



Technology's global village fragments community life

Transportation and communications technologies widen human horizons but splinter human relationships; computer networks could reverse this trend

Two hundred years ago, when the United States Constitution was drafted, 90 percent of all work was organized through face-to-face relationships, mostly within the community and family. Small farms predominated. Artisans, working autonomously in their scattered homes and local communities, produced at their own pace, selling not their labor, but a finished product. Since then, the continuing industrial revolution has brought extraordinary increases in productivity to our society, but also a new impersonal scale and a tendency toward economic and political centralization.

Now, in the advanced industrial countries, most people work for corporations or the government, and what they do is continually affected by what other people are doing thousands of miles away. The once tightly knit working world has become fragmented, and relationships formed at work no longer overlap closely with community life. Stresses and conflicts can multiply as a result.

By contrast, in low-technology societies such as a tribal community, people lived in a face-to-face world, in which friends, neighbors, community leaders, and fellow workers were nearly all kin. Technologies for transportation or long-distance communication both were virtually nonexistent and unnecessary. One's range of activities and relationships extended scarcely farther than one could walk.

Today's societies and new technologies have fostered a formerly almost unimaginable wealth, as well as a new level of individual opportunity. But we have paid a price—loss of community and dependence on impersonal centralized organizations. Engineers, for example, find themselves out of work because of decisions made thousands of miles away by individuals they cannot even name. How many engineers have lost their jobs because an investment banker changed his mind about a company? What about the defense engineers whose careers depend on the whims of U.S. government officials as they choose one weapons system over another?

As we head toward the 21st century, high technology is becoming even more central. But will the workers' world become even more widely split? Will people face even greater pressures?

Yes, unless we harness the new technologies to human ends.

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Managers now introducing new technology tend to create a split when they use the new machines to "run" the workers by setting the conditions and pace of the job. This split is not dictated by the machines. If the workers were in charge and organized the machinery to their advantage—in effect, told the machines what to do—a startling reversal of 500 years of increasing division of the work place could result. Emerging electronic communications systems hold this promise, although not without accompanying problems.

With the new systems—personal-computer work stations, satellite communications, and the like—geographic location no longer need severely restrict access to information or opportunities. The rise of telecommunications is the story of transcending space rather than just moving across it.

The days of close relationships

The dissolution of community has been a fairly recent development in the history of the human race. Throughout most of history, the direct relationships of family, community, personal friendship, and work-place collegiality predominated in most people's lives.

In medieval Europe, for example, most humans lived out their lives in tiny villages among people known from birth. In both town and countryside, homes were work places. For both craftsmen and farmers, work and community were unified in daily life. People's intellectual horizons and personal prospects were often limited in such communities. Literacy, which provided for some level of long-distance communication, was largely a monopoly of the church in the Middle Ages; therefore the average person heard little news of remote events, and thus felt unaffected. Travel was slow and perilous. These communities, however, offered a social strength and sense of security for which many people long today.

Local autonomy was seldom threatened by close government control. The greatest medieval kings ruled territories a fraction the size of modern-day nations, and their control was minimal by today's standards. Though they might have the power to put men to death, they lacked the technologies and administrative apparatuses for record-keeping, tax collection, communication, law enforcement, and other activities by which modern governments penetrate our daily lives.

The modern age of accelerating technological innovation transformed social organization and pierced local autonomy. This started with the end of the Middle Ages. New agricultural technologies, for example, transformed farming, increasing the volume of produce available for trade and eventually reducing the need for farm labor. This led to peasants supplementing their incomes by taking on low-skilled craft work farmed out by urban merchants—notably the spinning of yarn and the weaving of cloth. The countryside increasingly became part of a larger network of trade and production relations. Many peasants were forced to migrate to the swelling cities; those who remained became prey to the buying habits of remote populations.

The processes of centralization and increasing productivity have continued to dominate social change ever since. By the nineteenth century, the development of heavy industries led to the concentration of people in factory towns filled with laborers dependent on remote owners and customers. Corporate and government bureaucracies also sprang up, requiring whole skyscrapers full of white-collar workers. Whereas the preindustrial city worker, the tradesman or guild member, worked for himself or for at most one boss, these new blue- and white-collar workers became organized in increasingly hierarchical and often remote tiers of management, thereby decreasing their autonomy dramatically and elevating their potential anxiety. Centralizing pressures often dictated how new technology would be used. Early mainframe computers, for example, were used to increase central control over work and for years were developed with minimal attention to the potential of distributed computing.

The burgeoning organizations required by advanced industrial societies naturally depended on a tremendous growth in the capacities of government. Markets could only flourish where peace was maintained. Currency and credit systems had to be carefully monitored. The rules of fair competition had to be enforced, education provided, and boundaries protected. Over territories

the size of modern nations, these functions required elaborate new forms of social organization, and via the technologies of communication and record-keeping, the local autonomy was yet again diminished, this time by subjugation to another remote power—the state bureaucracy.

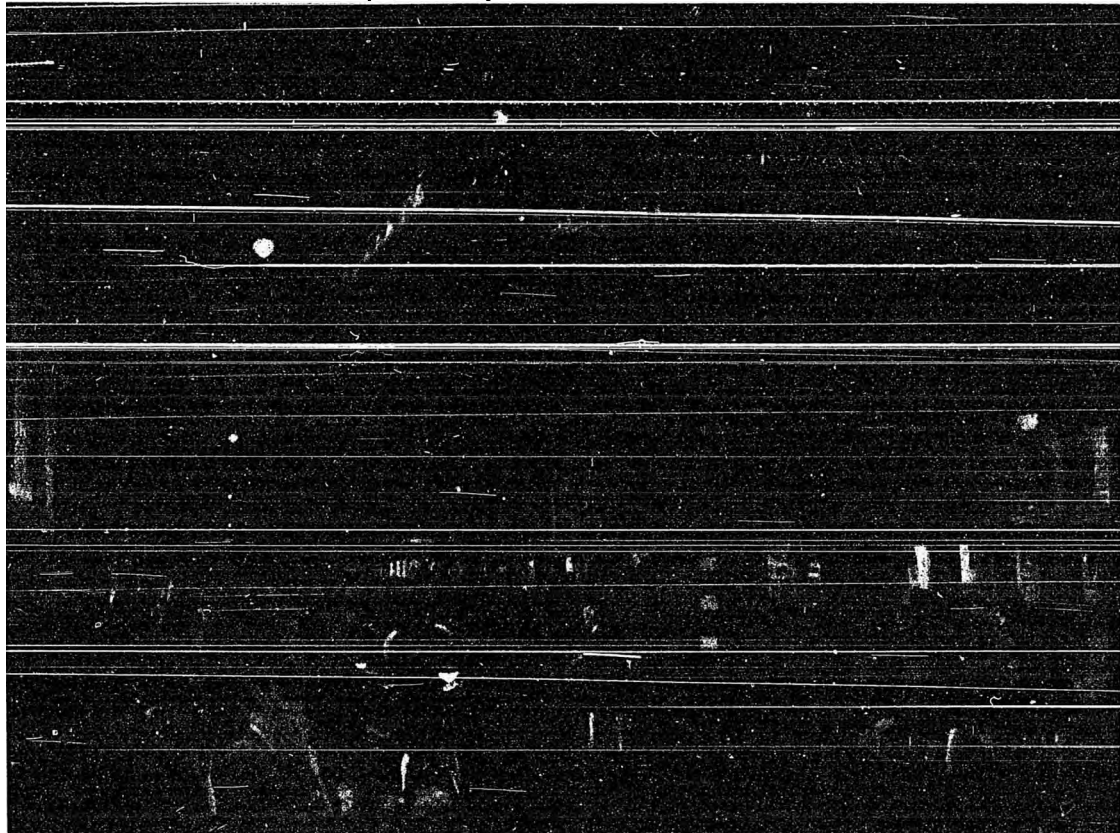
The modern space-transcending technologies that allow long-distance links between people do little to knit them together close to home. Many of these technologies, furthering the separation of work and community that the Industrial Revolution brought, even compete with home lives. This is especially true of transportation. In the United States, people spend astonishing amounts of time on the road, usually alone. Car travel is inherently isolating, removing individuals from visual and verbal contact with others and enclosing them in a silent womb. Additionally, commuting long distances to work shortens the time spent with families and within communities. Transportation technology also increases the number of strangers that pass through communities. Neighbors no longer know whether a car parked across the street ought to be there or belongs to a burglar. As a result, communities are more dependent on police for crime protection.

Telecommunications to the rescue?

Emerging telecommunications technologies could be used to reverse this trend toward central control and individual isolation. Telecommunications has become an increasingly attractive substitute for transportation. Computers and phone lines allow access to centrally stored corporate records or other data from widely distributed sites. It is no longer necessary for all those who need certain data to work in the same giant office building. The different divisions of a company—sales, research, manufacturing—need no longer be located close to each other.

Electronic communications allows engineers to work in campuslike settings in California, Arizona, or North Carolina, while manufacturing is done in Michigan or Ohio and central manage-

Sixth Avenue Elevated at Third Street, John Sloan, 1928



Whitney Museum of American Art, New York (Bradley Smith, photo) (copy of painting)

ment works out of New York. Indeed, operations are distributed throughout the world without sacrifice of central coordination. Teleconferencing links individuals for meetings; computer-aided design and manufacturing systems are integrated on an international scale; long-distance access to data bases and electronic-mail networks is easy. Some stockbrokers are able to do nearly all their work by the combination of telephone conversations with their clients and computer hookups with information sources and the representatives on the stock exchange.

While corporate decentralization makes workers more remote from the organizations that control their jobs, it helps pave the way for population decentralization, and therefore it could become easier to put down roots than at any time since the rapid decline of family farming and small-town life began more than 50 years ago.

The indirect electronic linkages will save time and energy that can go into direct familial relationships. Some of the split between family and work can be overcome. Parents can adjust schedules more easily to the demands of child-rearing. And for that matter, children can know firsthand what their parents do for a living.

Technology: not a perfect solution

There are some problems with telecommuting. Few houses are designed to provide good work spaces. Many telecommuting employees miss the easy, informal intercommunication of the office and feel left out of the gossip networks essential to corporate life. Suburban neighborhoods do not offer the ease or variety of social stimulation of urban business districts or even office parks. If nothing else, those who telecommute will want public places

Technology and traffic jams: cause or cure?

The application of electrotechnology to transportation has so far contributed little to easing the traffic congestion that limits today's urban mobility in the United States. Yet electrotechnology can and should play an important role not only in the operation of transit vehicles themselves, but also in transit information, communications, control, and fare collection.

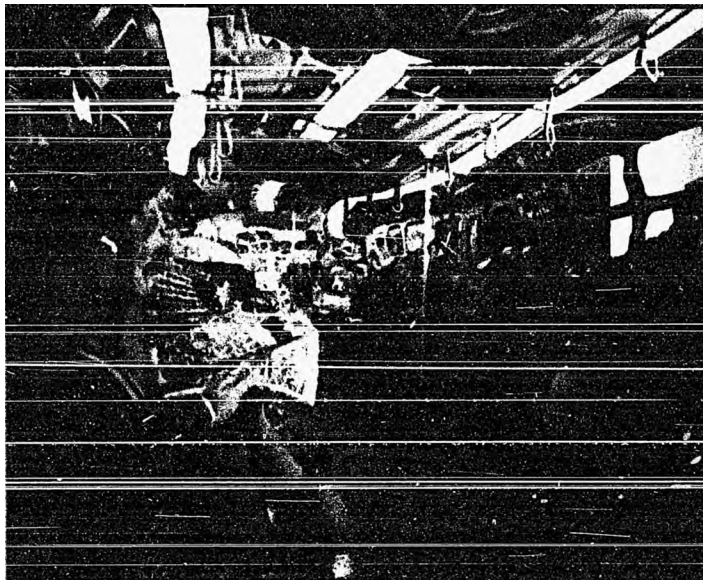
The failure of modern transportation is due to a combination of social and political phenomena.

We have collectively failed to recognize our transportation needs and to deal with them effectively. The blame must be shared by many within society—governments, corporations, and individuals.

Traffic congestion is not a new phenomenon. Since the Industrial Revolution, the size and shape of U.S. cities has been dictated by the ability of employees to get to work. In the mid-nineteenth century most employees walked to work. Thus, industrial and commercial centers were staffed with employees who lived within five miles of their work. Cities were small, and social groups were mixed.

With the advent of the train, urban areas could expand, because employees could travel up to 30 miles in an hour. Suburbs sprang up along railroad lines. (Songwriter George M. Cohan claimed that New Rochelle, N.Y., was only "forty-five minutes from Broadway" in his song by that title.) Most suburbs were small at first—commuters typically walked to the station. The invention of the elevator brought taller buildings and more intensive development of urban

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Passengers on the IRT, Red Grooms

Credit: The Anti-Slavery Society

centers. The automobile and paved highways reversed this process. In combination with Federal housing programs, automotive flexibility stimulated suburban building and almost killed many central cities. No longer were suburbs confined to radial railroad lines. The interstices among existing suburbs were quickly filled with low-density, single-family houses. The new suburbanites quickly learned to use their automobiles for all their travel, and they have saturated major routes to the

city center, including new freeways, as quickly as they are built.

We are now approaching an impasse: streets, highways, and freeways cannot support enough traffic for efficient high-density commercial and industrial development, and residential densities are too low to support the high-density public transportation services that are available. There are no clear solutions. To date, the social solutions have not worked. New towns that have attempted to combine low-density housing with low-density employment have not succeeded financially or sociologically. Single-family homes sell; medium-density townhouses do not in many cities. As a result, shopping centers and schools are shortchanged. Residents predominantly work elsewhere.

Under the sponsorship of the Federal government, many billions of dollars have been spent to improve public transit. In the aggregate this effort has been ineffective. Most of the money has been spent for buses that continue to give second-class service at infrequent intervals. This service is acceptable only to those who have little or no choice. The billions of dollars spent for heavy rail systems in San Francisco, Wash-

close to their homes to go to for short breaks during the working day. And they will want to go into the office at least occasionally, if only to have some sense of personal involvement with their companies and co-workers.

Corporate decentralization and telecommuting only work at present to the benefit of a small number of information workers. For most workers, the new technologies are much more threatening than beneficial. For blue-collar workers, corporate decentralization often means an effort to escape unions by fleeing to the Third World or the U.S. Sun Belt. Electrotechnology today actually aids versions of corporate decentralization that are intended largely as "divide and conquer" strategies. And, of course, electrotechnology is a central part of the automation that is now eliminating the jobs on which millions of people depend.

Few new high-tech jobs are likely to go to those displaced from

older jobs. This means that many good workers with years of experience and a strong record of following society's rules will be permanently out of work unless some action is taken to help them. So far there has been very little effort put into retraining in the United States. Government policy has been simply to encourage relocation, even though this tears apart established communities, puts a strain on families, and may often send migrants to areas unprepared to absorb them.

Electrotechnology is also producing a new group of "victims of progress." These are older people who have difficulty adapting to the new technology. Those still in school are in the best position to pick up relevant skills. Those in the early stages of careers are likely to be taught new skills on the job or to have time to gain back any investment in educational efforts of their own. And it appears that younger people learn the basic skills of the

ington, D.C., Atlanta, Baltimore, and Miami have done little for the traveling public. At best they satisfy less than 10 percent of the peak hour trips. In spite of advances in control and communications, today's heavy rail technology gives service that is little better than that provided by 1910-vintage subways.

We have become so desperate for an acceptable solution to this transit problem that we have coined a new name, "light rail," for the nineteenth-century streetcar. Institutional solutions have not worked because the traveler's needs are individual. Furthermore the average citizen wants to use his or her automobile and is not easy to dissuade. Federal capital and operating subsidies have not changed the second-class image of public transit service. In fact, Federal involvement has so escalated the cost of transit that good service now may be beyond our reach.

Is there no solution? Certainly there is not an obvious one; however, I believe that there can be a solution if we are willing to abandon our romance with the automobile and take objective views of our transportation problems. First, we must identify travel needs. Each trip has a specific origin, a specific destination, and a desired departure or arrival time. The transportation mode or modes that serve a trip must serve it in its entirety. A high-speed trip segment is of no value if connecting services are slow, inconvenient, and filled with delays.

Next, we must abandon our quest for a universal solution. Unfortunately, many new concepts are designed to be automobile look-alikes, not to meet transportation needs. What works in the city center will not work in the suburbs. The essential characteristics of high-density transportation services are different from low-density ones. This means transfers are needed for some trips. If these transfers are convenient and do not introduce delays, they will be acceptable to most travelers.

Thus, the solution to urban transportation needs may be a set of complementary, carefully coordinated services. This in turn points to a need for high-quality communications.

In low-density areas, urban trips are best served by automobiles. In high-density areas, large transit vehicles can move the requisite number of travelers without exceeding the capacities of downtown streets, provided there is no automobile interference. Singapore has effectively banned automobiles from its central business district, so that more efficient high-volume transport modes can be used. More cities need the courage to take such decisive steps.

Intermediate-density areas need intermediate solutions, perhaps even good bus service. None of these transit solutions can work without passengers, but before we can ask people to abandon their automobiles in favor of public transportation, we must be able to run the vast majority of urban trips in a

timely, efficient, and economical manner. This includes both work and nonwork trips in most parts of an urban area.

As has been so amply demonstrated, today's transit solutions are marginal at best. We need new and creative technology—not rehashed ideas that were patented before the turn of the century nor reworked transportation systems that were developed for very different urban structures. We have had technical successes in the past but not operational successes, because we have failed to understand fully the problems we were trying to solve. For example, the Government, through the Urban Mass Transportation Administration (UMTA), part of the U.S. Department of Transportation, spent \$150 million to build an automated car system in Morgantown, W. Va., as a demonstration project. The system, which sends unmanned cars along a guideway to destinations selected by the passengers, is a technical success, but it provides only marginally better service than the 16 buses that it replaced.

The Japanese and French have successfully installed similar systems to serve medium travel densities in new urban developments. In the United States, automated monorail systems have been successful only at airports and amusement parks. The UMTA's downtown people-mover program was abandoned for financial reasons, but it really failed because no city was willing to completely rethink circulation patterns in its central business district.

We have talked and written much about electric vehicles, trip-rental vehicles, dual-mode vehicles, and other technical and operational concepts that may be capable of serving low-density areas. However, most promoters of electric vehicles are looking for high speed and long endurance, which are not necessary for circulation in business and residential areas. The UMTA's vast Service and Methods Demonstration Program has focused on costly concepts that provide limited service improvements. Few have been continued beyond the period of Federal support.

It can be argued that perhaps President Ronald Reagan has done us a favor by largely dismantling the UMTA program. New ideas, new concepts, and new insights are badly needed. Political courage is needed to recognize that the automobile is not the universal solution to our transportation needs. Its use can and must be restricted.

Complementary services must be created that can accommodate a great variety of trips promptly, efficiently, and comfortably. Travelers must have access to good, reliable information about schedules, expected arrival times, and passenger loads. Shelters and other amenities should be provided, and simple fare schemes should be available. New guideways, built at immense cost, are not needed. Existing streets can support large volumes of traffic in shared vehicles. ♦

Technology and the rhythm of life

The kinds of communities that are growing today are a far cry from old-fashioned industrial towns where a factory whistle or the passing of a train might tell everyone the time. In those communities, and even more in earlier artesian and rural communities, people shared a rhythm of life.

Before the Industrial Revolution, natural cycles and social custom determined schedules. In heavy industry, production machinery itself set many of the rhythms; the workers in a factory had to start and stop at the same time for reasons that do not apply to office workers. In the older factory or rural communities, more residents shared the same occupations, with similar daily and seasonal cycles. In the suburbs and far-flung city areas that are now growing, there is a greater dependence than ever on watches, telephones, daily calendars, and computers to coordinate relations with others. Modern nations move to millions of different rhythms, and people must take great care not to bump into one another or fail to connect with their partners. —C.C.

computer age more quickly and easily than their elders.

However, there is no intrinsic reason why those sections of the population whose skills become outmoded must be made to bear the cost of a transition that could benefit many others. The solution is an investment policy aimed at full employment and improved quality of work life. Much of this will have to take place within the conventional framework of the corporate organization. But some jobs could be created through investment by local communities.

Consider three areas where needs are acute and where much work could be organized through local, often direct, relationships. Jobs could be created in: (1) decentralized commodity production (such as vegetable gardening); (2) rebuilding the country's infrastructure (such as roads); and (3) human services (such as care for the growing elderly population). None of these is a high-tech industry, yet each offers something desirable. The role of high technology lies partly in freeing people to serve these other needs, but this will require a conscious, and in many cases public, investment.

At the same time, the increased productivity that electrotechnology is bringing might encourage society to choose quality of human relations over cost reductions. Efficiency is not the only important social goal. Perhaps some technological innovations will serve both economic efficiency and the quality of social relations. For example, society might take advantage of telecommunications technology to reduce the frequency of personnel transfers and to strengthen people's integration into local communities. By improving the efficiency of networks of indirect relationships, more of people's time and energy might be freed for the direct, personal relationships that we most value and need.

A chance for utopian living

One of the most positive prospects that electrotechnology offers is a much greater degree of choice in geographical distribution of the population, the types of residential communities that are built, and the characteristics of work places. For example, some people greatly prefer urban life, with its bustle of activity, diversity of stimuli, and rich variety of residents. Others find the concentration of people oppressive and prefer to be in more peaceful surroundings, closer to nature. The new telecommunications systems can help satisfy both groups.

The great Swiss designer Le Corbusier imagined a "radiant city" of the future where life would revolve around enormous skyscrapers within which all activities would be coordinated by constant communication—much like today's "wired" office buildings, but incorporating residences as well. Between these giant structures, there would be open spaces for farming use or

parks. A single radiant city might stretch across Europe.

By contrast, the U.S. architect Frank Lloyd Wright wanted to decentralize society, abolishing even existing cities in favor of a "broad-acre city," in which low-density residential development would spread far and wide. He envisioned individuals and families having a maximum of independence in a sort of Jeffersonian democracy. The key, Wright noted, was the development of space-transcending technologies—communications rather than transportation.

Note that each of these contrasting utopias depends on electrotechnology. And note that each might be attractive or oppressive. Wright's image of bucolic isolation seems to come closer to current directions of consumer choice in housing and population redistribution. Virtually all net population growth in the United States during the 1970s took place on the fringe of central cities, in broadly suburban developments. At the same time, significant populations of young professionals and other relatively well-off people have chosen to move into central cities. For them, urban life is not a necessity imposed by employment so much as a consumer good, for which they often pay high prices. The "good" scenario for electrotechnology in community development is not either of these possibilities, but the choice between them.

The problem of poverty amid plenty

There is still the question of economic democracy. The utopian visions of both Wright and Le Corbusier assume that every citizen has a productive place in the economy. The United States, Great Britain, and, to lesser degrees, other advanced industrial societies are rapidly developing "underclasses" permanently excluded from viable, legal economic participation (other industrial countries avoid this problem by restricting immigration severely and by relying on "guest" workers from the Third World). These groupings of poorly educated, generally unemployed, often ethnically distinct people—not the working class—are what George Orwell had in mind when he wrote of the mass of "proles" in his novel *1984*.

Tolerance of the growth of such groups is inhumane and uncivil. Excluded by society, they become an important cause of crime and a drain on the public treasury. Yet electrotechnology is removing these people further from economic and political citizenship. Often illiterate, they have little chance of becoming "computer-literate." Unemployed in a marginally automated society, they can hardly expect to share in the bounty of a more automated future.

The utopian visions apply almost entirely to the advanced industrial countries. Perhaps a few countries on the periphery of the industrial system will reach the center, but the vast majority of the world's people will live in grinding poverty even as the rich societies build the "radiant" or "broad-acre" city. This disparity is a threat to the dreams of the rich societies and also presents a moral obligation that they face. So far, every sign is that electrotechnology will exacerbate rather than alleviate the gap between rich and poor.

Automation reduces the need of manufacturers to seek cheaper labor abroad. Educational facilities in the poorer countries are fighting an uncertain struggle against illiteracy; though computers might help them, they lack the funds for ordinary paper and pencils. Ambitious high-tech development plans routinely fail. The Sudan, for example, spent \$30 million to develop a satellite communications system, but it lacks television sets to receive the broadcasts, power to run them, and engineers and technicians to repair the equipment. The country, the largest in Africa, has only two paved intercity roads.

The real negative scenario is not what will happen in the United States, West Germany, or Japan. It is how disaster in the rest of the world might overwhelm any progress that the advanced nations make. And the real positive scenario is that the advanced industrial countries can use part of their prosperity to extend opportunity to the rest of the world. ♦