacities in computation and communications will make possible a universal, instantaneous access to enormous quantities of valuable information. As these technologies become less and less expensive and more and more convenient, all the people of the world, not just the wealthy, will be able to use the wonderful services that information machines make available. Gradually, existing differences between rich and poor, advantaged and disadvantaged, will begin to evaporate. Widespread access to computers will produce a society more democratic, egalitarian, and richly diverse than any previously known. Because "knowledge is power," because electronic information will spread knowledge into every corner of world society, political influence will be much more widely shared. With the personal computer serving as the great equalizer, rule by centralized authority and social class dominance will gradually fade away. The marvelous promise of a "global village" will be fulfilled in a worldwide burst of human creativity.

A sampling from recent writings on the information society illustrates these grand expectations.

The world is entering a new period. The wealth of nations, which depended upon land, labor, and capital during its agricultural and industrial phases—depended upon natural resources, the accumulation of money, and even upon weaponry—will come in the future to depend upon information, knowledge and intelligence.⁹

. . .

The electronic revolution will not do away with work, but it does hold out some promises: Most boring jobs can be done by machines; lengthy commuting can be avoided; we can have enough leisure to follow interesting pursuits outside our work; environmental destruction can be avoided; the opportunities for personal creativity will be unlimited.¹⁰

Long lists of specific services spell out the utopian promise of this new age: interactive television, electronic funds transfer, computer-aided instruction, customized news service, electronic magazines, electronic mail, computer teleconferencing, on-line stock market and weather reports, computerized Yellow Pages, shopping via home computer, and so forth. All of it is supposed to add up to a cultural renaissance.

Whatever the limits to growth in other fields, there are no limits near in telecommunications and electronic technology. There are no limits near in the consumption of information, the growth of culture, or the development of the human mind.¹¹

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Computer-based communications can be used to make human lives richer and freer, by enabling persons to have access to vast stores of information, other "human resources," and opportunities for work and socializing on a more flexible, cheaper and convenient basis than ever before.¹²

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When such systems become widespread, potentially intense communications networks among geographically dispersed persons will become actualized. We will become Network Nation, exchanging vast amounts of information and social and emotional communications with colleagues, friends and "strangers" who share similar interests, who are spread all over the nation.¹³

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A rich diversity of subcultures will be fostered by computer-based communications systems. Social, political, technical changes will produce conditions likely to lead to the formation of groups with their own distinctive sets of values, activities, language and dress.¹⁴

According to this view, the computer revolution will, by its sheer momentum, eliminate many of the ills that have vexed

political society since the beginning of time. Inequalities of wealth and privilege will gradually fade away. One writer predicts that computer networks will "offer major opportunities to disadvantaged groups to acquire the skills and social ties they need to become full members of society."¹⁵ Another looks forward to "a revolutionary network where each node is equal in power to all others."¹⁶ Information will become the dominant form of wealth. Because it can flow so quickly, so freely through computer networks, it will not, in this interpretation, cause the kinds of stratification associated with traditional forms of property. Obnoxious forms of social organization will also be replaced. "The computer will smash the pyramid," one best-selling book proclaims. "We created the hierarchical, pyramidal, managerial system because we needed it to keep track of people and things people did; with the computer to keep track, we can restructure our institutions horizontally."¹⁷ Thus, the proliferation of electronic information will generate a leveling effect to surpass the dreams of history's great social reformers.

The same viewpoint holds that the prospects for participatory democracy have never been brighter. According to one group of social scientists, "The form of democracy found in the ancient Greek city-state, the Israeli kibbutz, and the New England town meeting, which gave every citizen the opportunity to directly participate in the political process, has become impractical in America's mass society. But this need not be the case. The technological means exist through which millions of people can enter into dialogue with one another and with their representatives, and can form the authentic consensus essential for democracy."¹⁸

Computer scientist J. C. R. Licklider of the Massachusetts Institute of Technology is one advocate especially hopeful about a revitalization of the democratic process. He looks forward to "an information environment that would give politics greater depth and dimension than it now has." Home computer consoles and television sets would be linked together in a massive network. "The political process would essentially be a giant teleconference, and a campaign would be a months-long series of communications among candidates, propagandists, commentators, political action groups and voters." An arrangement of this kind would, in his view, encourage a more open, comprehensive examination of both issues and candidates. "The information revolution," he exclaims, "is bringing with it a key that may open the door to

a new era of involvement and participation. The key is the self-motivating exhilaration that accompanies truly effective interaction with information through a good console through a good network to a good computer.¹⁹ It is, in short, a democracy of machines.

Taken as a whole, beliefs of this kind constitute what I would call mythinformation: the almost religious conviction that a widespread adoption of computers and communications systems along with easy access to electronic information will automatically produce a better world for human living. It is a peculiar form of enthusiasm that characterizes social fashions of the latter decades of the twentieth century. Many people who have grown cynical or discouraged about other aspects of social life are completely enthralled by the supposed redemptive qualities of computers and telecommunications. Writing of the “fifth generation” supercomputers, Japanese author Yoneji Masuda rhapsodically predicts “freedom for each of us to set individual goals of self-realization and then perhaps a worldwide religious renaissance, characterized not by a belief in a supernatural god, but rather by awe and humility in the presence of the collective human spirit and its wisdom, humanity living in a symbolic tranquility with the planet we have found ourselves upon, regulated by a new set of global ethics.”²⁰

It is not uncommon for the advent of a new technology to provide an occasion for flights of utopian fancy. During the last two centuries the factory system, railroads, telephone, electricity, automobile, airplane, radio, television, and nuclear power have all figured prominently in the belief that a new and glorious age was about to begin. But even within the great tradition of optimistic technophilia, current dreams of a “computer age” stand out as exaggerated and unrealistic. Because they have such a broad appeal, because they overshadow other ways of looking at the matter, these notions deserve closer inspection.

The Great Equalizer

As is generally true of a myth, the story contains elements of truth. What were once industrial societies are being transformed into service economies, a trend that emerges as more material production shifts to developing countries where labor costs are low and business tax breaks lucrative. At the same time that industrialization takes hold in less-developed nations of the world, deindustrialization is

gradually altering the economies of North America and Europe. Some of the service industries central to this pattern are ones that depend upon highly sophisticated computer and communications systems. But this does not mean that future employment possibilities will flow largely from the microelectronics industry and information services. A number of studies, including those of the U.S. Bureau of Labor Statistics, suggest that the vast majority of new jobs will come in menial service occupations paying relatively low wages.²¹ As robots and computer software absorb an increasing share of factory and office tasks, the “information society” will offer plenty of opportunities for janitors, hospital orderlies, and fast-food waiters.

The computer romantics are also correct in noting that computerization alters relationships of social power and control, although they misrepresent the direction this development is likely to take. Those who stand to benefit most obviously are large transnational business corporations. While their “global reach” does not arise solely from the application of information technologies, such organizations are uniquely situated to exploit the efficiency, productivity, command, and control the new electronics make available. Other notable beneficiaries of the systematic use of vast amounts of digitized information are public bureaucracies, intelligence agencies, and an ever-expanding military, organizations that would operate less effectively at their present scale were it not for the use of computer power. Ordinary people are, of course, strongly affected by the workings of these organizations and by the rapid spread of new electronic systems in banking, insurance, taxation, factory and office work, home entertainment, and the like. They are also counted upon to be eager buyers of hardware, software, and communications services as computer products reach the consumer market.

But where in all of this motion do we see increased democratization? Social equality? The dawn of a cultural renaissance? Current developments in the information age suggest an increase in power by those who already had a great deal of power, an enhanced centralization of control by those already prepared for control, an augmentation of wealth by the already wealthy. Far from demonstrating a revolution in patterns of social and political influence, empirical studies of computers and social change usually show powerful groups adapting computerized methods to retain control.²² That is not surprising. Those best situated

to take advantage of the power of a new technology are often those previously well situated by dint of wealth, social standing, and institutional position. Thus, if there is to be a computer revolution, the best guess is that it will have a distinctly conservative character.

Granted, such prominent trends could be altered. It is possible that a society strongly rooted in computer and telecommunications systems could be one in which participatory democracy, decentralized political control, and social equality are fully realized. Progress of that kind would have to occur as the result of that society's concerted efforts to overcome many difficult obstacles to achieve those ends. Computer enthusiasts, however, seldom propose deliberate action of that kind. Instead, they strongly suggest that the good society will be realized as a side effect, a spin-off from the vast proliferation of computing devices. There is evidently no need to try to shape the institutions of the information age in ways that maximize human freedom while placing limits upon concentrations of power.

For those willing to wait passively while the computer revolution takes its course, technological determinism ceases to be mere theory and becomes an ideal: a desire to embrace conditions brought on by technological change without judging them in advance. There is nothing new in this disposition. Computer romanticism is merely the latest version of the nineteenth- and twentieth-century faith we noted earlier, one that has always expected to generate freedom, democracy, and justice through sheer material abundance. Thus there is no need for serious inquiry into the appropriate design of new institutions or the distribution of rewards and burdens. As long as the economy is growing and the machinery in good working order, the rest will take care of itself. In previous versions of this homespun conviction, the abundant (and therefore democratic) society was manifest by a limitless supply of houses, appliances, and consumer goods.²³ Now "access to information" and "access to computers" have moved to the top of the list.

The political arguments of computer romantics draw upon a number of key assumptions: (1) people are bereft of information; (2) information is knowledge; (3) knowledge is power; and (4) increasing access to information enhances democracy and equalizes social power. Taken as separate assertions and in combination, these beliefs provide a woefully distorted picture of the role of electronic systems in social life.

Is it true that people face serious shortages of information? To read the literature on the computer revolution one would suppose this to be a problem on a par with the energy crisis of the 1970s. The persuasiveness of this notion borrows from our sense that literacy, education, knowledge, well-informed minds, and the widespread availability of tools of inquiry are unquestionable social goods, and that, in contrast, illiteracy, inadequate education, ignorance, and forced restrictions upon knowledge are among history's worst evils. Thus, it appears superficially plausible that a world rewired to connect human beings to vast data banks and communications systems would be a progressive step. Information shortage would be remedied in much the same way that developing a new fuel supply might solve an energy crisis.

Alas, the idea is entirely faulty. It mistakes sheer supply of information with an educated ability to gain knowledge and act effectively based on that knowledge. In many parts of the world that ability is sadly lacking. Even some highly developed societies still contain chronic inequalities in the distribution of good education and basic intellectual skills. The U.S. Army, for instance, must now reject or dismiss a fairly high percentage of the young men and women it recruits because they simply cannot read military manuals. It is no doubt true of these recruits that they have a great deal of information about the world—information from their life experiences, schooling, the mass media, and so forth. What makes them "functionally illiterate" is that they have not learned to translate this information into a mastery of practical skills.

If the solution to problems of illiteracy and poor education were a question of information supply alone, then the best policy might be to increase the number of well-stocked libraries, making sure they were built in places where libraries do not presently exist. Of course, that would do little good in itself unless people are sufficiently well educated to use those libraries to broaden their knowledge and understanding. Computer enthusiasts however, are not noted for their calls to increase support of public libraries and schools. It is *electronic information* carried by *networks* they uphold as crucial. Here is a case in which an obsession with a particular kind of technology causes one to disregard what are obvious problems and clear remedies. While it is true that systems of computation and communications, intelligently structured and wisely applied, might help a society raise its standards of

literacy, education, and general knowledgeability, to look to those instruments first while ignoring how to enlighten and invigorate a human mind is pure foolishness.

"As everybody knows, knowledge is power."²⁴ This is an attractive idea, but highly misleading. Of course, knowledge employed in particular circumstances can help one act effectively and in that sense enhance one's power. A citrus farmer's knowledge of frost conditions enables him/her to take steps to prevent damage to the crop. A candidate's knowledge of public opinion can be a powerful aid in an election campaign. But surely there is no automatic, positive link between knowledge and power, especially if that means power in a social or political sense. At times knowledge brings merely an enlightened impotence or paralysis. One may know exactly what to do but lack the wherewithal to act. Of the many conditions that affect the phenomenon of power, knowledge is but one and by no means the most important. Thus, in the history of ideas, arguments that expert knowledge ought to play a special role in politics—the philosopher-kings for Plato, the engineers for Veblen—have always been offered as something contrary to prevailing wisdom. To Plato and Veblen it was obvious that knowledge was *not* power, a situation they hoped to remedy.

An equally serious misconception among computer enthusiasts is the belief that democracy is first and foremost a matter of distributing information. As one particularly flamboyant manifesto exclaims: "There is an explosion of information dispersal in the technology and we think this information has to be shared. All great thinkers about democracy said that the key to democracy is access to information. And now we have a chance to get information into people's hands like never before."²⁵ Once again such assertions play on our belief that a democratic public ought to be open-minded and well informed. One of the great evils of totalitarian societies is that they dictate what people can know and impose secrecy to restrict freedom. But democracy is not founded solely (or even primarily) upon conditions that affect the availability of information. What distinguishes it from other political forms is a recognition that the people as a whole are capable of self-government and that they have a rightful claim to rule. As a consequence, political society ought to build institutions that allow or even encourage a great latitude of democratic participation. How far a society must go in making political authority and public roles available to ordinary people is a matter of dispute among political theorists. But no serious

student of the question would give much credence to the idea that creating a universal gridwork to spread electronic information is, by itself, a democratizing step.

What, then, of the idea that "interaction with information through a good console, through a good network to a good computer" will promote a renewed sense of political involvement and participation? Readers who believe that assertion should contact me about some parcels of land my uncle has for sale in Florida. Relatively low levels of citizen participation prevail in some modern democracies, the United States, for example. There are many reasons for this, many ways a society might try to improve things. Perhaps opportunities to serve in public office or influence public policy are too limited; in that case, broaden the opportunities. Or perhaps choices placed before citizens are so pallid that boredom is a valid response; in that instance, improve the quality of those choices. But it is simply not reasonable to assume that enthusiasm for political activity will be stimulated solely by the introduction of sophisticated information machines.

The role that television plays in modern politics should suggest why this is so. Public participation in voting has steadily declined as television replaced the face-to-face politics of precincts and neighborhoods. Passive monitoring of electronic news and information allows citizens to feel involved while dampening the desire to take an active part. If people begin to rely upon computerized data bases and telecommunications as a primary means of exercising power, it is conceivable that genuine political knowledge based in first-hand experience would vanish altogether. The vitality of democratic politics depends upon people's willingness to act together in pursuit of their common ends. It requires that on occasion members of a community appear before each other in person, speak their minds, deliberate on paths of action, and decide what they will do.²⁶ This is considerably different from the model now upheld as a breakthrough for democracy: logging onto one's computer, receiving the latest information, and sending back an instantaneous digitized response.

A chapter from recent political history illustrates the strength of direct participation in contrast to the politics of electronic information. In 1981 and 1982 two groups of activists set about to do what they could to stop the international nuclear arms race. One of the groups, Ground Zero, chose to rely almost solely upon mass communications to convey its message to the public. Its leaders appeared on

morning talk shows and evening news programs on all three major television networks. They followed up with a mass mail solicitation using addresses from a computerized data base. At the same time another group, the Nuclear Weapons Freeze Campaign, began by taking its proposal for a bilateral nuclear freeze to New England town meetings, places where active citizen participation is a long-standing tradition. Winning the endorsement of the idea from a great many town meetings, the Nuclear Freeze group expanded its drive by launching a series of state initiatives. Once again the key was a direct approach to people, this time through thousands of meetings, dinners, and parties held in homes across the country.

The effects of the two movements were strikingly different. After its initial publicity, Ground Zero was largely ignored. It had been an ephemeral exercise in media posturing. The Nuclear Freeze campaign, however, continued to gain influence in the form of increasing public support, successful ballot measures, and an ability to apply pressure upon political officials. Eventually, the latter group did begin to use computerized mailings, television appearances, and the like to advance its cause. But it never forgot the original source of its leverage: people working together for shared ends.

Of all the computer enthusiasts' political ideas, there is none more poignant than the faith that the computer is destined to become a potent equalizer in modern society. Support for this belief is found in the fact that small "personal" computers are becoming more and more powerful, less and less expensive, and ever more simple to use. Obnoxious tendencies associated with the enormous, costly, technically inaccessible computers of the recent past are soon to be overcome. As one writer explains, "The great forces of centralization that characterized mainframe and minicomputer design of that period have now been reversed." This means that "the puny device that sits innocuously on the desktop will, in fact, within a few years, contain enough computing power to become an effective equalizer."²⁷ Presumably, ordinary citizens equipped with microcomputers will be able to counter the influence of large, computer-based organizations.

Notions of this kind echo beliefs of eighteenth- and nineteenth-century revolutionaries that placing fire arms in the hands of the people was crucial to overthrowing entrenched authority. In the American Revolution, French Revolution, Paris Commune, and Russian Revolution the role of "the people armed" was central to the revolutionary

program. As the military defeat of the Paris Commune made clear, however, the fact that the popular forces have guns may not be decisive. In a contest of force against force, the larger, more sophisticated, more ruthless, better equipped competitor often has the upper hand. Hence, the availability of low-cost computing power may move the baseline that defines electronic dimensions of social influence, but it does not necessarily alter the relative balance of power. Using a personal computer makes one no more powerful *vis-à-vis*, say, the National Security Agency than flying a hang glider establishes a person as a match for the U.S. Air Force.

In sum, the political expectations of computer enthusiasts are seldom more than idle fantasy. Beliefs that widespread use of computers will cause hierarchies to crumble, inequality to tumble, participation to flourish, and centralized power to dissolve simply do not withstand close scrutiny. The formula information = knowledge = power = democracy lacks any real substance. At each point the mistake comes in the conviction that computerization will inevitably move society toward the good life. And no one will have to raise a finger.

Information and Ideology

Despite its shortcomings as political theory, mythinformation is noteworthy as an expressive contemporary ideology. I use the term "ideology" here in a sense common in social science: a set of beliefs that expresses the needs and aspirations of a group, class, culture, or subculture. In this instance the needs and aspirations that matter most are those that stem from operational requirements of highly complex systems in an advanced technological society; the groups most directly involved are those who build, maintain, operate, improve, and market these systems. At a time in which almost all major components of our technological society have come to depend upon the application of large and small computers, it is not surprising that computerization has risen to ideological prominence, an expression of grand hopes and ideals.

What is the "information" so crucial in this odd belief system, the icon now so greatly cherished? We have seen enough to appreciate that the kind of information upheld is not knowledge in the ordinary sense of the term; nor is it understanding, enlightenment, critical thought, timeless wisdom, or the content of a well-educated mind. If one looks carefully at the writings of computer enthusiasts, one finds that information in a particular form and context is offered as a paradigm to inspire emulation. Enormous quantities of

data, manipulated within various kinds of electronic media and used to facilitate the transactions of today's large, complex organizations is the model we are urged to embrace. In this context the sheer quantity of information presents a formidable challenge. Modern organizations are continually faced with overload, a flood of data that threatens to become unintelligible to them. Computers provide one way to confront that problem; speed conquers quantity. An equally serious challenge is created by the fact that the varieties of information most crucial to modern organizations are highly time specific. Data on stock market prices, airline traffic, weather conditions, international economic indicators, military intelligence, public opinion poll results, and the like are useful for very short periods of time. Systems that gather, organize, analyze, and utilize electronic data in these areas must be closely tuned to the very latest developments. If one is trading on fast-paced international markets, information about prices an hour old or even a few seconds old may have no value. Information is itself a perishable commodity.

Thus, what looked so puzzling in another context—the urgent “need” for information in a social world filled with many pressing human needs—now becomes transparent. It is, in the first instance, the need of complex human/machine systems threatened with debilitating uncertainties or even breakdown unless continually replenished with up-to-the-minute electronic information about their internal states and operating environments. Rapid information-processing capabilities of modern computers and communications devices are a perfect match for such needs, a marriage made in technological heaven.

But is it sensible to transfer this model, as many evidently wish, to all parts of human life? Must activities, experiences, ideas, and ways of knowing that take a longer time to bear fruit adapt to the speedy processes of digitized information processing? Must education, the arts, politics, sports, home life, and all other forms of social practice be transformed to accommodate it? As one article on the coming of the home computer concludes, “running a household is actually like running a small business. You have to worry about inventory control—of household supplies—and budgeting for school tuition, housekeepers’ salaries, and all the rest.”²⁸ The writer argues that these complex, rapidly changing operations require a powerful information-processing capacity to keep them functioning smoothly. One begins to wonder how everyday activities such as running a

household were even possible before the advent of microelectronics. This is a case in which the computer is a solution frantically in search of a problem.

In the last analysis, the almost total silence about the ends of the “computer revolution” is filled by a conviction that information processing is something valuable in its own right. Faced with an information explosion that strains the capacities of traditional institutions, society will renovate its structure to accommodate computerized, automated systems in every area of concern. The efficient management of information is revealed as the *telos* of modern society, its greatest mission. It is that fact to which mythinformation adds glory and glitter. People must be convinced that the human burdens of an information age—unemployment, de-skilling, the disruption of many social patterns—are worth bearing. Once again, those who push the plow are told they ride a golden chariot.

Everywhere and Nowhere

Having criticized a point of view, it remains for me to suggest what topics a serious study of computers and politics should pursue. The question is, of course, a very large one. If the long-term consequences of computerization are anything like the ones commonly predicted, they will require a rethinking of many fundamental conditions in social and political life. I will mention three areas of concern.

As people handle an increasing range of their daily activities through electronic instruments—mail, banking, shopping, entertainment, travel plans, and so forth—it becomes technically feasible to monitor these activities to a degree heretofore inconceivable. The availability of digitized footprints of social transactions affords opportunities that contain a menacing aspect. While there has been a great deal written about this problem, most of it deals with the “threat to privacy,” the possibility that someone might gain access to information that violates the sanctity of one’s personal life. As important as that issue certainly is, it by no means exhausts the potential evils created by electronic data banks and computer matching. The danger extends beyond the private sphere to affect the most basic of public freedoms. Unless steps are taken to prevent it, we may develop systems capable of a perpetual, pervasive, apparently benign surveillance. Confronted with omnipresent, all-seeing data banks, the populace may find passivity and compliance the safest route, avoiding activities that once represented

political liberty. As a badge of civic pride a citizen may announce, "I'm not involved in anything a computer would find the least bit interesting."

The evolution of this unhappy state of affairs does not necessarily depend upon the "misuse" of computer systems. The prospect we face is really much more insidious. An age rich in electronic information may achieve wonderful social conveniences at a cost of placing freedom, perhaps inadvertently, in a deep chill.

A thoroughly computerized world is also one bound to alter conditions of human sociability. The point of many applications of microelectronics, after all, is to eliminate social layers that were previously needed to get things done. Computerized bank tellers, for example, have largely done away with small, local branch banks, which were not only ways of doing business, but places where people met, talked, and socialized. The so-called electronic cottage industry, similarly, operates very well without the kinds of human interactions that once characterized office work. Despite greater efficiency, productivity, and convenience, innovations of this kind do away with the reasons people formerly had for being together, working together, acting together. Many practical activities once crucial to even a minimal sense of community life are rendered obsolete. One consequence of these developments is to pare away the kinds of face-to-face contact that once provided important buffers between individuals and organized power. To an increasing extent, people will become even more susceptible to the influence of employers, news media, advertisers, and national political leaders. Where will we find new institutions to balance and mediate such power?

Perhaps the most significant challenge posed by the linking of computers and telecommunications is the prospect that the basic structures of political order will be recast. Worldwide computer, satellite, and communication networks fulfill, in large part, the modern dream of conquering space and time. These systems make possible instantaneous action at any point on the globe without limits imposed by the specific location of the initiating actor. Human beings and human societies, however, have traditionally found their identities within spatial and temporal limits. They have lived, acted, and found meaning in a particular place at a particular time. Developments in microelectronics tend to dissolve these limits, thereby threatening the integrity of social and political forms that depend on them. Aristotle's observation

that "man is a political animal" meant in its most literal sense that man is a *polis* animal, a creature naturally suited to live in a particular kind of community within a specific geographical setting, the city-state. Historical experience shows that it is possible for human beings to flourish in political units—kingdoms, empires, nation-states—larger than those the Greeks thought natural. But until recently the crucial conditions created by spatial boundaries of political societies were never in question.

That has changed. Methods pioneered by transnational corporations now make it possible for organizations of enormous size to manage their activities effectively across the surface of the planet. Business units that used to depend upon spatial proximity can now be integrated through complex electronic signals. If it seems convenient to shift operations from one area of the world to another far distant, it can be accomplished with a flick of a switch. Close an office in Sunnyvale; open an office in Singapore. In the recent past corporations have had to demonstrate at least some semblance of commitment to geographically based communities; their public relations often stressed the fact that they were "good neighbors." But in an age in which organizations are located everywhere and nowhere, this commitment easily evaporates. A transnational corporation can play fast and loose with everyone, including the country that is ostensibly its "home." Towns, cities, regions, and whole nations are forced to swallow their pride and negotiate for favors. In that process, political authority is gradually redefined.

Computerization resembles other vast, but largely unconscious experiments in modern social and technological history, experiments of the kind noted in earlier chapters. Following a step-by-step process of instrumental improvements, societies create new institutions, new patterns of behavior, new sensibilities, new contexts for the exercise of power. Calling such changes "revolutionary," we tacitly acknowledge that these are matters that require reflection, possibly even strong public action to ensure that the outcomes are desirable. But the occasions for reflection, debate, and public choice are extremely rare indeed. The important decisions are left in private hands inspired by narrowly focused economic motives. While many recognize that these decisions have profound consequences for our common life, few seem prepared to own up to that fact. Some observers forecast that "the computer revolution" will eventually be guided by new wonders in artificial intelligence.

Its present course is influenced by something much more familiar: the absent mind.

Notes

1. See, for example, Edward Berkeley, *The Computer Revolution* (New York: Doubleday, 1962); Edward Tomeski, *The Computer Revolution: The Executive and the New Information Technology* (New York: Macmillan, 1970); and Nigel Hawkes, *The Computer Revolution* (New York: E. P. Dutton, 1972). See also Aaron Sloman, *The Computer Revolution in Philosophy* (Hassocks, England: Harvester Press, 1978); Zenon Pylyshyn, *Perspectives on the Computer Revolution* (Englewood Cliffs, N.J.: Prentice-Hall, 1970); Paul Stoneman, *Technological Diffusion and the Computer Revolution* (Cambridge: Cambridge University Press, 1976); and Ernest Braun and Stuart MacDonald, *Revolution in Miniature: The History and Impact of Semiconductor Electronics* (Cambridge: Cambridge University Press, 1978).
2. Michael L. Dertouzos in an interview on "The Today Show," National Broadcasting Company, August 8, 1983.
3. Daniel Bell, "The Social Framework of the Information Society," in *The Computer Age: A Twenty Year View*, Michael L. Dertouzos and Joel Moses (eds.) (Cambridge: MIT Press, 1980), 163.
4. See, for example, Philip H. Abelson, "The Revolution in Computers and Electronics," *Science* 215:751-753, 1982.
5. Edward A. Feigenbaum and Pamela McCorduck, *The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World* (Reading, Mass.: Addison-Wesley, 1983), 8.
6. Among the important works of this kind are David Burnham, *The Rise of the Computer State* (New York: Random House, 1983); James N. Danziger et al., *Computers and Politics: High Technology in American Local Governments* (New York: Columbia University Press, 1982); Abbe Moshowitz, *The Conquest of Will: Information Processing in Human Affairs* (Reading, Mass.: Addison-Wesley, 1976); James Rule et al., *The Politics of Privacy* (New York: New American Library, 1980); and Joseph Weizenbaum, *Computer Power and Human Reason: From Judgment to Calculation* (San Francisco: W. H. Freeman, 1976).
7. Quoted in Jacques Vallee, *The Network Revolution: Confessions of a Computer Scientist* (Berkeley: And/Or Press, 1982), 10.
8. Tracy Kidder, *Soul of a New Machine* (New York: Avon Books, 1982), 228.
9. *The Fifth Generation*, 14.
10. James Martin, *Telematic Society: A Challenge for Tomorrow* (Englewood Cliffs, N.J.: Prentice-Hall, 1981), 172.
11. *Ibid.*, 4.
12. Starr Roxanne Hiltz and Murray Turoff, *The Network Nation: Human Communication via Computer* (Reading, Mass.: Addison-Wesley, 1978), 489.
13. *Ibid.*, xxix.
14. *Ibid.*, 484.
15. *Ibid.*, xxix.
16. *The Network Revolution*, 198.
17. John Naisbitt, *Megatrends: Ten New Directions Transforming Our Lives* (New York: Warner Books, 1984), 282.
18. Amitai Etzioni, Kenneth Laudon, and Sara Lipson, "Participating Technology: The Minerva Communications Tree," *Journal of Communications*, 25:64, Spring 1975.
19. J. C. R. Licklider, "Computers and Government," in Dertouzos and Moses (eds.), *The Computer Age*, 114, 126.
20. Quoted in *The Fifth Generation*, 240.
21. *Occupational Outlook Handbook, 1982-1983*, U.S. Bureau of Labor Statistics, Bulletin No. 2200, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. See also Gene I. Maeroff, "The Real Job Boom Is Likely to be Low-Tech," *New York Times*, September 4, 1983, 16E.
22. See, for example, James Danziger et al., *Computers and Politics*.
23. For a study of the utopia of consumer products in American democracy, see Jeffrey L. Meikle, *Twentieth Century Limited: Industrial Design in America, 1925-1939* (Philadelphia: Temple University Press, 1979). For other utopian dreams see Joseph J. Corn, *The Winged Gospel: America's Romance with Aviation, 1900-1950* (Oxford: Oxford University Press, 1983); Joseph J. Corn and Brian Horrigan, *Yesterday's Tomorrows: Past Visions of America's Future* (New York: Summit Books, 1984); and Erik Barnow, *The Tube of Plenty* (Oxford: Oxford University Press, 1975).
24. *The Fifth Generation*, 8.
25. "The Philosophy of US," from the official program of The US Festival held in San Bernardino, California, September 4-7, 1982. The outdoor rock festival, sponsored by Steven Wozniak, co-inventor of the original Apple Computer, attracted an estimated half million people. Wozniak regaled the crowd with large-screen video presentations of his message, proclaiming a new age of community and democracy generated by the use of personal computers.
26. "Power corresponds to the human ability not just to act but to act in concert. Power is never the property of an individual; it belongs to a group and remains in existence only so long as the group keeps together." Hannah Arendt, *On Violence* (New York: Harcourt Brace & World, 1969), 44.
27. John Markoff, "A View of the Future: Micros Won't Matter," *InfoWorld*, October 31, 1983, 69.
28. Donald H. Dunn, "The Many Uses of the Personal Computer," *Business Week*, June 23, 1980, 125-126.