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The Twilight Of Hierarchy:
Speculations On The Informatization Of Society

By

Harlan Cleveland
THE TWILIGHT OF HIERARCHY

Speculations on the Informatization of Society

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Prepared for the Pacific Basin workshop on
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at the
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This paper does not explicitly address the regional information/communication issues in the Pacific Basin. It is intended, instead, to suggest the prospective impacts for all regions, nations and organizations of "the informatization of society." The author's hope is that the Singapore workshop of The Pacific Basin Project will consider the implications of "the twilight of hierarchy" for the future management of information flows and communication networks in the Pacific region.

The speculations in this paper are adapted from three recent writings that touch on "the informatization of society:" "Information as a Resource" (The Futurist, December 1981), "King Canute and the Information Resource" (Intermedia, January 1983), and the manuscript of a new book (The Knowledge Executive: Leadership in an Information Society) scheduled for publication by E.P. Dutton in May 1985.

Harlan Cleveland
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Hubert H. Humphrey Institute of Public Affairs
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THE TWILIGHT OF HIERARCHY
Speculations on the Global Information Society

Harlan Cleveland
University of Minnesota

The Informatization of Society

It is still shocking, forty years later, to remember that the Manhattan Project, the huge secret organization which produced the atom bomb during World War II, did not employ on its staff a single person whose full-time assignment was to think hard about the policy implications of the Project if it should succeed. Thus no one was working on nuclear arms control — though I.I. Rabi says he and Robert Oppenheimer used to discuss it earnestly over lunch. We have been playing catch-up, not too successfully, ever since.

The Manhattan Project was not an exception; it was the rule. For three hundred years until the 1970s, science and technology were quite generally regarded as having a life of their own, an "inner logic," an autonomous sense of direction. Their self-justifying ethic was change and "growth." But in the 1970s, society started to take charge — not of scientific discovery but of its technological fallout. The decision not to build the SST or deploy an ABM system even though we knew how to make them, the dramatic change in national environmental policy, and the souring of the nuclear power industry, bear witness.

The most prominent and pervasive consequence of the people's concern about the impacts and implications of new technologies is what the French call "l'informatization de la société." The made-up word, which we will Americanize to "informatization," will serve as well as any to describe what
is happening to some of our key concepts and conceptions as information becomes the dominant resource in "post-industrial society." (The new word is certainly better than "post-industrial," which describes the future by saying it comes after the past.)

The revolutions that began with Charles Babbage's "analytical engine" (less than 150 years ago) and Guglielmo Marconi's wireless telegraphy (not yet a century old) started on quite different tracks. But a quarter of a century past, computers and telecommunications began to converge to produce a combined complexity, one interlocked industry that is transforming our personal lives, our national politics and our international relations.

The industrial era was characterized by the influence of humankind over things, including Nature as well as the artifacts of Man. The information era features a sudden increase in humanity's power to think, and therefore to organize.

The "information society" does not replace, it overlaps, the growing and extracting and processing and manufacturing and recycling and distribution and consumption of tangible things. Agriculture and industry continue to progress by doing more with less through better knowledge, leaving plenty of room for a knowledge economy that, in statistics now widely accepted, accounts for more than half of our workforce, our national product and our global reach.

A Dominant Resource, a Different Resource

The size and scope of "the information society" are now familiar even in the popular literature. We can take it as read that information is the dominant resource in the United States, and coming to be so in other "advanced" or "developed" countries. To take only one cross-section of this startling shift, the actual production, extraction and growing of things now soaks up a good deal less than a quarter of our human resources. Of all the
rest, which used to be lumped together as "services," more than two-thirds are information workers. By the end of the century, something like two-thirds of all work will be information work.

Here is one effort to describe the sweep of change -- historical numbers and estimates pulled together from varied sources by G. Molitor of Public Policy Forecasting, Inc.:

**U.S. Workforce Distribution**

<table>
<thead>
<tr>
<th></th>
<th>1880</th>
<th>1920</th>
<th>1955</th>
<th>1975</th>
<th>2000 (est.)</th>
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</thead>
<tbody>
<tr>
<td>Agriculture &amp; Extractive</td>
<td>50%</td>
<td>28%</td>
<td>14%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Manufacturing, Commerce, Industry</td>
<td>36</td>
<td>53</td>
<td>37</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>Other Services</td>
<td>12</td>
<td>10</td>
<td>20</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Information, Knowledge, Education</td>
<td>2</td>
<td>9</td>
<td>29</td>
<td>50</td>
<td>66</td>
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It is not only in the United States that the informatization of society has proceeded so far so fast. A study by the Organization for Economic Cooperation and Development (the club of richer nations, with headquarters in Paris) puts the average information labor force of several of its members countries at more than one-third of the total during the early- to mid-1970s, and rising: the information component of labor increased its share of the total by 2.8% for each five-year period since World War II.

Farming, which in some people's vocabularies is the most primitive of pursuits, is probably farther ahead than most industries in the embedding of information in physical processes. Says agricultural economist G. Edward Schuh: "All of the increase in agricultural output from the mid-1920s through the mid-1970s (a fifty-year period!) came about with no increase in the capital stock of physical resources. It was all due to new knowledge or
information. That makes clear the extent to which knowledge is an output or resource."

If information (organized data, refined into knowledge and combined into wisdom) is now our "crucial resource," as Peter Drucker describes it, what does that portend for the future? Thinking about the inherent characteristics of information provides some clues to the vigorous rethinking that lies ahead for all of us:

1. **Information is Expandable.** In 1972, the same year *The Limits to Growth* was published, John McHale came out with a book called *The Changing Information Environment* which argued that information expands as it is used. Whole industries have grown up to exploit this characteristic of information: scientific research, technology transfer, computer software (which already makes a contribution to the U.S. economy that is three times the contribution of computer hardware), and agencies for publishing, advertising, public relations, and government propaganda to spread the word (and thus to enhance the word’s value).

The ultimate "limits to growth" of knowledge and wisdom are time (time available to human minds for reflecting, analyzing, and integrating the information that will be "brought to life" by being used) and the capacity of people — individually and in groups — to analyze and think integratively. There are obvious limits to the time each of us can devote to the production and refinement of knowledge and wisdom. But the capacity of humanity to integrate its collective experience through relevant individual thinking is certainly expandable — not without limits, to be sure, but within limits we cannot now measure or imagine.

2. **Information is not resource-hungry.** Compared to the processes of the steel-and-automobile economy, the production and distribution of information
are remarkably sparing in their requirements for energy and other physical and biological resources.

Investments, price policies and power relationships which assume that the more developed countries will gobble up disproportionate shares of "real" resources are overdue for wholesale revision.

3. Information is substitutable. It can and increasingly does replace capital, labor, and physical materials. Robotics and automation in factories and offices are displacing workers and thus requiring a transformation of the labor force. Any machine that can be accessed by computerized telecommunications doesn't have to be in your own inventory. And Dieter Altenpohl, an executive of Alusuisse, has calculations and charts to prove that, as he says, "The smarter the metal, the less it weighs."

4. Information is transportable — at close to the speed of light. As a result, remoteness is now more choice than geography. You can sit in Auckland, New Zealand, and play the New York stock markets in real time — if you don't mind keeping slightly peculiar hours. And the same is true, without the big gap in time-zones, of people in any rural hamlet in the United States. In the world of information-richness, you will be able to be remote if you want to, but you'll have to work at it.

5. Information is diffusive. It tends to leak — and the more it leaks the more we have. It is not the inherent tendency of natural resources to leak. Jewels may be stolen; a lump or two of coal may fall off the coal car on its way from Montana; there is an occasional spillage of oil in the ocean. But the leakage of information is wholesale, pervasive, and continuous. In the era of the institutionalized leak, monopolizing information is very nearly a contradiction in terms; that can be done only in more and more specialized fields, for shorter and shorter periods of time.

6. Information is shareable. Shortly before his death, Colin Cherry
wrote that information by nature cannot give rise to exchange transactions, only to sharing transactions. Things are exchanged: if I give you a flower or sell you my automobile, you have it and I don't. But if I sell you an idea or give you a fact, we both have it. An information-rich environment is thus a sharing environment. That needn't mean an environment without standards, rules, conventions and ethical codes. It does mean the standards, rules, conventions and codes are going to be different from those created to manage the zero-sum bargains of market trading and traditional international relations.

The Erosion of Hierarchies

I am not a scholar of information/communication theory, but in my listening and reading as a practicing generalist I am struck with three seminal ideas as containing the most nourishment for our purpose, which is to think about how the new information environment is likely to modify our inherited assumptions about rule, power and authority.

One is that information (in its generic sense) is not like other resources, nor, as some would have it, merely another form of energy. It is not subject to the laws of thermodynamics, and efforts to explain the new information environment by using metaphors from physics will just get in our way.

A second idea I find nourishing is that the ultimate purpose of all knowledge is to organize things or people, arrange them in ways that make them different from the way they were before. This is true of rearranging the genes in a chromosome, and it is equally true of rearranging people's ideas to create a movement. There is no such thing as useless knowledge, only people who haven't yet learned how to use it. This was the powerful message carried in a 1981 article in Science by Lewis Branscomb, chief scientist of IBM.
wrote that information is so far from being scarce that it is in "chronic surplus." There is still plenty for scientists to find out, but "the yawning chasm is between what is already known by some but not yet put to use by others."

A third insight, from the late British communications theorist Colin Cherry, is the distinction between the information ("message") itself and the service of delivering it. You may own the paper you hold in your hand, but you don't own its contents, the facts and ideas in the paper. Neither, now that I have written them down and you and I are sharing them, do I.

The historically sudden dominance of the information resource has, it seems to me, produced a kind of theory crisis, a sudden sense of having run out of basic assumptions. This is not only the product of information and communication technologies (and their fusion in the new systems that are sprouting daily in the deregulated environment created when the U.S. Government by deciding to stop suing IBM and settle with AT&T said in effect that information and telecommunications were all really one industry — for which again the French have a name, l'informatique). Other dramatic extensions of scientific rationalism and engineering genius such as nuclear fission and gene-splicing — all with an indispensable assist from the new information technologies — have also made their contribution to the bouleversement of long-held social and political convictions.

But somewhere near the center of the confusion is the trouble we make for ourselves by carrying over into our thinking about information (which is to say symbols) concepts developed for the management of things -- concepts such as property, depletion, depreciation, monopoly, "inevitable" unfairnesses, geopolitics, the class struggle, and top-down leadership.

The assumptions we have inherited are not producing satisfactory growth
with acceptable equity either in the capitalistic West or in the socialist East. As Simon Nora and Alain Minc wrote in their landmark report to the President of France: “The liberal and Marxist approaches, contemporaries of the production-based society, are rendered questionable by its demise.”

The most troublesome concepts are those which were created to deal with the main problems presented by the management of things — problems such as their scarcity, their bulk, their limited substitutability for each other, the expense and trouble in transporting them, the paucity of information about them (which made them comparatively easy to hide) and the fact that, being tangible, they could be hoarded. It was “in the nature of things” that the few had access to resources and the many did not.

Thus, the inherent characteristics of physical resources (“natural” and man-made) made possible the development of hierarchies of power based on control (of new weapons, of energy sources, of trade routes, of markets, and especially of knowledge), hierarchies of influence based on secrecy, hierarchies of class based on ownership, hierarchies of privilege based on early access to valuable resources, and hierarchies of politics based on geography.

Each of these five bases for discrimination and unfairness is crumbling today — because the old means of control are of dwindling efficacy, secrets are harder and harder to keep, and ownership, early arrival, and geography are of dwindling significance in getting access to the knowledge and wisdom which are the really valuable legal tender of our time.

Out of dozens of assumptions requiring a newly skeptical stare in the new knowledge environment, these five seem to me to bear most directly on leadership and management, because they are likely to affect most profoundly the ways in which, and the purposes for which, people will in future come together in organizations to make something different happen.
Power and Participation

Knowledge is power, as Francis Bacon wrote in 1597. So the wider the spread of knowledge, the more power gets diffused. For the most part individuals and corporations and governments don't have a choice about this; it is the ineluctable consequence of creating — through education — societies with millions of knowledgeable people.

We see the results all around us, and around the world. More and more work gets done by horizontal process — or it doesn't get done. More and more decisions are made with wider and wider consultation — or they don't "stick." If the Census Bureau counted each year the number of committees per thousand population, we would have a rough quantitative measure of the bundle of changes called "the information society." A revolution in the technology of organization — the twilight of hierarchy — is already well under way.

Once information can be spread fast and wide — rapidly collected and analyzed, instantly communicated, readily understood by millions — the power monopolies that closely-held knowledge used to make possible were subject to accelerating erosion.

In the old days when only a few people were well educated and "in the know," leadership of the uninformed was likely to be organized in vertical structures of command and control. Leadership of the informed is different: it results in the necessary action only if exercised mainly by persuasion, bringing into consultation those who are going to have to do something to make the decision a decision. Where people are educated and are not treated this way, they either balk at the decisions made or have to be dragooned by organized misinformation backed by brute force. Recent examples of both results have been on display in Poland.
This is the rationale for Chester Barnard's durable theory of the executive function: that authority is delegated upward. As "director" of an organization, you have no power that is not granted to you by your "subordinates." Eliciting their continuous (and if possible cheerful) cooperation is your main job as director; without it, you cannot get the most routine tasks (for which others are holding you, not your staff, responsible) accomplished. Indeed, nowadays in many offices orders that used to be routinely accepted are now resisted or refused. In the modern American office, if you want a cup of coffee you don't take that co-worker, your secretary, off her (or his) own work to get it for you.

In an information-rich polity, the very definition of "control" changes. Very large numbers of people empowered by knowledge -- coming together in parties, unions, factions, lobbies, interest-groups, neighborhoods, families, and hundreds of other structures -- assert the right or feel the obligation to "make policy."

Decision-making proceeds not by "recommendations up, orders down," but by development of a shared sense of direction among those who must form the parade if there is going to be a parade.

Collegial not command structures become the more natural basis for organization. Not "command and control," but conferring and "networking," become the mandatory modes for getting things done.

"Planning" cannot be done by a few leaders, or by even the brightest whiz-kids immersed in a systems analysis unit or a planning staff. Real-life "planning" is the dynamic improvisation by the many on a general sense of direction — announced by the few, but only after genuine consultation with those who will have to improvise on it.

More participatory decision-making implies a need for much information, widely spread, and much feedback, seriously attended — as in biological
processes. Participation and public feedback become conditions precedent to decisions that stick.

That means more openness, less secrecy -- not as an ideological preference but as a technological imperative. Secrecy goes out of fashion anyway, because secrets are so hard to keep.

And "policy" widens out to become what Paul Appleby, that far-seeing philosopher of public administration, called it a generation ago: "Policy," he said, "is the decisions that are made at your level and higher."

Most of the history we learn in school is so narrowly focussed on visible leaders that it may give us the wrong impression about leadership processes even in earlier times. We learn that Genghis Khan or Louis XIV or Ibn Saud or the Emperor of Japan or George Washington said this and did that -- as though he thought it up by himself, consulted with nobody and wrote it without the help of a ghostwriter. But even in ancient, "traditional" societies I suspect that effective leadership consisted in being closely in touch with where the relevant publics were ready to be told to go.

Consensus is a prominent feature of many cultures now dismissed as "primitive." The Polynesians in the Pacific Islands with their circular village councils and the American Indians around their campfires made (and in some degree still make) decisions by fluid procedures which may induce more genuine participation than a "modern" meeting run by parliamentary procedure. In the agora of Athens and the Roman "Senate and public" (the SPQR), there seems to have been lively participation by those (well-born male citizens) qualified to take part.

The difference in the current scene is the sheer scale of the relevant publics. In "democratic" Athens slaves, women, tradesmen and other non-citizens didn't presume to play in the decision games. The notion that "all
Men," let alone whole peoples, had inalienable rights came in only with the
Enlightenment, a scant three centuries ago — and has been made effective,
still in a minority of the world's nations, only in the 20th century. (In
Switzerland, women still can't vote.)

Participatory fever is contagious. "Public policy" used to mean "what
the government does." Now it includes corporate policies, collective
bargaining agreements, the cost of health care, the recruitment of university
presidents, lobbying practices, equal employment opportunity, environmental
protection, tax shelters, waste disposal, private contributions to political
candidates, the sex habits of employees, or just about any other "insider"
activities that outsiders think are important enough to engage their time and
attention.

The biggest issues so far have to do with the quality of public
responsibility that shows forth in the actions of corporations, universities,
hospitals, and the thousands of other structures in which executives make the
decisions that serve people, cost them, anger or please them.

The rising tide of participation is reflected in dramatic organizational
changes. Big corporations now usually have a vice president for keeping the
corporation out of trouble with noisy outsiders, or even with their own
stockholders and employees, who raise questions about what the company ought
to produce, who it ought to employ, and how it ought to invest its money.

Should "my" company, or any American company, make and market nerve gas,
even if the government does want to buy some? Should "my" company, or any
American company, promote nuclear proliferation by selling to developing
countries nuclear power plants that make plutonium, the fuel for nuclear
weapons, as a byproduct of generating electricity? Shouldn't "my" company
have more women, and Blacks, and American Indians in its employ — and
especially in its Board and top management? Should a company whose stock I own invest my money in South Africa? Should "my" company, or any American company, pass the "social costs" of its profit-seeking -- overcrowding, the paving of green space, radioactive risk, dirt, noise, toxic waste, acid rain, or whatever -- to the general public? Should our community hospital perform abortions, splice genes, change people's sex, invest in expensive equipment that can help only a few affluent patients? Should our state university do secret work for the Defense Department? Should the C.I.A. recruit our students for who-knows-what clandestine wars in other people's countries?

Such questions cannot be brushed aside without raising their decibel level. There are ways to deal with all of them: shifts of policy or consultative processes or diversionary moves or public explanations -- in descending order of probable effectiveness. But the visibly responsible leaders increasingly have to build into their organizations, not as a public relations frill but as an essential ingredient in "bottom line" budgeting, staff members competent to help develop strategy on such issues as these. And the visible executive now has to be personally competent to defend the organization's public posture in public debate.

These "public responsibility" issues can make or break companies, products, and executive reputations. If you don't believe that, take a Nestle executive to lunch and ask him about marketing baby formula in the Third World.

Dilemmas of Openness

The push for participation by all kinds of people, and the inherent leakiness of the information resource, combine to produce the modern executive's most puzzling dilemma. The dilemma must have been familiar to the
first cave people who tried to bring other cave people together to get something done. But for us moderns, the scale of the perplexity is without precedent. The dilemma can be summarized in one question: How do you get everybody in on the act and still get some action?

The contemporary clamor to be in on the act is certainly impressive. In business, customers are feistier, more likely to complain; stockholders are more numerous and less passive; policy-holders are more inclined to follow through on their insurance claims; union members and other citizens give advice on what's wrong with the steel and automobile industries; employees assert the right to judge whether their employers should make fragmentation bombs; maritime unions decide whether shipments should go to the Soviet Union; advocacy agencies excluded from the United Way organize their own competing drive for community funds; ethnic groups keep a watchful eye on investments in South Africa and business with the Arabs. More and more parents have a world population policy; teachers organize to tell school systems what ought to be taught; students want tailor-made courses of study. Environmental groups, carefully avoiding questions about whom they represent, are articulate (and effective) beyond the wildest dreams of Gifford Pinchot and Teddy Roosevelt. New kinds and colors of people are breaking through the oligopoly of influence long controlled by businessmen and male lawyers from early-arriving ethnic groups. Even those deadly predictable circuses, our national political conventions, become increasingly interesting as minorities and women fill more delegate slots and live TV coverage enhances the risk that a delegate will be seen making a deal, picking his nose, adjusting her shoulder strap, or falling asleep — in millions of living rooms at once.

Openness, then, is the buzzword of modernization. In its firmament the deities are the public hearing, the news conference, the investigative reporter, "60 minutes" and "20-20," Ted Koppel, Phil Donahue and the National
Enquirer. Its devils are also well-known: smoke-filled rooms, secret
invasions, hidden or edited tapes, and expense-account luncheons at which The
Establishment decides what to do next.

In consequence, compared with a generation ago, most public officials --
and a rapidly growing number of "private" executives conscious of their
ultimate growing number of "private" executives conscious of their ultimate
public responsibility -- are much more inclined to ask themselves, before
acting, how their actions would look on the front page of the Washington Post
or the Wall Street Journal, or on the evening telecast. Even former Vice
President Agnew has conceded that taking cash from contractors in his
government office might be wrong if judged by what he called post-Watergate
moral standards. No one doubts that raising the risk of public exposure will
improve the private behavior of executive leaders as they ask themselves. "How
would I feel about this action if everyone was able to see me take it?" The
moral of Watergate is clear enough: If the validity of your action depends on
its secrecy, better decide to do something else.

But the yen for wider knowledge and broader participation has gone well
beyond this sensitivity training for visible leaders, and raised new questions
about the "cost-benefit calculation" of more openness. A generation of
experience suggests that it is high time we faced the next question: How much
openness is enough?

Since this isn't a mystery story, I will reveal at the outset the conclusion of the next few paragraphs. Experience teaches that the procedures
of openness are well designed to stop bad things from happening, and ill
designed to get good things moving -- unless the consensus for action has been
built in private ahead of time.

A practical benefit of openness is simply that complex social systems
work badly if they are too centralized. (In managing their agriculture the 
Soviets have put this proposition on public exhibit for more than half a 
century.) The opposite of centralization is of course not "decentralization," 
which is simply an effort to preserve hierarchical workways when your 
organization gets too large for grandpa to know everything. The opposite of 
centralization is what Charles Lindblom calls "mutual adjustment:" in a 
generally understood environment of moral rules, norms, conventions, mores, 
very large numbers of people are adjusting their behavior by watching each 
other and modifying their behavior just enough to accommodate the differing 
purposes of others, but not so much that the mutual adjusters lose sight of 
where they themselves want to go.

What makes "mutual adjustment" work is the wide availability of relevant 
information, so each mutual adjuster can figure out what the others may do 
under varied conditions, and give forth useful signals about his/her own 
behavior. The market principle doesn't guarantee smoothly working systems, of 
course; perfect competition among buyers and sellers with full information is 
to be found only in textbooks for sophomores. Yet very large systems, many of 
them global in scale, based on massive information outputs and feedback 
systems, have been developed in this century. In recent years systems 
unimaginable before the marriage of computers and telecommunications (currency 
and commodity markets, world-wide airline and hotel reservation systems, 
global public health controls and weather forecasting systems come readily to 
mind) are accepted now as routine.

In other writings I have addressed the growing costs of openness. The 
very great benefits of openness and wide participation are flawed by 
oversimplification and confrontation, by apathy and nonparticipation, by 
muscle-binding legalisms, by too many meaningless public hearings, by an 
excess of voting and parliamentary process, by the nay-saying power of
procedural objection, by the protection of mediocrity, by the inhibition of excellence in recruitment and the absence of candor in evaluation -- and by one thing more. Mythology has it the other way around, but it seems clear now that wide consultation early in a policy process tends to discourage innovation and favor standpattism.

More openness in decision-making is a radical litany, yet the multiplication of those consulted tends to water down radical reform. During the Vietnam war, I used to conduct seminars on this subject (among others) during the long hours spent with student leaders on the barricades. Why, I asked them, do you advocate openness with such passion when the reforms you want would be voted down if you put them to a big public meeting? They were regularly nonplussed by the question; evangelists, in David Riesman's phrase, often "mistake the righteousness of their cause for its marketability."

An action proposal, especially if it is new and unfamiliar, will seem threatening or at least postponable to most of the experts who haven't already been involved. It is no accident that so many memorable U.S. public policy initiatives (much of the New Deal and the Lend-Lease idea in the 1930's, the Marshall Plan and Harry Truman's Point Four in the '40s, the Open Skies proposal in the '50s, the Peace Corps and Food for Peace and the War on Poverty in the '60s, the Nixon Doctrine and the Carter human rights initiative in the '70s) began as the products of leadership hunch and thinking-out-loud rhetoric, with most of the professional staff work and the needed consultations at home and abroad following after. In each case the executive leaders were sensing a trend the American people would buy if a credible salesman came forward to peddle it. But if all the relevant experts had been asked for their opinions before launching them, some or all of these great ideas might well have shriveled in the womb. Too many people, in Washington
and abroad, would have said, "Let's study it some more."

Bold initiatives for change can thus be killed by premature exposure to the rough winds of public debate. Yet let us again remember that this cuts both ways: timely openness is also well designed to stop foolish change. Earlier and wider consultation would almost certainly have killed the ill-fated Bay of Pigs operation, drastically modified the Vietnam escalation, and illuminated the grotesquerie at Watergate for the foolish scheme everyone, including President Nixon, later judged it to have been.

Whatever the costs and benefits of openness in particular cases, it is clear enough that in every kind of hierarchy the winds of openness and participation by new kinds of people are whistling through the cracks, blowing in the windows and knocking down the doors. The result in each case cannot be so clearly judged in advance; it depends on how well those involved have analyzed and balanced the openness equation. Openness, like technology, is not properly an ideology. The answer to whether it helps or hurts basic human purposes is the same as the answer to most of the interesting questions in the study of society: It depends.

The Obsolescence of Ownership

The openness which the informatization of society brings in its train was bound to raise fundamental questions about the idea that knowledge "belongs" to a person or an organization -- or a nation. The propensity of this "sharing resource" to leak is eroding the doctrine that knowledge can be owned, exchanged and monopolized the way "real" resources can.

That you or I can "own" a fact or an idea, that a message of any kind "belongs" to a person or a corporation or a government, is (for reasons already cited from Colin Cherry's work) rather a peculiar notion to begin with. The person from whom you got the message didn't lose it; any right you
acquire by receiving it is at best shared with the sender, the carrier, and often a good many other nosy people who are privy to it. Even if you paid to get the message (if, for example, it was a piece of research you hired someone to do), or if someone paid to get it to you (a friend who sent you a cable, a company that sent you a commercial), it was the assembly or delivery service, not the information contained in the message, that was paid for. The researcher could not "own" the facts and ideas s/he strung together for your use, and neither can you even if you use them as your "own."

The new tide of information technologies makes the "ownership" of "intellectual property" more detached from reality with every new invention. Dynamic high-technology keeps developing better and faster techniques of piracy -- xerography, videotape, the backyard dish for picking up signals from satellites. The knowledge explosion also produces new kinds of works (computer software), new means of delivery (microfiche, videocassettes, computerized videotext over a telephone line), and new ways to assemble great complexities of facts and ideas in more readily accessible form (computerized data bases, inventory controls, energy use data, on-line reservation systems for airlines and car rentals).

In this environment, laws written to protect books and phonograph records and broadcasts, the products of the past, are getting harder and harder to apply. Laws which address technologies not yet invented are hard to write.

The nervous breakdown of copyright protection is now an open scandal. It may be retarded in degree by technological fixes. Satellite broadcasters can scramble their signals to prevent pirating. Elaborate codes have been devised by the creators of some computer programs, though teenage computer hackers have been showing how inherently porous they are.

When I first acquired a home computer, I found the ethical dilemma right
up front: in the instruction manual. On its cover sheet I was threatened with litigious mayhem if I copied any of the software. On the very first page of the manual I was told that before I did anything else I should make at least two copies of the floppy diskette provided with the manual.

Since then, the makers of software keep up their pitiful efforts to maintain a proprietary interest in their products, but the happy-go-lucky free distribution of copies of copyrighted diskettes has already become one of the friendly gestures that makes the owners of personal computers feel like members of a new kind of guild. The leakiness of the information resource seems destined to overwhelm the backward-looking efforts to imprison it. The history of arms control, and the success of computer pirates, teach us that there is always a technological fix for a technological fix.

Is the doctrine that information is owned by its originator (or compiler) necessary to make sure that Americans remain intellectually creative? In most other countries creative work is overwhelmingly controlled by organizations and carried out by salaried people. In Japan, even the most inventive employee is likely to have a lifetime job and receive salary raises in lockstep with his age cohort, his morale sustained not by personal ownership of his ideas but by togetherness in an organizational family.

Most U.S. patents are held by organizations (corporations, universities, government agencies), not by the inventors. Many copyrights, perhaps most, are held by publishers and promoters, not by the authors and songwriters the Founding Fathers may have had in mind when they sewed information-as-property into the U.S. Constitution.

An author or songwriter who helps a publisher make money should certainly participate in the proceeds. But direct agreements about profit-sharing or joint venture arrangements (the movie industry is already full of relevant examples) seem a less fragile basis for such cooperation than the fraying
fictions that the author owns the words in a book and that shared information is being "exchanged."

In U.S. universities and research institutes, creative work is already rewarded mostly by promotion, tenure and tolerant traditions about teaching loads and outside consulting. We generate a respectably innovative R&D effort in public-sector fields such as military technology, space exploration, weather forecasting, environmental protection and the control of infectious diseases without the scientists and inventors having to own the ideas they contribute to the process.

In the private sector, the leaders of industries on the high-tech frontier are already saying out loud that their protection from overseas copyists doesn't lie in trade secrets but in healthy R&D budgets.

The notion of information-as-property is built deep into our laws, our economy, and our political psyche — and into the expectations and tax returns and balance sheets of writers and artists and the companies, agencies and academies that pay them to be creative. But we had better continue to develop our own ways, compatible with our own traditions, of rewarding intellectual labor without depending on laws and prohibitions that are disintegrating fast — as the Volstead Act did in our earlier effort to enforce an unenforceable Prohibition.

In international politics the notion that knowledge is "owned" by sovereign states is in maximum disarray. Every newly miniaturized recording or micrographic device, and every new satellite launched for communication or photography or remote sensing, makes it more difficult to sustain the doctrine that national governments can own, or even control, their information resources.
In 1979 the U.S. government sent two delegations to two world meetings about the control of information. At a UNESCO conference in Paris, the delegates righteously advocated the "free flow" of information, meaning information furnished by U.S. news agencies, U.S. television producers, and U.S. movie studios. A few weeks later, at the UN Conference on Science and Technology for Development in Vienna, an equally righteous group of Americans came out against the free flow of information, meaning "information" as a technology we were anxious to hoard.

Both principles are authentically American: the right to choose, and the right to own. In the international discourse, we will hardly be able to have it both ways. Yet there is no evidence that the two groups of delegates, and the government that instructed them both, perceived the irony or the contradiction.

The U.S. State Department, which instructed both delegations, seemed unusually disoriented by the new information environment when it ruled last year that Western European owners of IBM computers could not move them from, say, Birmingham to Manchester without first seeking U.S. permission. This assertion of extraterritoriality, over equipment produced by a multinational company with headquarters in the United States, was designed to prevent "strategic" equipment from flowing indirectly to Communist countries. Regardless of the merits of the case, the edict is simply unenforceable. In the global information society, the long arms of "ownership" and "control" are shrinking fast.

If information is inherently hard to bottle up, policies based on a long-term information monopoly are likely to have a short half-life. For the 1980s and beyond, the principle is clear: if the validity of your action depends on its continuing secrecy, don't depend on it.
In our generation-long arms race with the Soviet Union, successive U.S. Administrations have managed to persuade themselves that each new U.S. weapons system (its made-in-America technology a continuing mystery to our adversaries) would enable us to stay "ahead." In one of the most damaging of these actions, in the early 1970s, the U.S. decided to stuff multiple independently targetable reentry vehicles (MIRVs) into single missiles. Despite elaborate secrecy on our part, the Soviets soon figured out how to do likewise. But since they (for other reasons) had built much bigger missiles boosted by more powerful rockets, they were able to stuff more MIRVs into their canisters than we could. Thus did we outsmart ourselves by taking an action which depended for its validity on technological secrecy, and created the famous "window of vulnerability" instead.

In the management of mutual deterrence the overclassification of information about what we could do, if we had to, may actually increase the danger of war by miscalculation. The core of the nuclear deterrent, that remarkably stable if unattractive substitute for peace, is the Soviet leaders' uncertainty about what the U.S. President would do in the event of Soviet moves against our allies or ourselves; combined with their certainty that we have the means to retaliate no matter what. Keeping our intentions credibly uncertain is easy: we cannot know what we would do "if," until we know what the "if" is. But keeping from our adversaries full knowledge of our capabilities merely adds another element of madness to the "mad momentum" of the nuclear arms race.

Our own government has for three decades engaged in half-hearted and demonstrably ineffective efforts to "own" strategic U.S. science and keep foreign nationals out of sensitive university research. In our mostly open society, it never worked very well. Americans have no corner on the market for brains; scientists talk quite freely across frontiers to each other; our
European and Japanese allies never had much enthusiasm for controlling transborder information flows (because sales of equipment mean jobs for Europeans and Japanese); and Soviet technological espionage, like our own, has long been a thriving industry.

Keeping our R&D to ourselves is a policy that depends for its validity on secrecy. As informatization intensifies in the post-industrial world, strategic secrecy can be expected to work less and less well.

Similar government behavior used to work better for dictators and totalitarian bureaucracies in societies where keeping information from spreading is honored by doctrine and practiced ad absurdum. The last time I looked, Xerox machines still had to be licensed by the government in the Soviet Union: in Bulgaria, even typewriters are closely controlled. Ideas are harder to license: Russian youngsters readily learn about jeans and hard rock, and scientists on both sides of the porous Curtain seem to know how far along their peers are in unravelling (for example) the puzzlements of rocketry and space travel.

The good news is that information is leaky, that sharing is the natural mode of scientific discovery and technological innovation. The new information environment seems bound to undermine the knowledge monopolies which totalitarian governments convert into monopolies of power. In the horoscope of the U.S.S.R. and the Soviet bloc, a future looms where nobody is in charge.

Does Access Lead to Fairness?

The informatization of society may destabilize more than the Soviet bloc. It may help undermine the systems that keep two billion people in relative poverty, and more than a third of them in absolute poverty. In many ways the most exciting, and puzzling, question about the new knowledge environment is
whether it will be good news or bad news for the global fairness revolution —
and for that revolution's U.S. precinct, the upward mobility of women,
minorities and the poor.

The most arresting trait of the information resource is that it is
inherently more accessible than other resources — and that once accessed, it
unlocks the other resources. What does that imply for access to the power and
affluence that knowledge brings in its wake? Theoretically at least, compared
to the things-as-resource, information-as-resource should encourage:

- the spreading of benefits rather than the concentration of wealth (information can be more equitably
  shared than petroleum or gold or land or even water);
  and
- the maximization of choice rather than the suppression
  of diversity (the informed are harder to regiment than the
  uninformed).

In the industrial era, poverty was explained and justified by shortages
of things; there just weren't enough minerals, food, fibres, and manufactures
to go around. Looked at this way, the shortages were merely aggravated by the
tendency of the poor to have babies.

In the post-industrial era, the physical resources are joined at center
stage by information, the resource that is harder for the rich and powerful to
hoard. Each of the babies, poor or not, is born with a brain. The collective
capacity of all the brains in each society to convert information into
knowledge and wisdom is the measure of that society's potential.

But whether the informatization of the globe will actually mean a fairer
shake for those who have been the victims of discrimination depends mostly on

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what they do. Most of the fairness achieved in world history has not been the consequence of charity, goodheartedness and noblesse oblige on the part of those in power. Always in history, it seems, fairness has been granted, legislated or seized when there was no alternative. And usually the reason there was no alternative was that the "downs" were determined (or at least perceived by the "ups" to be determined) to cast off their shackles and take the law into their own hands.

Societies flexible enough to adapt to the pressure from the "downs" (as the United States has been doing, not without conflict and coercion, on school integration, voter rights, sex discrimination and equal employment opportunity) manage to keep change comparatively peaceful.

Societies which try to maintain rigid hierarchies (and especially those which, like the Shah's Iran, at the same time encourage education for most of their people) get blown out of the water. In Iran it was the marriage of convenience between those who harbored two powerful resentments, about tradition (the mullahs who had been bypassed and downgraded by "modernization") and about fairness (the Iranian students at home and abroad), which brought the Shah down. Afterwards the tradition-defenders and the fairness advocates went after each other, and the fairness people lost.

In other countries the mix is different, but part of the stew of resentments is always the complaint we learn from infancy to make: "It isn't fair."

There will be less excuse in the future than in the past for depriving whole populations of the benefits of development. There will also be less excuse for the disadvantaged to blame their condition on the barons and bosses when the accessible knowledge to even the score is already floating out there in the noosphere.
The noösphere of knowledge that is power, this accessible resource, has many of the characteristics of a "commons." In considering the implications for fairness of information-as-a-resource, it is an intriguingly fresh thought, worth a moment of speculation.

In earlier times sharing arrangements for a common resource were customary, for example in tribal ownership and nomadic practices. Vestiges of the idea survive in the Boston Commons, the National Park system, and in the way many major waterways, in Europe and North America, are managed.

For people in old England the commons, as Ivan Illich defines it, was "that part of the environment which lay beyond their own thresholds and outside of their possessions, to which, however, they had recognized claims of usage, [not to produce commodities but to provide for the subsistence of their households]." The commons "was necessary for the community's survival, necessary for different groups in different ways, but... in a strictly economic sense, was not perceived as scarce."

The older commons, such as those for sheep and cattle, have disappeared through "enclosure." But the "commons" idea has now been revived in a big way, as the basis for worldwide cooperation in the environments that by common consent belong to no one or everyone (which seems to be about the same thing): the deep ocean and its seabed, Antarctica, outer space and celestial bodies, and the weather.

The Mediterranean Sea, the arena of bloody ancient feuds and lethal modern rivalries, has recently been formally recognized by all the coastal states (including the Arab states and Israel) as so precious a shared commons that reversing its degradation must be a matter for cooperation even among sworn enemies. The resulting international agreement, intermediated by the U.N. Environment Programme, is self-enforcing: violating its terms would be
in a literal sense self-defeating.

For the management of an information commons, a sharing environment, these exotic precedents suddenly seem not so exotic.

Illich, in a Tokyo speech called "Silence as a Commons," argued that electronic devices (from the microphone to the computer) are a form of "enclosure," reserving to the few the privilege of breaking the silence otherwise available to the many.

I don't know about silence; I haven't much experience with it. But on the computer as a form of "enclosure," I demur. In its general impact the forced march of information technology, personal computers combined with global telecommunications, seems to me to be taking us away from the idea of enclosure. My hunch is that the fusion of computers and communications will further empower the many to participate in "making policy" in domains to which the few, with their moth-eaten monopolies of knowledge, will have to yield more and more access.

Neighborhood organizations are furnishing themselves with personal computers to deal more effectively with the banks and developers and government agencies that will otherwise make the neighborhoods' decisions for them. American Indian tribes might set up a computer teleconference to concert their political clout on fast-moving legislation. A single individual with a personal computer can even now get access to so much useful and timely information that she or he can, with a week's homework and without leaving home, intervene as an unusually knowledgeable citizen in almost any public policy issue on the national agenda.

To chart these potentials is not to fulfill them. The trends in information technology would make it possible to organize as a commons (with free though not necessarily costless access thereto) most of the world's useful knowledge. That is not to say it will happen. It just helps remake
the point that those who think "it isn't fair" will have plenty of opportunity to get access to almost any information that is being withheld from them to their disadvantage. But they will have to want to work at it, they will have to prepare their brains for the task. In the information society as in its predecessors, there is still no free lunch.

The Passing of Remoteness

I have argued the mind-blowing implications of the informatization of society for four of the old hierarchies -- based on control, secrecy, ownership, and structural unfairness. Let's look at what is happening to the fifth of the old hierarchies, those based on location.

The inherited idea is that the political importance of communities is based on their geography. Cities usually developed because they were seaports or on critical inland waterways, or (earlier) on important overland caravan routes and (later) on important railway lines. It made a difference whether you were in the city or in "the country;" if you lived in a rural area, you were remote. There was no choice about it, you were just remote.

The importance of countries was often based on the natural resources they had discovered, and developed, on "their" territory. The spices of the Orient, the rubber and tin of Southeast Asia, the coal and iron of Central Europe, the diamonds (and later uranium) of South Africa, the fruit of Central America, the petroleum reserves of Indonesia and Mexico and Venezuela and North Africa and the Persian (or Arabian) Gulf and the North Sea, the soil that produced those "waving fields of grain" in North America -- these crucial resources left an indelible mark on the national sovereignties which happened to find them in their back yards.

Then there was the sense of place in military strategy, summed up in the
once-popular word "geopolitics." This was the idea that a nation's power depended largely on its geography — how vulnerable its land mass, how defendable its frontiers, how rich its mineral deposits, how fertile its soil, how plentiful its water, how extensive its coastline.

But communications satellites and fast computers are gradually erasing distance, eroding the idea that some places are world centers because they are near other places or obsolescent natural resources or old-fashioned means of transportation, while other areas are bound to be peripheral because they are remote from these centers.

Octavio Paz, a poet, caught onto what was happening well before most of the systems analysts and political pundits. "We Mexicans," he wrote in the 1970s, "have always lived on the periphery of history. Now the center or nucleus of world society has disintegrated and everyone — including the European and the North American — is a peripheral being. We are living on the margin... because there is no longer any center.... World history has become everyone's task and our own labyrinth is the labyrinth of all mankind."

The passing of remoteness is one of the great unheralded macrotrends of our extraordinary time. Once you can plug in through television to U.N. votes or a bombing in Beirut or a Wimbledon final; once you can sit in Auckland, or Singapore, or Bahrein and play the New York stock markets in real time; once you can participate in rule, power and authority according to the relevance of your opinion rather than the mileage to the decision-making venue — then the power centers are wherever the brightest people are using the latest information in the most creative ways.

Distant farmsteads can, if they will, be connected to the central cortex of their commodity exchanges, their political authorities, their global markets. The fusion of rapid microprocessing and global telecommunications
presents nearly all of us with a choice (and an obligation to choose) between relevance and remoteness. There will be costs and benefits to either choice -- but the necessity to choose is new, and inescapable.

There is, of course, an alternative to geography as a principle of organization. The revised proposition was recently formulated by futurist Magda McHale: in the new knowledge environment, civilization will be built more around communities of people, and less around communities of place.

That this trend is well advanced can be seen in a quick review of what is happening to the great hierarchies which in this last couple of centuries have been dividing, and governing, the world.

The State is not withering away, as with their different motives Karl Marx and the advocates of world government would have desired. But power is leaking out of sovereign national governments in three directions at once.

The State is leaking at the top, as more international functions require the pooling of sovereignty in alliances, in a World Weather Watch, in geophysical research, in eradicating contagious diseases, in satellite communication, in facing up to global environmental risks.

The State is leaking sideways, as multinational corporations -- "private," pseudoprivate, and "public" -- conduct more and more of the world's commerce, and operate across political frontiers so much better than committees of sovereign states seem able to do.

The State is also leaking from the bottom, as minorities, single-issue constituencies, special-purpose communities and neighborhoods take control of their own destinies, legislating their own growth policies, their own population policies, their own environmental policies.

And what has Nation come to mean? Increasingly it means not a hierarchy of power but ethnicity -- the Frenchness of Quebec, the tribal loyalties of
the Ibo in Biafra, the separatism of the Scots, the rhetorical brotherhood of the Arabs, the world's many diasporas ranging from the Overseas Chinese to the Zionist, and non-Zionist, Jews outside Israel.

And Organized Religion? All of the great religious traditions have had to settle, so far in world history, for hegemony in one or another part of the world. But in a world of people-communities, not place-communities, the "parish" cannot be mostly geography-based. Now, even "established" religions are trying to break free from their national and regional parishes. The Roman Catholic Pope's extensive travels and the terrorist outreach of Ayatollah Khomeini's Shi'ites form a grotesque correlation: both are breaking loose from historic geographic bounds to appeal to wider religious — and therefore political — constituencies.

The prospect of people rather than place as a basis for community has interesting implications for universities trying to serve a "local" clientele; for corporations that have bet heavily on regional organization; and for political systems that have bet heavily on geography-based constituencies. It implies that those institutions which exploit the electronic answers to remoteness may be "catching a wave" in the twilight of hierarchy.