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Mythinformation in the high-tech era

The romanticization of the personal computer as a social panacea threatens to blind society to the fact that without guiding wisdom even the best tool can be misused

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> "[With powerful personal computers] revolution, transformation and salvation are all to be carried out."
> Edward A. Feigenbaum
> and Pamela McCorduck
> (in *The Fifth Generation*)

A specter is haunting modern society—the specter of computer revolution. Countless books, magazine articles, and news-media specials declare that this upheaval is underway, that nothing will escape unchanged. Such announcements are strongly reminiscent of a recurring ceremonial gesture in popular uprisings of nineteenth-century Europe. When it seemed that the forces of disruption in the streets had power sufficient 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 to begin governing in a way that guaranteed political representation to all the people. Subsequent events, of course, did not always match these grand hopes. It is unlikely that the computer revolution will, either.

Like political revolutionists, advocates of computerization believe that a glorious transformation is sweeping the world and that they are its vanguard. "We are all very privileged 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," declared computer scientist Michael L. Dertouzos of the Massachusetts Institute of Technology in Cambridge on NBC's "Today Show" in August 1983. At frequent intervals in the last dozen years, cover stories in *Time* and *Newsweek* magazines have echoed this revolutionary theme, 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

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'The word "revolutionary" can be applied only to revolutions whose aim is freedom.'

—Marquis de Condorcet, late eighteenth century

'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.'

—Starr Roxanne Hiltz and Murray Turoff, *The Network Nation*, 1978

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.

Computer as the great equalizer

According to a fairly standard account of the computer revolution, described in such books as *The Fifth Generation* (Addison-Wesley, 1983), by Edward A. Feigenbaum and Pamela McCorduck, and *The Network Nation* (Addison-Wesley, 1978), by Starr Roxanne Hiltz and Murray Turoff, the world has entered an age characterized by the overwhelming dominance of electronic information systems in all areas of human practice. Industrial society, which depends on material production for its livelihood, is rapidly being supplanted by a society in which information services will enable people to satisfy their economic and social needs. Ever-expanding technical capacities in computation and communications will make possible 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, the visionaries say, 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 more widely shared. With the personal computer serving as the great equalizer, rule by centralized authority and entrenched social elites will gradually fade. The marvelous promise of a "global village" will be fulfilled in a worldwide burst of human creativity.

Long lists of specific services are meant to suggest the coming of utopia: 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 such services are supposed to add up to a cultural renaissance. In the words of James Martin, writing in *Telematic Society* (Prentice-Hall, 1981):

"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."

According to this standard view, the computer revolution will, by its sheer momentum, eliminate many of the ills that have vexed political society since the beginning of civilization. Inequalities of wealth and privilege, for example, will disappear in time. Profs. Hiltz and Turoff predict 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."

Information will become the dominant form of wealth. Because it can flow so freely through computer networks, it will not, in this interpretation, cause the kinds of stratification associated with traditional forms of property. Thus, the proliferation of electronic information will generate a leveling effect to surpass even the grandest dreams of history's great social reformers.

From the same standpoint, the prospects for participatory democracy have never been brighter, offering all the democratic benefits of the ancient Greek city-state, the Israeli kibbutz, and the New England town meeting. J.C.R. Licklider, a computer scientist at MIT, is especially hopeful for a revitalization of the democratic process through a massive network linking home computer consoles and television sets. Writing in "Computers and Government," an article published in *The Computer Age*,

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'Revolutions are festivals of the oppressed and exploited. At no other time are the mass of people in a position to come forward so actively as creators of a new social order, as at a time of revolution. At such times the people are capable of performing miracles.'

—V.I. Lenin, 1905

'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 *The Computer Age*, by Michael L. Dertouzos and Joel Moses, 1980

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by Dr. Dertouzos and Joel Moses, a professor at MIT, (MIT Press, 1980) Dr. Licklider states, "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."

Mythinformation defined

Taken as a whole, beliefs such as these make up what I would call mythinformation: the almost religious conviction that a widespread adoption of computers and communications systems and broad access to electronic information will automatically produce a better world for humanity. It is a peculiar form of enthusiasm that characterizes social fashions of the later decades of the twentieth century. Many people who have grown cynical or discouraged about other aspects of social life are enthralled by the supposed redemptive qualities of computers and telecommunications.

Looking forward to the realization of an "information society," Japanese writer Yoneji Masuda, quoted in *The Fifth Generation*, 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 tranquillity with the planet we have found ourselves upon, regulated by a new set of global ethics."

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, the telephone, electricity, automobiles, airplanes, radio, television, and nuclear power have all figured prominently in the belief that a new and glorious age was about to begin [see "Utopian visions of earlier technological periods," below]. 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 broad appeal and because they overshadow other ways of looking at the matter, these notions deserve closer inspection.

A look at revolutionary assertions

As is generally true of myths, the story contains elements of truth. What were once industrial societies are being transformed into service economies, a trend that emerges as a greater share of material production is shifted to the developing countries, where labor costs are low and business tax breaks are lucrative. Some of the service industries are ones that depend upon highly sophisticated computer and communications systems. But contrary to the predictions of computer romantics, this shift does not mean that future employment possibilities will flow largely from the microelectronics and information-services industries.

A number of studies, including those of the U.S. Bureau of Labor Statistics, suggest that the vast majority of new jobs will be

Utopian visions of earlier technological periods

If you thought that computers were the first panacea for all our ills, how about steam, electrical power, and electronics?

From the Age of Steam

"Fellow Men! I promise to show the means of creating a paradise within ten years, where everything desirable for human life may be had by every man in superabundance, without labor, and without pay; where the whole face of nature shall be changed into the most beautiful of forms, and man may live in the most magnificent palaces, in all imaginable refinements of luxury, and in the most delightful gardens; where he may accomplish, without labor, in one year, more than hitherto could be done in thousands of years." —*J. A. Etzler,* The Paradise within the Reach of all Men, with Labor, by Powers of Nature and Machinery *(1842)*

From the Age of Electrical Power

"Centralization has claimed everything for a century: the results are apparent on every hand. But the reign of steam approaches its end: a new stage in the industrial revolution comes on. Electric power, breaking away from its servitude to

menial service positions paying relatively low wages. As robots and computer software absorb an increasing share of factory and office tasks, the "information society" will offer plenty of work for janitors, hospital orderlies, and fast-food helpers.

The computer savants are correct in noticing that computerization alters relationships of social power and control; however they misrepresent the direction this development is likely to take. Most obvious of those who stand to benefit 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 each possibility that the new electronics offers for greater efficiency, productivity, command, and control.

Other notable beneficiaries of the systematic use of vast amounts of digitized information are public bureaucracies, intelligence agencies, and ever-expanding military organizations. 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 is any motion toward increased democratization and social equality or the dawn of a cultural renaissance? Current developments in the information age suggest an increase in power by those who already have a great deal of power, an enhanced centralization of control by those already prepared for control and an augmentation of wealth by the already wealthy. Far from demonstrating a revolution in patterns

steam, is becoming independent. Electricity is a decentralizing form of power: it runs over distributing lines and subdivides to all the minutiae of life and need. Working with it, men may feel the thrill of control and freedom once again."

—*Joseph K. Hart,* The Survey Graphic No. 51, March 1, 1924

From the Age of Electronics

"The electric age of servomechanisms suddenly releases men from the mechanical and specialist servitude of the preceding machine age. As the machine and the motorcar released the horse and projected it onto the plane of entertainment, so does automation with men. We are suddenly threatened with the liberation that taxes our inner resources of self-employment and imaginative participation in society . . . . Panic about automation as a threat of uniformity on a world scale is the projection into the future of mechanical standardization and specialism, which are now past."

—*Marshall McLuhan,* Understanding Media *(1964)*

—*L.W.*

of social and political influence, empirical studies of computers and social change—such as those described in *Computers and Politics*, by James Danziger *et al.* (Columbia University Press, 1982)—usually show powerful groups adapting computerized methods to retain control. Thus, if there is to be a computer revolution, the best guess would be that it would 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 control, and social equality would be fully realized. Progress of that kind would involve, however, concerted efforts by society to remove the many difficult obstacles blocking those ends. The writings of computer enthusiasts, however, seldom propose such deliberate action. Instead, they strongly suggest that the good society will be a natural spin-off from the fast proliferation of computing devices. They evidently assume that there is no need to try to shape the institutions of the information age to maximize human freedom or to place limits upon concentrations of power.

There is nothing new in this assumption. Computer romanticism strongly resembles a common nineteenth- and twentieth-century faith that expects to generate freedom, democracy, and justice through simple material abundance. From that point of view, there is no need for serious inquiry into the appropriate design of new institutions for the distribution of rewards and burdens. As long as the economy is growing and the machinery is in good working order, the rest will take care of itself. In previous versions of this homespun conviction, the abundant (and

'What were formerly called revolutions were little more than a change of persons or an alteration of local circumstances . . . . [W]hat we now see in the world . . . is a renovation of the natural order of things, a system of principles as universal as truth . . . . '

—Thomas Paine, 1791

'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 accumulations of money, and even upon weaponry —will come in the future to depend upon information, knowledge and intelligence.'

— Edward A. Feigenbaum and Pamela McCorduck, *The Fifth Generation*, 1983

therefore democratic) world was to be found in a limitless supply of houses, appliances, and consumer goods. Now "access to information" and "access to computers" have moved to the top of the list.

Probing the key assumptions

The political arguments of the computer romantics draw upon four 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 humans to vast data banks and communication systems would be a progressive step.

Alas, the idea is entirely faulty. It mistakes sheer supply of information for an educated ability to gain knowledge and to act effectively based on what one knows. 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 a fairly high percentage of the young men and women it recruits because they simply cannot read military manuals. While no doubt these recruits have a great deal of information about the world from their life experiences,

schooling, the mass media, and so forth, they are "functionally illiterate" because 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 by itself unless people were sufficiently well-educated to use those libraries to broaden their knowledge and understanding. Computer enthusiasts, however, are not known for their calls for increased support of public libraries and schools: it is *electronic information* carried by *networks* that 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. It may be true that systems of computation and communications, intelligently structured and wisely applied, might help a society raise its standard of literacy, education, and general knowledgeability. However, to look to those instruments first while ignoring everything else history has taught us about how to educate and stimulate a human mind is grave foolishness.

Knowledge equals power?

"As everybody knows, knowledge is power." This is an attractive idea expounded by Dr. Feigenbaum, 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 to take steps to fight the harmful effects of cold snaps on the crops. 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.

An equally serious misconception among computer enthusiasts is the belief that democracy is largely a matter of distributing information. Once again, this assertion plays on the wide 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, imposing secrecy to restrict freedom. Democracy, however, 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. How far a society must go in making political authority and public roles available to everyone 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 grid to spread electronic information is, by itself, a democratizing step.

What then of Dr. Licklider's idea that "interaction with information through a good console, through a good network to a good computer" will foster renewed sense of political involvement and participation? The fact is that relatively low levels of citizen participation prevail in some modern democracies, in-

cluding the United States. There are many reasons for this and many ways a society might try to improve the situation. Perhaps opportunities to serve in a 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 introducing 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 has replaced the face-to-face politics of precincts and neighborhoods. The passive monitoring of electronic news

Walkman meets Pac-Man: technological innovation

Last fall my wife Gail, a counselor at a private high school in California, took a group of seven teenage girls on a tour of colleges on the East Coast, traveling several hundred miles with them in a van. "That must have been a noisy couple of weeks," I said to her when she returned. "No," she said, "actually, it was very quiet. As soon as we got into the van, all of the girls tuned in their individual Walkman tape players and listened silently until we stopped."

There they were in the same space, listening to different kinds of music, not talking to each other, not engaged with each other. Nor is that situation unique. I once watched a poker game in which all four players were listening to separate Walkman tape players—one jazz, one rock, one country, one classical.

There is, I suppose, some virtue in this way of listening. Before the Walkman, we had the large portable tape player, nicknamed the "ghetto blaster" and "the box," that forced passersby on the streets to listen to disco whether they wanted to or not. But at least the ghetto blaster maintained some semblance of communication between self and others. The Walkman has been designed to eliminate that. You are alone with the machine and the central programming source.

A similar form of isolated consciousness appears in video games. In video-game arcades you find people intently playing games that involve shooting down space ships, gobbling dots, or shooting figures of opponents. Some of the games do enable players to take turns. And of course people do talk to each other and share their experience. But as often as not the player is oblivious to others in the arcade, and the basic interaction is between the individual, the machine, and the central, automated programming source.

Ultimately, it seems to me, the experience tends to close the individual in on himself. Other people are not necessary to complete the feedback loop. The game can go on indefinitely and be completely absorbing without the least reference to other people. In fact, a video game now under development is one guided by galvanic skin response that will enable one to think or emote the position of space ships and other objects on a video screen. This is a further step in what may be an inevitable progression toward breaking down all the barriers that exist between the central automated programming

and information allows citizens to feel involved, while releasing them from the desire to take an active part. If people begin to rely on computerized data bases and telecommunications as primary means of exercising power, genuine political knowledge that is based on first-hand experience may vanish altogether.

The vitality of democratic politics depends on 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. 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.

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in an age of moral solipsism

source and the innermost recesses of the human soul.

Miniature tape machines and video games extend a pattern of experience that is already deeply entrenched in modern life. Most notable is broadcast television. Psychiatrists frequently report that one major source of alienation within families is that family members watch TV rather than talk to each other. The communications medium discourages communication. Similarly, what Walkman and Pac-Man (a video game) have in common is that neither requires nor encourages any kind of social interaction. In what ways will the forms of sensibility spawned by these instruments make contact with the surrounding world?

The question takes on greater significance if you consider the widespread adoption of personal computers. People become engaged with computer programs as intensely as others are involved with video games. Once again, the interaction is between the individual, the machine, and a central programming source.

Current developments in electronic technology such as these create a strong impetus for individuals to dwell within themselves and not reach out. Entertainment, news, education, banking, a wide range of services and even work are available through information machines. Much of what a person needs can be provided by a central programming source. What will the consequences be for one's sense of self?

Perhaps an answer of sorts is given in the recent popularity of an idea that might be called the new solipsism. In philosophy, solipsism is the theory that the self is the only thing that can be known or that the self is the only existent reality. In this context I am not talking about a subtle philosophical doctrine, however, but about a concrete conviction that forms the heart of several movements in pop psychology and pop mysticism, such as Werner Erhardt's "est": the idea that the self is responsible for its own experience. If you are not feeling well, if the world is tormenting you—you have no one to blame but yourself. If you want to have a pleasant, fulfilling existence, you must stop generating external barriers and acknowledge that you can control the content of your consciousness.

In some ways the new solipsism is simply an extension of good old-fashioned self-seeking individualism. But by

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Computer power to the people?

Of all the political ideas of computer enthusiasts, there is none more poignant than the faith that the computer is destined to become a potent equalizer in modern society. Support for this is found in the fact that small "personal" computers are becoming more and more sophisticated, less and less expensive, and ever more simple to use. Presumably, ordinary citizens equipped with microcomputers will be able to counter the influence of large, computer-based organizations. As John Markoff explains in an article in *Infoworld*, "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."

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marketing this idea and its accompanying training in an effective way, "est" has won hundreds of thousands of disciples, disciples who believe that there are no social problems; the self generates all worldly ills and therefore the remedy is strictly internal.

I am not suggesting that "est" in specific will become a dominant force in our society. But I do think we are already seeing the rise of a form of isolated self-centered consciousness, a kind of moral sensibility distinctly suited to a world in which most people spend a great deal of time staring into cathode-ray tubes. At exactly the historical moment in which the power of science and technology to alter things is increasing drastically and the power of technology-based institutions has reached unprecedented proportions, the doctrine arises that the self is responsible—not for the wise use of that power nor for the shape of those institutions, but simply for the self's own experience.

Why is this solipsism significant? As philosophers, social scientists, policy analysts, and citizens' groups debate the meaning of technological change, they try to offer sound arguments about the direction such change ought to take. That approach assumes that there is a living moral sensibility shared by all of us that will respond to arguments about what is right and what is wrong. But is that assumption any longer valid? Many forces in our world combine to neutralize commonly shared moral sensibility, creating the illusion that we live in self-contained comfortably isolated worlds. Could it be that at precisely the moment when the most profound social choices are to be made, the faculties that might enable us to make wise choices will have been rendered inert? Will people be satisfied to monitor passively the events that change how they live and not expect to be involved in making any significant social decisions?

Where the sense of sociability and public concern have gone dead, one must seek ways to revitalize them. To realize one's responsibility in an age of high technology, it is often less important to have the right argument on one's side than it is to be aware that there are common problems, to create new occasions for debate, and to find new ways of taking action. Whether we acknowledge it or not, we are all here together and share a common fate. —*L.W.*

Notions of this kind echo the beliefs of eighteenth- and nineteenth-century revolutionists that placing firearms in the hands of the people was crucial to overthrowing entrenched authority. The military defeat of the Paris Commune in 1871 made clear, however, that arming the people may not be enough. In a contest of force against force, the larger, more sophisticated, better-equipped competitor usually has the upper hand. Hence, the availability of low-cost computing power may move the baseline that defines the electronic dimensions of social influence, but it does not necessarily alter the balance of power. Using a personal computer makes one no more powerful vis-à-vis, say, the U.S. National Security Agency than flying a hang glider establishes a person as a match for the U.S. Air Force.

The political expectations of computer enthusiasts are seldom more than wishful thinking. 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 without anyone having 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, subculture, or culture.

In the case of mythinformation, the needs and aspirations that matter most are the ones that stem from the operational requirements of highly complex systems in an advanced technological society; the groups most directly involved are those who build, maintain, operate, and improve and market these systems. At a time when almost all major components of our technological society have come to depend on 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 to this odd ideology, the icon now so greatly cherished? 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 writings of computer enthusiasts, one finds that "information" is enormous quantities of data manipulated by various kinds of electronic media, used to facilitate the transactions of today's large, complex organizations. 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. Computers provide one way to confront that problem; to put it simply, speed conquers quantity.

An equally serious challenge is that the information most crucial in modern organizations is highly time-specific. Data on

stock-market prices, airline traffic, weather conditions, international economic indicators, military intelligence, public-opinion polls, and the like are useful for very short periods of time. Systems that gather, organize, analyze, and use electronic data in these areas must be closely tuned to the very latest developments. Information is itself a perishable commodity.

But is it sensible to transfer this ideology, as many evidently wish, to all parts of human life? As one article in *Business Week* 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." 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 like running a home were even possible before the advent of microelectronics.

If the long-term consequences of computerization are anything like the ones commonly predicted, they will require a rethinking of many fundamental conditions and institutions in social and political life. Three areas of concern seem paramount.

First, as people handle an increasing range of their daily activities through electronic instruments—mail, banking, shop-

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'When such systems become widespread, potentially intense communications networks among geographically dispersed persons will become actualized. We will become a 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.'

—Starr Roxanne Hiltz and Murray Turoff, *The Network Nation*, 1978

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ping, entertainment, travel plans, and so on—it becomes technically feasible to monitor these activities with unprecedented ease. Social transactions leave digitized footprints that afford opportunities for ingenious matching and correlating, opportunities that have a menacing aspect. While many have written about this problem, most identify the issue as one of a "threat to privacy." 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 preventive steps are taken, we may develop systems that contain a perpetual, pervasive but apparently benign surveillance.

Confronted with omnipresent, all-seeing data banks, the populace may find passivity and compliance the safest route, avoiding activities that once comprised political liberty. As a

badge of civic pride one may announce: "I'm not involved in anything a computer would find the least bit interesting."

It is important to note that the evolution of this unhappy state of affairs does not even depend on the "misuse" of computer systems. The prospect is much more insidious. An age rich in electronic information may achieve wonderful social conveniences at the cost of placing freedom—and the feeling of freedom—in a deep chill.

Second, a thoroughly computerized world is also one bound to renovate conditions of human sociability. Indeed, the point of many applications of microelectronics 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 locations for doing business, but were also among the places in a community where

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'The necessity of the times, more than ever, calls for our utmost circumspection, deliberation, fortitude and perseverance. Let us remember that "if we suffer tamely a lawless attack upon our liberty, we encourage it, and involve others in our doom." It is a very serious consideration . . . that millions yet unborn may be the miserable sharers of the event.'

—Samuel Adams, 1771

'People want to know what's new with computer technology. They don't want to know what could go wrong.'

—Quoted in Jacques Valle, *The Network Revolution*, 1982

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people met, talked, and socialized. Similarly, the so-called electronic cottage would operate very well without the kinds of human interactions that characterize office work.

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. Workers who in an office or factory might recognize a common grievance and act together to remedy it now are deprived of such contact. To an increasing extent, people are now under the direct influence of employers, news media, advertisers, and national political leaders. Where will we find new institutions to balance and mediate such power?

Third, 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 networks of computers, satellites and communications 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 initiator. But humans and their societies have traditionally found their identities within spatial and temporal

limits; they have lived, acted, and found meaning in a particular place and time. Developments in microelectronics tend to dissolve these limits, thereby threatening the integrity of social and political forms that depend on them.

Through methods pioneered by transnational corporations, it is now possible for organizations of enormous size to manage their activities effectively across the whole surface of the planet. 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 can easily evaporate. A transnational 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, almost subconscious experiments in modern social and technological history. Following a step-by-step process of improvements in technology, societies create new institutions, new patterns of behavior, new sensibilities, and new contexts for the exercise of power. By calling such changes "revolutionary," people tacitly acknowledge that these changes are matters that require reflection; possibly they even require strong public action to ensure that the outcomes are desirable. Yet the occasions in our society for reflection, debate, and public choice are now rare indeed. The important decisions are left in private hands inspired by narrowly focused economic motives. While it is widely recognized that these decisions add up in ways that have profound consequences for our common life, few seem prepared to own up to that fact. Some observers forecast that the computer revolution will be guided by new wonders in artificial intelligence. Its present course is influenced by something much more familiar: the absent mind. ◆