larger prospects. We bought in to the ideology that faster is better without taking the time to think it through. Increasingly, we communicate by electronic mail and the Internet. As a consequence, I believe that one can detect a decline in the salience of our communication and perhaps in its civility as well in direct proportion to its velocity and volume. It is certainly possible to detect a growing frustration among faculty with the time it takes to separate chaff from the grain in the rising deluge of e-mail, regular mail, memos, administrative pronouncements, and directives.

Conclusion

Fast knowledge has played havoc in the world because *Homo sapiens* is just not smart enough to manage everything that it is possible for the human mind to discover and create. In Wendell Berry's words, there is a kind of idiocy inherent in the belief "that we can first set demons at large, and then, somehow, become smart enough to control them" (1983, 65). Slow knowledge really isn't slow at all. It is knowledge acquired and applied as rapidly as humans can comprehend it and put it to consistently good use. Given the complexity of the world and the depth of our human frailties, this takes time and it always will. Mere information can be transmitted and used quickly, but new knowledge is something else. Often it requires rearranging worldviews and paradigms, which we can only do slowly. Instead of increasing the speed of our chatter, we need to learn to listen more attentively. Instead of increasing the volume of our communication, we ought to improve its content. Instead of communicating more extensively, we should converse more intensively with our neighbors without the help of any technology whatsoever. "There is no hurry, there is no hurry whatever."

4

Speed

> But is the nature of civilization "speed"? Or is it "consideration"? Any animal can rush around a corral four times a day. Only a human being can consciously oblige himself to go slowly in order to consider whether he is doing the right thing, doing it the right way, or ought in fact to be doing something else. . . . Speed and efficiency are not in themselves signs of intelligence or capability or correctness.
>
> —*John Ralston Saul*

Water

Plum Creek begins in drainage from farms on the west side of the city of Oberlin, Ohio, and flows eastward through a city golf course, a college arboretum, and the downtown area. East of the city, the stream receives the effluent from the city sewer facility before it joins with the Black River, which flows north through two rust-belt cities, Elyria and Lorain, before emptying into Lake Erie 25 miles west of

Cleveland. Plum Creek shows all of the signs of 150 years of human use and abuse. As late as 1850 the stream ran clear even in times of flood, but now it is murky brown year-round. Because of pollution, sediments, and the lack of aquatic life, the U.S. Environmental Protection Agency considers it to be a "nonattainment" stream. Yet it survives, more or less. To most residents of Oberlin, Plum Creek is little more than a drain and sewer useful for moving water off the land as rapidly as possible. Few regard it as an aesthetic asset or ecological resource.

The character of Plum Creek changes quickly as it flows eastward into downtown Oberlin. Runoff from city streets enters the stream where the creek runs under the intersection of Morgan and Professor Streets. One block to the east, a larger volume of runoff polluted by oil and grease from city streets enters the creek as it flows under Main Street, past a Midas Muffler shop, a NAPA Auto Parts Store, and City Hall, located in the flood plain. Where Plum Creek flows under Main Street, an increased volume of storm water and consequently increased stream velocity have widened the banks and cut the channel from several feet to a depth of 10 feet or more. The city has attempted to stabilize the stream by lining the banks with concrete or by riprapping with large chunks of broken concrete. The aquatic life that exists upstream mostly disappears as Plum Creek flows through the downtown. Bending to the northeast, the creek passes through suburban backyards, past the municipal wastewater plant, a Browning Ferris Industries landfill, and on toward the west fork of the Black River and Lake Erie.

Whatever Plum Creek once was, it is now fundamentally shaped by the fact that European settlers cut the forests and drained marshes which once absorbed rainfall and released water slowly throughout the year. The wetlands and forests that once made up the flood plain are now mostly gone, replaced by roads, lawns, buildings, and parking lots. Rainfall is quickly channeled from lawns, streets, and parking lots into storm drains and culverts and diverted into the creek. The result is a landscape that sheds water quickly, contributing to floods, reducing water quality, and degrading aquatic habitats. Mathematics tells the story: doubling the speed of water increases the size of soil particles transported by 64 times.

The history of the Plum Creek watershed is not unusual. More than 90 percent of Ohio wetlands have been drained. As a nation, we

have lost more than 50 percent of the wetlands that existed before European settlement and despite federal laws we continue to lose wetlands at a net rate of 24,000 acres each year (Revkin 2001, 1). The total paved area in the lower 48 states is equivalent to a land area larger than Kentucky. As a result, water moves more quickly across our landscapes than it once did, so that flooding, particularly downstream from urban areas, is more common and more severe than ever. Measured in constant dollars, flood plain damage rose by 50 percent between 1975 and 1990. We labor in vain to control flooding and prevent flood damage by the heroic engineering of dams, levees, and diversion channels while continuing to clear forests, drain wetlands, and pave. The results shown in the Mississippi floods of 1993 or those along the Missouri and Ohio rivers in 1997 are now part of the escalating price we pay for engineering, as if the velocity of water moving through the landscape did not matter.

Money

The city of Oberlin is a fairly typical midwestern college town with a square around which are arrayed college buildings, a historic church, an art museum, a hotel, and downtown businesses including three banks, two book stores, a bakery, a five and dime store, an Army-Navy store, an assortment of restaurants, a gourmet coffee shop, pizza parlors, and one struggling hardware store. In the past six years, however, the downtown lost among other businesses a car dealership, a drug store, a bicycle repair shop, and stores selling auto parts, clothing, and appliances. Going back even further, the economic changes are more striking. Older residents remember the six grocery stores that would deliver to your home, local dairies that delivered milk in glass bottles, and a train station. All that changed after World War II. A large mall with the standard assortment of national merchants located 10 miles away now drains off the largest part of what had once been mostly local business. Going south out of town, new development in Oberlin begins unsurprisingly with a McDonalds and a chain drug store. Farther on, a Pizza Hut newly relocated from the downtown has opened beside a large discount store with more strip development on the way. If this sounds familiar, it should. It is the American pattern of automobile-driven development by which capital moves from older

downtowns to the periphery where land is cheaper and zoning regulations are more lax.

Despite the fact that the city includes a well-endowed college, a vocational school, an air traffic control center, and an industrial park, an estimated 38 percent of the residents of Oberlin live below the poverty line. Money does not stay in the local economy for long. Most of the salaries and wages paid out in Oberlin exit the city economy quickly. Hence the multiplier effect or the number of times a dollar is spent in the local economy before being used to purchase something outside is low.

In contrast, 55 miles to the south in the Amish economy of Holmes County, the economic multiplier would be very high and unemployment and poverty virtually nonexistent. The Amish buy and sell from each other. They make their own tools, farm implements, and furniture. They grow a large percentage of their food, much of which they process themselves so that the value is added locally. Their expenditures for fuel, health care, consumer goods, luxury items, and expensive items like cars or retirement costs are low to zero. They have their own insurance system, which to a great extent consists of the applied arts of neighborliness toward those in need. They accept neither welfare nor social security. The contrast between the Oberlin economy and that of the Amish could hardly be greater.

An Amish friend of mine recently told me that "the horse is the salvation of the Amish society." The Amish culture, as previously noted, operates at the speed of the horse and the sun. Because they farm with horses, they aren't tempted to farm large amounts of land. Farming with horses, in other words, serves as a brake to the temptation to take over a neighbor's land. And because the effective radius of a horse-drawn buggy is about eight miles, and its hauling capacity is low, the Amish are not much tempted by consumerism at the local mall. But horsespeed does more. It slows the velocity of work to a pace that allows close observation of soils, wildlife, and plants. My Amish friend often uses only a walking plow, which he believes preserves soil biota and prevents erosion. The speed of the horse, in other words, allows the Amish to pay attention to the minute particulars of their farm and how they farm. By a similar logic, he waits to cut hay until the bobolinks in the field have fledged. The loss in protein content in the hay he believes is more than compensated by the health of the place and the pleasure derived from having birds on the farm.

The capital tied up in an Amish farm is mostly in land and buildings, not in equipment. Their cash flow seldom goes to banks or vendors of petrochemicals and fossil fuels. It is small wonder that Amish farms continue to thrive while 4.5 million non-Amish farms have disappeared in the past 60 years.

Information

Several years ago the college where I teach created an electronic "quick mail" system to reduce paper use and to increase our efficiency. Electronic communication is now standard throughout most organizations. The results, however, are mixed at best. The most obvious result is a large increase in the sheer volume of stuff communicated, much of which is utterly trivial. There is also a manifest decline in the grammar, literary style, and civility of communication. People stroll down the hall or across campus to converse less frequently than before. Students remain transfixed before computer screens for hours, often doing no more than playing computer games. Our conversations, thought patterns, and institutional speed are increasingly shaped to fit the imperatives of technology. Not surprisingly, more and more people feel overloaded by the demands of incessant communication. But to say so publicly is to run afoul of the technological fundamentalism now dominant virtually everywhere.

By default and without much thought, it has been decided (or decided for us) that communication ought to be cheap, easy, and quick. Accordingly, more and more of us are instantly wired to the global nervous system with cell phones, beepers, pagers, fax machines, and e-mail. If useful in real emergencies, the overall result is to homogenize the important with the trivial, making everything an emergency and an already frenetic civilization even more frenetic. As a result, we are drowning in unassimilated information, most of which fits no meaningful picture of the world. In our public affairs and in our private lives we are, I think, increasingly muddle-headed because we have mistaken volume and speed of information for substance and clarity.

On my desk I have the three volumes of correspondence between Thomas Jefferson and James Madison written with quill pen by candlelight and delivered by horse. The style is mostly impeccable.

Even when they wrote about mundane things, they did so with clarity and insight. Their disagreements were expressed with civility and felicity. The entire body of letters can be read for both pleasure and instruction. Assuming people still read two centuries from now, will they read the correspondence of, say, Bill Clinton or George W. Bush for either pleasure or instruction? In contrast to our own, Jefferson and Madison were part of a culture that, whatever its other flaws, had time to take words seriously. They knew, intuitively perhaps, that information and knowledge were not the same thing and that neither was to be confused with wisdom. In large part the difference, whether they thought about it or not, was the speed of the society.

It is time to consider the possibility that, for the most part, communication ought to be somewhat slower, more difficult, and more expensive than it is now. Beyond some relatively low threshold, the rapid movement of information works against the emergence of knowledge, which requires the time to mull things over, to test results, and, when warranted, to change perceptions and behavior. The speed of genuine wisdom, which requires the integration of many different levels of knowledge, is slower still. Only over generations through a process of trial and error can knowledge eventually congeal into cultural wisdom about the art of living well within the resources, assets, and limits of a place.

Synthesis

Water moving too quickly through a landscape does not recharge underground aquifers. The results are floods in wet weather and droughts in the summer. Money moving too quickly through an economy does not recharge the local wellsprings of prosperity, whatever else it does for the global economy. The result is an economy polarized between those few who do well in a high-velocity economy and those left behind. Information moving too quickly to become knowledge and grow into wisdom does not recharge moral aquifers on which families, communities, and entire nations depend. The result is moral atrophy and public confusion. The common thread between all three is velocity. And they are tied together in a complex system of cause and effect that we have mostly overlooked.

There is an appropriate velocity for water set by geology, soils, vegetation, and ecological relationships in a given landscape. There is an appropriate velocity for money that corresponds to long-term needs of whole communities rooted in particular places and the necessity of preserving ecological capital. There is an appropriate velocity for information, set by the assimilative capacity of the mind and by the collective learning rate of communities and entire societies. Having exceeded the speed limits, we are vulnerable to ecological degradation, economic arrangements that are unjust and unsustainable, and, in the face of great and complex problems, to befuddlement that comes with information overload.

The ecological impacts of increased velocity of water are easy to comprehend. We can see floods, and with effort we can discern how human actions can amplify droughts. But it is harder to comprehend the social, political, economic, and ecological effects of increasing velocity of money and information, which are often indirect and hidden. Increasing velocity of commerce, information, and transport, however, requires more administration and regulation of human affairs to ameliorate congestion and other problems. More administration means that there are fewer productive people, higher overhead, and higher taxes to pay for more infrastructure necessitated by the speed of people and things and problems of congestion. Increasing velocity and scale tends to increase the complexity of social and ecological arrangements and reduce the time available to recognize and avoid problems. Cures for problems caused by increasing velocity often set in motion a cascading series of other problems. As a result, we stumble through a succession of escalating crises with diminishing capacity to act intelligently. Other examples fit the same pattern such as the velocity of transportation, material flows, extraction of nonrenewable resources, introduction of new chemicals, and human reproduction. At the local scale the effect is widening circles of disintegration and social disorder. At the global scale, the rate of change caused by increasing velocity disrupts biological evolution and the biogeochemical cycles of the earth.

The increasing velocity of the global culture is no accident. It is the foundation of the corporation-dominated global economy that requires quick returns on investment and the obsession with rapid economic growth. It is the soul of the consumer economy that feeds

on impulse, obsession, and instant gratification. The velocity of water in our landscape is a direct result of too many automobiles, too much paving, sprawling development, deforestation, and a food system that cannot be sustained in any decent or safe manner. The speed of information is driven by something that more and more resembles addiction. But above all, increasing speed is driven by minds unaware of the irony that the race has never been to the swift.

Upshot

We are now engaged in a great global debate about how we might lengthen our tenure on the earth. The discussion is mostly confined to options having to do with better technology, more accurate resource prices, and smarter public policies, all of which are eminently sensible, but hardly sufficient. The problem is simply how a species pleased to call itself *Homo sapiens* fits on a planet with a biosphere. This is a design problem and requires a design philosophy that takes time, velocity, scale, evolution, and ecology seriously. We will neither conserve biotic resources nor build a sustainable civilization that operates at our present velocity.

But here's the rub: The very ideas that we need to build a sustainable civilization need to be invented or rediscovered, then widely disseminated, and put into practice quickly. Yet the same forces that have combined to give us a high-velocity economy and society reform themselves at glacial speed. Nearly 140 years after *The Origin of Species*, we still farm as if evolution did not matter. More than three decades after *Silent Spring*, we use more synthetic chemicals than ever. Three decades after publication of *The Limits to Growth* (Meadows et al. 1972), economic obesity is still the goal of governments everywhere. And a quarter of a century after Amory Lovins's prophetic and, as it turns out, understated projections about the potential for energy efficiency and solar energy (Lovins 1976), we are still using two to three times more fossil fuel than we need. Wendell Berry's devastating critique of American agriculture was published in 1977, yet sustainable agriculture is still a distant dream. Nearly a decade has passed since the scientific consensus began to form about the seriousness of global warming, yet we dawdle. I could go on, but the point is clear. The things that need to happen rapidly such as the

preservation of biological diversity, the transition to a solar society, the widespread application of sustainable agriculture and forestry, population limits, the protection of basic human rights, and democratic reform occur slowly, if at all, while ecological ruin and economic dislocation race ahead. What can be done?

First, we need a relentless analytical clarity to discern the huge inefficiencies of high-speed "efficiency." We have contrived a high-technology, high-speed economy that is neither sustainable nor capable of sustaining what is best in human cultures. On close examination, many of the alleged benefits of ever-rising affluence are fraudulent claims. Thoughtful analysis reveals that our economy often works to do with great expense, complication, and waste things that could be done more simply, elegantly, and harmoniously or in some cases things that should not be done at all. Most of our mistakes were a result of hurry in the name of economic competition, or national security, or progress. Now many mistakes must be expensively undone or written off as a permanent loss. The speed of the industrial economy must be reset to take account of evolution, natural rhythms, and genuine human needs. That means recalibrating public policies and taxation to promote a more durable prosperity.

Next, we need a more robust idea of time and scale that takes the health of people and communities seriously:

> The only way that can induce us to reduce our speed of movements is a return to a spatially more contracted, leisurely, and largely pedestrian mode of life that makes high speeds not only unnecessary but as uneconomic as a Concorde would be for crossing the English Channel. . . . In other words, slow is beautiful in an appropriately contracted small social environment of beehive density and animation not only from a political and economic but, in the most literal sense, also from an aesthetic point of view, releasing an abundance of long abandoned energy not by patriotically making us drive slowly, but by depriving us materially of the need for driving fast. (Kohr 1980, 58)

Our assumptions about time are crystallized in community design and architecture. Sprawling cities, economic dependency, and long-distance transport of food and materials require high-velocity transport,

high-speed communication, and result in higher costs, community disintegration, and ecological deformation. Rethinking velocity and time will require rethinking our relationship to the land as well. Here, too, we have options for increasing density through open space development and smarter planning that create proximity between housing, employment, shopping, culture, public spaces, recreation, and health care—what is now being called the "new urbanism."

Finally, in a society in which people sometimes talk about "killing time" we must learn, rather, to take time. We must learn to take time to study nature as the standard for much of what we need to do. We must take time and make the effort to preserve both cultural and biological diversity. We must take time to calculate the full costs of what we do. We must take time to make things durable, repairable, useful, and beautiful. We must take the time, not just to recycle, but rather to eliminate the very concept of waste. In most things, timeliness and regularity, not speed, are important. Genuine charity, good parenting, true neighborliness, good lives, decent communities, conviviality, democratic deliberation, real prosperity, mental health, and the exercise of true intelligence have a certain pace and rhythm that can only be harmed by being accelerated. The means to control velocity can be designed into daily life like speed bumps designed to slow auto traffic. Holidays, festivals, celebrations, sabbaticals, Sabbaths, prayer, good conversation, storytelling, music making, the practice of fallowing, shared meals, a high degree of self-reliance, craftwork, walking, and shared physical work are speed control devices used by every healthy culture.

5

Verbicide

In the beginning was the Word.

—*John 1:1*

He entered my office for advice as a freshman advisee sporting nearly perfect SAT scores and an impeccable academic record—by all accounts a young man of considerable promise. During a 20-minute conversation about his academic future, however, he displayed a vocabulary that consisted mostly of two words: "cool" and "really." Almost 800 SAT points hitched to each word. To be fair, he could use them interchangeably as "really cool" or "cool . . . really!" He could also use them singly, presumably for emphasis. When he became one of my students in a subsequent class I confirmed that my first impression of the young scholar was largely accurate and that his vocabulary, and presumably his mind, consisted predominantly of words and images derived from overexposure to television and the new jargon of computer-speak. He is no aberration, but an example of a larger problem,

good ends. As teachers we should insist on good writing. We should assign books and readings that are well written. We should restore rhetoric, the ability to speak clearly and well, to the liberal arts curriculum. Our own speaking and writing ought to demonstrate clarity and truthfulness. And we, too, should be held accountable for what we say.

In terms of sheer volume of words, factoids, and data of all kinds, this is surely an information age. But in terms of understanding, wisdom, spiritual clarity, and civility, we have entered a darker age. We are drowning in a sea of words with nary a drop to drink. We are in the process of committing what C. S. Lewis once called "verbicide" (Aeschliman 1983, 5). The volume of words in our time is inversely related to our capacity to use them well and to think clearly about what they mean. It is no wonder that during a dreary century of gulags, genocide, global wars, and horrible weapons, our use of language was dominated by propaganda and advertising and controlled by language technicians. "We have a sense of evil," Susan Sontag has said, but we no longer have "the religious or philosophical language to talk intelligently about evil" (Miller 1998, 55). That being so for the twentieth century, what will be said at the end of the twenty-first century, when the stark realities of climatic change and biotic impoverishment will become fully apparent? Can we summon the clarity of mind to speak the words necessary to cause us to do what in hindsight will merely appear to have been obvious all along?

6

Technological Fundamentalism

> The implied objective of "progress" is—not *exactly* perhaps, the brain in the bottle, but at any rate some frightful subhuman depth of softness and helplessness.
>
> —*George Orwell*

Scene 1: Entry to a classroom building. With a deafening noise he revved up the two-cycle engine on a blower preparing to clean the leaves, paper, and cigarette butts that had accumulated in the entryway. He made considerable progress herding the debris away from the building and down the sidewalk until cigarette butts lodged in the seams in the concrete. Turning, he blasted the miscreant trash at right angles, but this only blew the debris onto the grass, posing still greater difficulties. Moving cigarette butts and bits of paper in an orderly fashion through grass is a challenge, even for a machine capable of generating gale-force winds. Then the apparatus stalled out—"down time," it's called. In that moment of sweet silence, I walked over and

inquired whether he thought a broom or rake might do as well. "What'd you say?" he responded. "Can't hear anything, my ears are still ringing!" I repeated the question. "S'pose so," he said, "but they think I'm more productive with this piece of *&!@."

Perhaps he is more productive. I do not know how experts calculate efficiency in complex cases like this. If, however, the goal is to disrupt public serenity, burn scarce fossil fuels, create a large amount of blue smoke, damage lung tissue, purchase expensive and failure-prone equipment, frazzle nerves, interrupt conversations, and improve the market for hearing aids, rakes and brooms cannot compete. When the technology and the task at hand are poorly matched, however, there is no real efficiency. In such cases the result, in Amory Lovins's telling phrase, is rather like "cutting butter with a chain saw."

Scene 2: Committee meeting. I once served on what is called with some extravagance the Educational Plans and Policies Committee. It is a committee to which one is elected, or sentenced, depending on your view. In one meeting we were casually asked to pronounce our blessing on a plan to link the entire campus so that everyone would be able to communicate with everyone else via computer, 24 hours a day, without leaving dormitory rooms or offices. This, we were told, was what our competitor colleges were doing. We were assured that this was the future. Information, we were informed, is doubling every six months. Electronic networking was judged to be an adequate response to that condition of information overload. Curious, I inquired what was known about the effects of computers on what we and our students think about or how well we can think about it. In other words, are there some things worth thinking about for which computers are ill suited? Can computers teach us to be properly skeptical of computers? Would people so wired and networked still want to talk to each other face to face? Would they remember how? Would they be sane? Or civil? Would they still know a tree from a bird? And after all the hype, what is the relation between information, knowledge, and wisdom? My fellow committee members, thoughtful persons all, stirred impatiently. After an awkward pause, one said, "We've been through this before and don't need to rehash the subject." I asked, "When?" Another awkward pause. No one could recall when that momentous conversation had occurred. "Well, it's all in the literature," said another. I asked for citations. None were forthcoming. What I had read on the subject by Joseph Weizenbaum

(1976), Theodore Roszak (1986), Neil Postman (1992), and C. A. Bowers (1993, 2000) would suggest to the curriculum committees of the world good reasons for caution. But these books had not been discussed by the committee, and no others were suggested.

Scene 3: Washington, D.C. A high public official is describing plans for the creation of a national information superhighway. The speech is full of high-tech words and "mega" this and that. Sober-looking public officials, corporate executives, and technicians glance at each other and nod approvingly. Members of the press dutifully scribble notes. TV cameras record the event. The questions that follow are mostly of the "gee whiz" kind. From the answers given, one might infer that the rationale for a superhighway is: (1) it will make the American economy more "competitive" because lack of information is what ails us; and (2) it's inevitable and can't be stopped anyway.

I am neither for nor against leaf blowers, computers, networks, or the information age, for that matter. My target is fundamentalism, which is not something that happens just to religious zealots. It can happen to well-educated people who fail to ask hard questions about why we do what we do, how we do it, or how these things affect our long-term prospects. We, leaf blowers and computer jockeys alike, have tended to become technological fundamentalists, unwilling, perhaps unable, to question our basic assumptions about how our tools relate to our larger purposes and prospects.

Scene 1 is an obvious case of technological overkill in which means and ends are not well matched. The deeper problem, noted by all critics of technology, from Mary Shelley and Herman Melville on, is that industrial societies are long on means but short on ends. Unable to separate can do from should do, we suffer a kind of technological immune deficiency syndrome that renders us vulnerable to whatever can be done and too weak to question what it is that we should do.

In scene 2, the committee did not know how computers affect what we pay attention to and how this, in turn, affects our long-term ecological prospects. Not knowing these things and being unwilling to admit them as honest, even important, questions, we did not know whether all of this technology could be used for good or not. Assuming that it could be used to good effect, we did not know how to do so. Seduced by convenience, dazzled by cleverness, armed with no adequate philosophy of technology, and not wanting to appear to our

peers as premodern, we were at the mercy of those selling "progress" to us without a whisper about where it will ultimately take us.

In scene 3, much of the same is true on a larger scale as we approach the entry ramp of the information superhighway. Smart and well-meaning people believe this to be the cat's meow. But by what standard should we judge this enterprise? Will it, on balance, help us preserve biotic potential? Will it help to make us a more sane, civil, and sustainable culture? In this regard it is enlightening to know that a substantial part of the traffic now appearing on the superhighway so far built has to do with the distribution of pornography. Furthermore, the phrase "information superhighway" invites comparison to the interstate highways built in the United States between 1956 and the present. Any fair accounting of the real costs of that national commitment would include the contributions of the interstate system to the following problems:

- damage to urban neighborhoods and communities
- highway deaths
- loss of biological diversity
- damage to fragile landscapes
- urban sprawl
- polluted air
- acid rain
- noise pollution
- global warming
- destruction of an extensive national railway system
- distortion of American political life by an automobile lobby
- the foreign policy consequences of dependence on imported oil.

We, the children of the people who made or acquiesced in that decision, might prefer that these costs had been forthrightly discussed in 1956. Years from now, what might our children and grandchildren wish we had thought about before we built an information superhighway? We cannot know for certain, but we might guess that they would want us to have asked some of the following questions.

First, they might wish that we had been clearer about the purposes of the information superhighway. What problem was it intended to solve? What was the master idea behind it, and how might it support or undermine other master ideas in Western culture having to do with justice, fairness, tolerance, religious freedom, and democracy (Roszak 1986, 91–95)? Looking back, the rationale behind the interstate highway system was never much debated. To the contrary, it was presented as a combination of "national security" and "economic competitiveness," phrases that for nearly 50 years have been used to foreclose debate and conceal motives that should have been publicly examined.

Second, our descendants may wonder why we were so mesmerized by the capacity to move massive amounts of information at the speed of light. What kind of information for what purposes needs to be moved in such great quantities at that speed? At what velocity and volume does information become knowledge? Or wisdom? Is it possible that sometimes wisdom works inversely to velocity and volume? The bottleneck in this system will always be the space between our two ears. At what rate can we process information, or sift through the daily tidal wave of information to find that which is important or even correct? It would seem sensible to move the smallest possible amount of information consonant with the largest possible ends at a speed no faster than the mind can assimilate it and use it to good purpose. This speed is probably less than that of light. As discussed in chapter 3, the most valuable information relative to our long-term ecological prospects may prove to be that which is accumulated slowly and patiently—the kind of information that is mulled over and sometimes agonized over and with the passage of time may become cultural wisdom.

Third, future generations may wish that we had asked about the distribution of costs and benefits from the information superhighway. Looking back, the interstate highway system was a great boon to the heavy construction industry, car makers, oil companies, insurance companies, and tire makers. It was less useful to those unable to afford cars, who once relied on trains or buses. It was decidedly not beneficial to those whose communities were bulldozed or bisected to make way for multiple-lane expressways. Nor was it useful to those who had to spend a significant part of their lives driving to their newly dispersed workplaces. Accordingly, our descendants might wish us to ask whether access to the information superhighway will be fair? Will it be equally open to the poor? Will it be used to make society more or

less equitable? Or more sustainable? Or will it be said of the information superhighway that it, like the "computer, as presently used by the technological elite, is . . . an instrument pressed into the service of rationalizing, supporting, and sustaining the most conservative, indeed reactionary, ideological components of the current Zeitgeist" (Weizenbaum 1976, 250)?

Our descendants will also wish that we had asked who will pay for the information superhighway. By one estimate, automobiles receive about $300 billion in various public subsidies each year (Nadis & MacKenzie 1993). They are supported by public road-building revenues, various taxes and tax loopholes, and by Defense Department expenditures to prepare for and fight wars to guarantee our access to oil. Might the same be true of the costs of the information superhighway?

Fourth, our descendants may wish that we had asked whether the standardization and uniformity imposed by information technology will homogenize our thoughts and language as well. For comparison, automobiles, interstate highways, and their consequences have served to homogenize American culture. Because of the scale of our automobility, our economy is less diverse and less resilient than it otherwise might have been. Our landscape has been rendered more uniform and standard to accommodate 200 million cars and trucks. Highways and automobiles have exacted a sizable toll on wildlife and biological diversity. Automobiles destroyed other and slower means of mobility including walking and bicycling. Will the imperatives of the information superhighway have analogous effects on our mindscapes? Will standardization and uniformity, shaped to fit information technology, homogenize our thoughts and language as well? Can cultural differences or cultural diversity survive technological homogenization? Will the vernacular information of indigenous cultures survive the information superhighway? Can increasingly uniform and standardized societies protect cultural diversity? And if they cannot, can they protect biological diversity?

The twentieth century is littered with failed technologies, once believed to be good in their time and promoted by smart and well-meaning people. The purveyors of automobiles, H-bombs, chlorinated fluorocarbons, toxic chemicals, and television all promised great things. These failed in large part because they succeeded too well. They became too numerous, or too efficient at doing one thing,

or intruded too fully in places where they were inappropriate. A world with 100 million automobiles, for example, is probably okay. One with 500 million cars has more problems than I can list and fewer options for solving them than one might wish. Moreover, each of these technologies has caused unforeseen ecological and social problems that we wrongly call "side effects." There are, however, no such things as side effects, for the same reason that many technological accidents, as sociologist Charles Perrow (1984) once pointed out, are "normal accidents." Given human errors and acts of God, all such happenings are predictable events. What some call side effects of technology are the fine print of the deal when we think we are buying only convenience, speed, security, and affluence.

For a technological society, Garrett Hardin's (1968) query "what then?" is the ultimate heresy. But, standing, as we do, before such technological choices as nanotechnologies, genetic engineering, virtual reality machines, and information superhighways, no previous society needed its heretics more than ours. Information superhighways: What then? Ultimately, minds and perceptions so modified have different ecological prospects. Stripped of all the hype, the information superhighway is only a more complex, extensive, and expensive way to converse. But conversations conducted on that highway must ultimately be judged, as all conversations must be judged, not on the amount of talk or its speed, but by their intelligence, wisdom, and by what they inspire us to do.