

Technology and Freedom: The Virtuous Circle

by James K. Glassman

Introduction¹

Without freedom, technologies that enhance human welfare would be scarce rather than abundant. Technology and freedom are symbiotic, forming a virtuous circle. By examining the relationship between them, we can find ways to preserve the circle and to accelerate activity within it.

Friedrich von Hayek used the word freedom carefully. He began *The Constitution of Liberty* with a quotation from Abraham Lincoln: “The world has never had a good definition of freedom.”² Hayek agreed. He frequently used “freedom” in the sense of a personal state of being — one “in which a man is not subject to coercion by the arbitrary will of another or others.”³ A good definition of technology is “the application of science, especially to industrial or commercial objectives.”⁴ *With respect to the relationship between the two, three conclusions emerge:*

- Technology is a force for good.
- Free individuals will naturally develop better technology.
- The major roadblocks to technological development are political.

Technology as a Force for Good

The technology of computers and advanced forms of telecommunications speed information throughout organizations, lowering costs by reducing uncertainty and the need for redundancies. Innovative businesses have made possible the widespread adoption of these technologies. New technology also makes possible the development of new products to meet previously unmet needs. And by empowering individuals, technology helps the spread of human freedom around the world.

“Technology spreads human freedom by empowering individuals.”

TABLE I

Improvement and Spread of Technology

	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>1999</u>
Microprocessor speed (MHz)	.11	8	50	800
Cost of sending 1 trillion bits	\$150,000	\$129,000	\$90	\$.12
Number of wireless telephones	—	—	23million	1.4billion**
Number of Internet users	N/A	N/A	96million*	650million

* 1995

** 2002

Source: International Telecommunications Union.

“Microprocessor speeds have been doubling every 18 months.”

Lowering the Cost of Information. Many technological innovations are due to the increasing power of computers and the falling cost of information. Today we think of technology involving applications that are innovative or exotic. In 1965, Gordon Moore, the cofounder of Intel Corp., predicted that every 18 months the processing power of a silicon chip would double as transistor density increased, a forecast that has proven uncannily accurate.⁵ The increasing power of the computer chip has made possible the spread of related technologies. [See Table I.]

- Over 30 years, the cost of sending 1 trillion bits of information has dropped from \$150,000 to 17 cents.⁶
- Ten years ago there were only 23 million wireless phones in use worldwide; today, there are 1.4 billion.⁷
- In just five years, the number of global Internet users has increased from 96 million to 650 million, with more than half in Asia; within a year, users are forecast to reach one billion.⁸

Improving Human Welfare. Technology can directly improve human welfare. For instance:

- Due to biotechnology first put to practical use in 1995, biotech seeds account for 75 percent of the soybean acreage in the United States, saving time, money, fertilizer, pesticides and topsoil.⁹

“Over 10 years, Internet users increased from 96 million to 650 million.”

“Biotech seeds save time, money and topsoil, and reduce fertilizer and pesticide use on 75 percent of the U.S. soybean crop.”

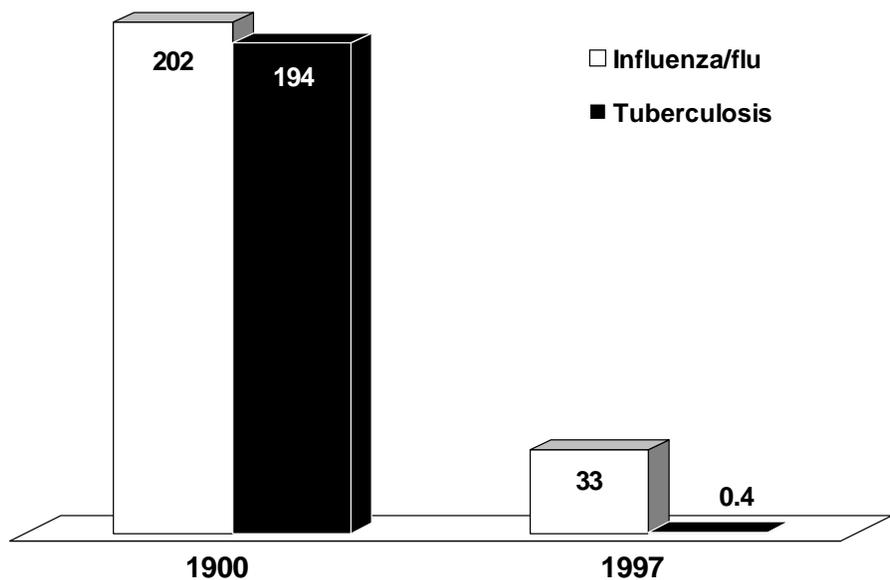
- Computer technology has made nearly every machine more productive; for example, “a Ford Taurus car contains more computing power than all the mainframe computers used in the Apollo Space Program.”¹⁰

Technology is a tool. Like a pencil or an ax, it can be put to good or bad uses. It has generally improved human welfare because individuals allowed to pursue their own choices will choose technology that improves their lives. For example:

- Mainly because of technology that insured the safety of water supplies and spread sanitation, the number of deaths from influenza and pneumonia per 100,000 population in the United States fell from 202 in 1900 to 33 in 1997; deaths from tuberculosis, from 194 in 1900 to 0.4 in 1997.¹¹ [See Figure I.]
- Year after year the United States produces record amounts of coal, and coal remains the number one source of energy in the country.¹² Yet because of new technology, the number of coal miners killed at work has dropped from an average of more than 2,000 per year between 1900 and 1940 to just 32 in 1997.¹³ [See Figure II.]

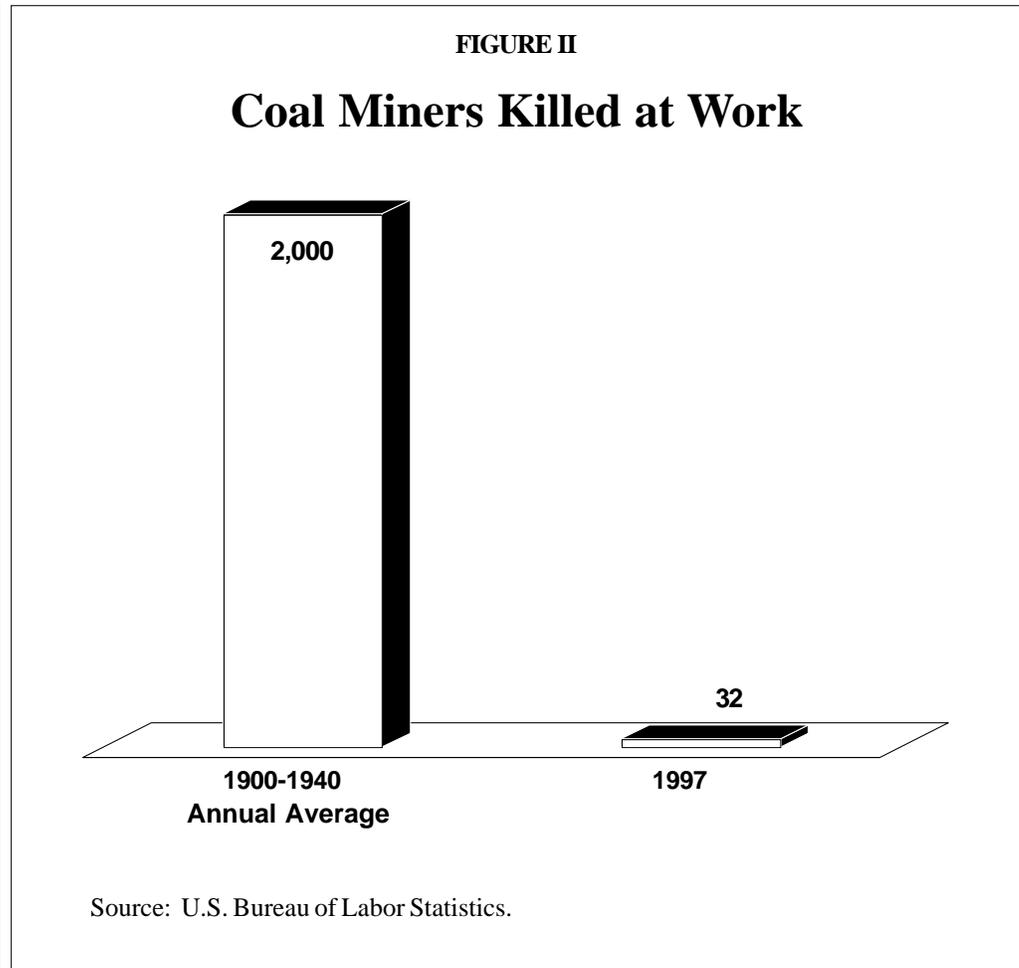
“Safer water supplies due to new technology reduced influenza deaths per 100,000 from 202 in 1900 to 33 in 1997, and the tuberculosis death rate from 194 to 0.4.”

FIGURE I
Examples of Health Improvement:
Deaths per 100,000 from Two Diseases



Source: U.S. Census Bureau.

“Better technology reduced accidental coal-mining deaths from 2,000 a year before the 1940s to 32 deaths in 1997.”



- For all sectors, the increase in industrial workplace safety caused the rate of accidental deaths at work to fall from 428 per million in 1930 to 38 per million in 2000. [See Figure III.]

Empowering Individuals. But is it naïve to view technology as generally beneficial? Doesn't the existence of advanced technology provide an incentive to a central government to try to exert more control? To limit freedom? Yes — but technology also provides countervailing power. Government now has the power to eavesdrop on conversations a mile away, but the speakers themselves now have the power to block the reception. Government can intercept Internet messages, but the senders of those messages can encrypt them in a way they could never encrypt written messages. In the end, technology provides, at the very least, a draw between individuals and overweening governments — and, more likely, gives the upper hand to individuals who want to be left alone. Much computer technology, after all, is *distributed* — that is, it does not rely on a single gigantic mainframe.

Central governments can disrupt communications. For example, China, which will soon have the most Internet users in the world, blocks access to certain Web sites, including that of the *Washington Post*, but not of my own far more subversive free market technology site, www.TechCentralStation.com. It

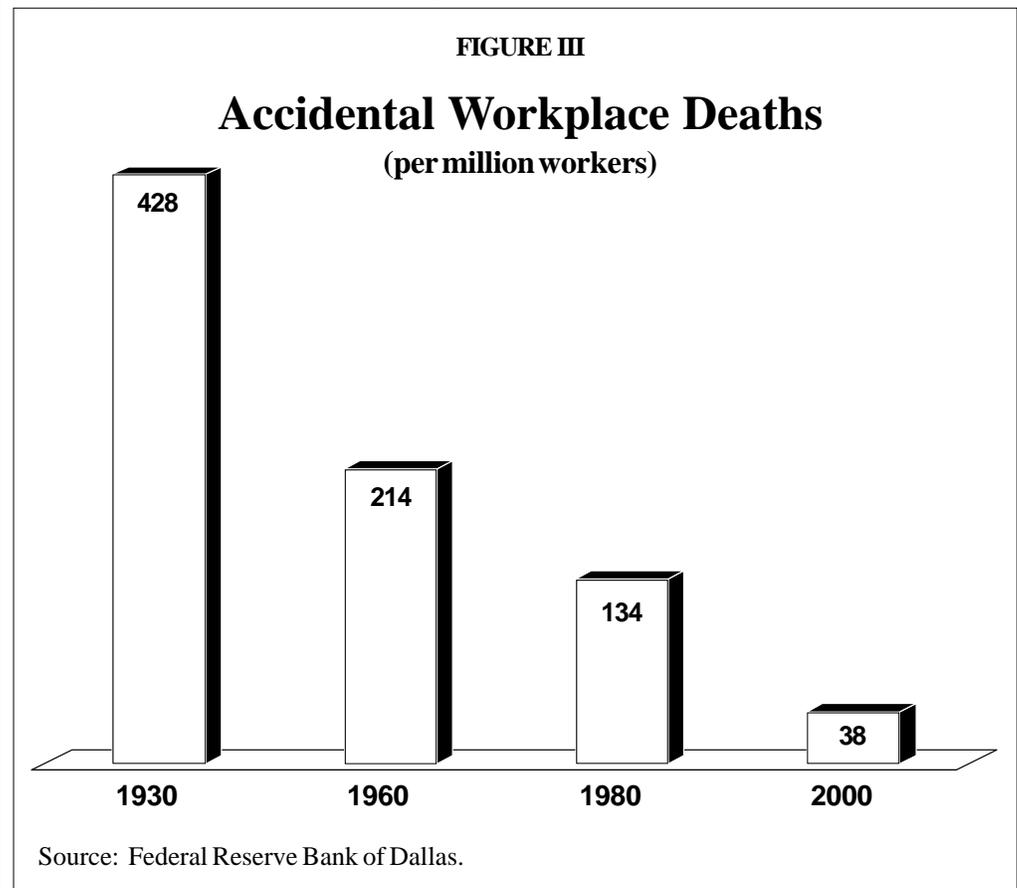
is not difficult for clever users to work around the roadblocks. The more important point is that computers allow work and information to be distributed widely rather than funneled through one channel that can be monitored and controlled by the state.

Thus technology is basically a force for good. It decentralizes power, and it creates wealth and health, which are both conditions of freedom and products of a free society. Robert Fogel recounts how David Landes began his first lecture each year to students in a popular introductory economics course at Harvard University: “Look to the left of you and to the right of you. If it were not for the Industrial Revolution, two out of three of you would not be alive.”¹⁴ Landes himself posits the idea of “Technophysio Evolution,” a process that has allowed humans to gain “an unprecedented degree of control over their environment” through a “synergism between the changes in technology and improvements in human physiology,” which produced “enormous advances in health and life expectancy.”¹⁵

“If not for the Industrial Revolution, two out of three persons would not reach adulthood.”

How Technology Develops

Undirected by the state or any other central authority, technology emerges from a process that encourages variety, spontaneity and discovery through trial and error. For example:



“Increased industrial workplace safety has reduced accidental deaths from 428 per million in 1930 to 38 in 2000.”

“Medieval China was a hotbed of scientific discovery, but without a market economy to encourage production, technological innovation faltered.”

- Michael Dell started Dell Computer Corp. in his Austin, Texas, college dormitory. Dell sold \$31 billion worth of computer hardware and software last year, compared with less than \$3 billion in 1993 — none of it was sold through stores.¹⁶
- Bill Gates democratized the computer with Microsoft Corp., which earned \$10 billion in profits and had a balance sheet graced with \$40 billion in cash and no debt last year — after growing at an average rate of 37 percent annually for a decade.¹⁷

Spontaneous Order. The incentives that motivate this process depend on free minds operating within free markets. William J. Baumol, in his new book, makes the extended argument that societies that are not free, such as medieval China, may be hotbeds of scientific discovery, but without market forces to encourage the actual production of these innovations, technology falters.¹⁸

As for the process of applying technology itself, the most articulate description comes from Paul Romer, a Stanford University economist. “Economic growth occurs whenever people take resources and rearrange them in ways that are more valuable,”¹⁹ Romer uses the metaphor of the recipe. When ingredients are rearranged, new products and new systems emerge. These creations, which often amount to new technology, spring “from better recipes, not just from more cooking.”

What is remarkable is the vast variety of recipes that emerge from a limited number of resources:

To get some sense of how much scope there is for more such discoveries, we can calculate as follows. The periodic table contains about a hundred different types of atoms, so the number of combinations made up of four different elements is $100 \times 99 \times 98 \times 97$ or about 94 million. A list of numbers like 1, 2, 3, 7 can represent the proportions for using the four elements in a recipe. To keep things simple, assume that the numbers in the list must lie between 1 and 10, that no fractions are allowed, and that the smallest number must always be 1. Then there are about 3,500 different sets of proportions for each choice of four elements, and $3,500 \times 94$ million (or 330 billion) different recipes in total. If laboratories around the world evaluated 1,000 recipes each day, it would take nearly a million years to go through them all.²⁰

Virginia Postrel points out that “an ordinary deck of cards can be combined 10^{68} different ways — one followed by 68 zeroes — which means that any time you shuffle a deck of cards, that particular order has probably never come up before in the history of cards. And...52 is a relatively small number.”²¹

“Hundreds of billions of new combinations can be made from 100 or so elements.”

Romer’s ideal combination of elements is a chemical refinery that can convert cheap, abundant and renewable resources into a product that humans value. Describing such an ideal refinery, he writes, “it would be smaller than a car, mobile so that it could search out its own inputs, capable of maintaining the temperature necessary for its reactions within narrow bounds, and able to automatically heal most system failures. It would build replicas of itself for use after it wears out, and it would do all of this with little human supervision.” Such a refinery exists. It is called a cow. “And if nature can produce this structured collection of hydrogen, carbon and miscellaneous other atoms by meandering along one particular evolutionary path of trial and error, . . . there must be an unimaginably large number of valuable structures and recipes for combining atoms that we have yet to discover.”²²

New combinations produce new technology. The best example is pharmaceuticals, where atoms and molecules, combined one way, can produce an effective drug; another way, a poison or a dud. Technology advances by trial and error — by making the combinations and seeing if they work as well as they possibly can. Postrel is fond of quoting the engineer Henry Petroski: “Form follows failure.”²³

It stands to reason that accelerating the formation and testing of combinations will accelerate technology. The question is how to encourage more and more such combinations.

“The trial and error advancement of technology by dispersed individuals is incompatible with central government planning.”

The Role of Government. Inevitably, some will ask if government can successfully regulate technological change. In 1921, Ludwig von Mises famously argued that “economic calculation is impossible in a socialist society.” Mises’ contention was that knowledge of the production functions of a large economic system could not be acquired, not to mention properly put to use, by a central planning board the way it can by individual dispersed entrepreneurs and managers. In support of Mises, Friedrich von Hayek wrote, “What the planning authority would have to know would not be the mere totals but the distinct, peculiar conditions prevailing in each enterprise which affect the information about values transmitted through market prices but would be completely lost in any statistical information about quantities that might reach the authority from time to time.”²⁴

Imagine, however, that technology could make all this data available and collectible. In his essay 20 years ago rebutting Oskar Lange’s 1936 criticism of Mises, Hayek described just how complicated the problem of gathering the information would be. “Even today,” he wrote, “the solution of 100,000 equations is still an unachieved ambition of the constructors of computers.”²⁵ Today, a decent personal computer can zip through 100,000 equations of this sort quite easily, thanks to Moore’s Law. Perhaps Joseph Schumpeter was right when he wrote in 1942 that it is “possible to derive, from the data and from the rules of rational behavior, uniquely determined solutions.”²⁶ However, Hayek’s overall

refutation stands. Each entrepreneur acts on the facts separately, through differentiated personal knowledge that, very simply, cannot be aggregated by any planning board.

Why Political Power Threatens Technology

Consumers want the best product combinations at the lowest prices, and producers have the incentive to make these combinations in a free market. Market forces and private property will produce these results as long as states do not interfere. But states do interfere. They decide what can be made, how it is made, who can make it and where it is sold. Politicians are judged “progressive” if they behave as technocrats, guiding technology in the “right” direction. Remember President Clinton’s “bridge to the 21st century”? Why did we need a bridge? We would come to the 21st century in due course, the year after the 20th century ended. A bridge indicated a structure going from one specific geographic point to another. But why build it there? And why build it at all?

The Impulse to Interfere Politically. Technology brings out the worst impulses in politicians. They say they want to nurture and protect their constituents but, in fact, they fear their own irrelevancy and the uncertainties technology creates for the system in which they thrive. Arthur Schlesinger Jr., the historian who served as an adviser to President Kennedy, wrote in 1997, “The computer turns the untrammelled market into a global juggernaut crashing across frontiers, enfeebling national powers of taxation and regulation, undercutting national management of interest rates and exchange rates, widening disparities of wealth within and between nations, dragging down labor standards, degrading the environment, denying nations the shaping of their own economic destiny, accountable to no one, creating a world economy without a world polity.”²⁷

In fact, technology has done none of these things. So far, anyway, it has not enfeebled national powers of taxation and regulation, and it has improved, not degraded, the environment.²⁸ What is important about Schlesinger’s lament is not its accuracy, but its hysterical tone. Some establishment intellectuals and most politicians see technology as a threat not to the wealth, health and happiness of individuals but to their own authority.

What was the initial response of the U.S. Congress to the Internet? To try to change the rules by which sales taxes are collected and to limit Internet content through the so-called Communications Decency Act.²⁹ Both attempts failed. But technology’s political discontents are legion. What follows are two examples.

Case Study: Assault on Genetically Modified Food. Americans have been eating genetically modified (GM) corn, potatoes and soybeans since the mid-1990s with no adverse consequences and lots of very good ones.

“Technology creates uncertainties that threaten politicians who want to tax and regulate it.”

“Genetically modified foods have not had adverse effects and have many benefits, including vitamin delivery.”

Typically, GM plants carry genes that make them resistant to pests, weed killers and insecticides or make them grow faster and surer. In some cases, the plants can be modified to deliver important vitamins to those who eat them. Between 1994 and 1998, the European Union approved the use of nine GM plants, including varieties of corn, tobacco, chicory and soybeans. According to a European Commission report, “No peer-reviewed scientific article reporting adverse effects on human health as a result of eating GM food has appeared.”³⁰ A commission memo stated, “The safety record [of genetically modified organisms] worldwide over some 30 years has been very good with no reported accident or unanticipated event. Genetic engineering is now routinely used in many thousands of research laboratories worldwide and has resulted in many novel products and processes, including industrial enzymes and such medicines as insulin and vaccines.”³¹

Nevertheless, four years ago, the EU slapped a moratorium on approval of all new GM organisms. Despite the fact that European Environmental Commissioner Margot Wallstrom called the moratorium “illegal and unjustified,”³² it remains in effect. Governments of the individual European countries have apparently decided to pander to Greens, who often wield power in shaky social-democratic coalitions.

Europeans led the agricultural revolutions of the past, inventing crop rotation and better plows and unlocking the mysteries of genetics. A Swiss scientist led the team that developed “golden rice,” a GM breed that fights blindness and malnutrition by introducing a beta-carotene gene into rice and is now being tested in Asia and Africa.³³ Currently, about 50 percent of soybeans worldwide are grown from GM seeds. The biggest enthusiasts, one U.S. government official told me, are farmers’ wives, who get to see their husbands more often. Sensible environmentalists are happy too, since GM farming means bigger crop yields, which preserves land and lowers fertilizer use, keeping chemicals out of streams. Best of all, genetics makes farming easier, especially for small farmers in developing countries. They lack the resources to constantly monitor their crops and to precisely dose them with fertilizer and pesticides; with GM methods, they do not have to.

But the moratorium has halted GM farming in places like Africa. Why should Africans make an investment in GM foods if they can’t sell to a prime market like Europe? Greenpeace and other extreme environmental groups have focused their efforts on Africa, spreading horror stories, trying desperately to keep the continent GM-free. So far, they are succeeding, and people may be dying as a result. As a famine spread in southern Africa last summer, 13 million people risked starvation. The U.S. pledged 490,000 metric tons of food for the drought-stricken region, about one-third of it GM corn. But the president of Zambia, under pressure from Green groups and worried that the corn might “contaminate” his country’s crops and make them ineligible for export to Eu-

rope, turned down the food aid. Journalists reported that corn piled up in warehouses while people nearby were starving.³⁴

Andrew Natsios, administrator of the U.S. Agency for International Development, blasted the European environmental romantics in a speech in Johannesburg in August. “People are scared in Zambia because all these rumors are going around,” he said, “and they’ve been fomented by people from outside groups.... I have never seen, in my 30 years of public service, such disinformation and intellectual dishonesty. I think it’s appalling. It’s frightening people into thinking there is something wrong with the food, and the consequence is that it’s slowing the famine relief in a very disturbing way.”³⁵

But the scandalous story of Zambia fits into the broad context of European resistance to GM. What’s behind it? Partly romanticism and a growing aversion to sound science. Those are qualities we also find in hysteria over climate change, which has led to a policy, supported by many misguided international companies, of advocating expensive measures to limit greenhouse gases, including carbon dioxide, because they might — many decades from now — raise surface temperatures on Earth to dangerous levels. A more straightforward reason why the Europeans are blocking biotechnology is to thwart competition from the United States by erecting non-tariff trade barriers. The use of environmental arguments to prevent competition through freer trade is neither new nor is it a solely European phenomenon. In 1993, Gary S. Becker and Guity Nashat Becker observed that the same tactics were used by U.S. firms that did not want competition from Mexico. The Beckers also noted that “regulations desired by most citizens do not get enacted in developing nations controlled by dictators or cliques.”³⁶ Unfortunately, nations with long democratic traditions also block the flow of new technology through free trade, in part because matters of technology and environment are seen as the realms of experts, wherein voters cannot make the right choices.

Thanks to genetic technology, Africans and Asians could become intensely competitive with European farmers. But fearing the political power of the farm lobby (and of Greens), European politicians would rather try to placate the people of their former colonies with financial aid than buy their goods. Milton Friedman commented on the use of this particular technique regarding aid given by the United States, many years ago:

Though foreign economic aid may win us temporary allies,... it is playing into our enemies’ hands and should be abolished. Instead, we should concentrate on promoting worldwide economic development through means that are consonant with the American tradition itself — strengthening of free market domestic

“European restrictions on biotech foods are barriers to trade from developing countries, similar to tariffs and domestic subsidies.”

economies in the less-developed nations, the removal of obstacles to private international trade, and the fostering of a climate favorable to private international investment.³⁷

Jocelyn Webster, a researcher with AfricaBio, a group based in Pretoria, South Africa, said at the United Nations World Summit on Sustainable Development in Johannesburg that she was “absolutely horrified at the negative tone” of summit delegates toward genetically modified foods. . . . In America, millions of people eat GM foods when they eat their breakfast cereal, but that kind of food is not good enough for starving Africans.”³⁸

“African farmers could compete with Europeans, but fear they cannot sell biotech foods in Europe.”

The day I arrived at the Johannesburg conference, about 200 poor farmers from Africa and India were protesting high trade barriers — including biotech barriers — erected by Europe. “We want the freedom to grow what we want, when we want, with what technology we want, and without trade-distorting subsidies or tariffs,” said Barun Mitra, an Indian quoted by Reuters.³⁹

Ultimately, developing nations have the most to gain from the virtuous circle of freedom breeding technology and technology breeding freedom. There are certainly no cultural impediments. As Hayek wrote:

From what I have seen of the world the proportion of private persons who are prepared to try new possibilities, if they appear to them to promise better conditions, and if they are not prevented by the pressure of their fellows, is much the same everywhere. The much lamented absence of a spirit of enterprise in many of the new countries is not an unalterable characteristic of the individual inhabitants, but the consequence of restraints which existing customs and institutions place upon them. This is why it would be fatal in such societies for the collective will to be allowed to direct the efforts of individuals, instead of governmental power being confined to protecting individuals against the pressures of society.⁴⁰

Case Study: Microsoft under Siege. Microsoft Corp. is the world’s largest software maker and the developer of the operating system used by most of the world’s personal computers. While that firm has prospered — its founder, Bill Gates, is almost certainly the most successful technologist of the past half-century — it also has been under siege from governments acting as those institutions of restraint that Hayek wrote about. For example, a long-running lawsuit filed during the Clinton administration by the U.S. Department of Justice sought to break the company into several parts. The suit began with complaints by competitors that Microsoft was bundling an Internet browser with its computer operating system. The Internet has now become such an integral

“Intellectual property rights allow companies like Microsoft to recoup research and development costs for technological innovations.”

part of personal computing that the charge seems absurd, but the suit has dragged on, causing severe damage not only to Microsoft but to technology generally.⁴¹

The latest attack on Microsoft is nearly as pernicious and as dangerous to the overall development of new technology. Politicians, in league again with Microsoft competitors, are trying to encourage their governments to adopt so-called open source software. The OSS model allows software developers to use source code developed by others but then, “when the resulting software product is distributed, its creator must make the entire source code base freely available to everyone, at no additional charge,” says Craig Mundie, a Microsoft senior vice president.” It is hard to see such a model working, unless governments require its use. “Two decades of experience have shown that an economic model that protects intellectual property and a business model that recoups research and development costs have shown repeatedly that they can create impressive economic benefits and distribute them very broadly,” says Mundie.⁴²

Microsoft clearly has an ax to grind, but it is wielding the ax in an important fight for technology and freedom. The opponents do not merely want to make available the option of open source software; they want to require government procurement preferences. A bill filed in the legislature in Argentina, for example, states that “all government entities will use only free programs [software] for their systems and IT equipment.”⁴³ In Italy, legislation requires that “in choosing computer programs needed to perform its activities, the Public Administration shall favor free software programs, or alternatively open source ones” and shall “give detailed reasons for choosing non-free source software.”⁴⁴ Some still haven’t learned that free choice, competition and property rights are the foundation of technological innovation and economic growth.

Conclusion: The Unknowable Future

“Competition is valuable only because, and so far as, its results are unpredictable,” said Friedrich von Hayek.”

All of the worries about government attempts to thwart technology come down to this: those who wield government power fear change and unpredictability, and thus they fear the technologies forged in a free market crucible. In the end, those who love freedom are those with the foresight and courage to embrace the unknowable future. “Competition,” said Hayek in a speech in Chicago 34 years ago, “is valuable *only* because, and so far as, its results are unpredictable and on the whole different from those which anyone has, or could have, deliberately aimed at. Further... the generally beneficial effects of competition must include disappointing or defeating some particular expectations or intentions.”⁴⁵

With such vast possibilities — so many combinations to try — technology will inevitably disappoint and defeat and benefit and thrill. It is why the

party of technology is the party of freedom and, in Hayek's wonderful phrase, the "party of life."⁴⁶ But as Hayek knew, the urge to limit freedom, to control and coerce others, lives on. To oppose these threats in the realm of technology is the most urgent item on the agenda of the party of life.

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NOTE: Nothing written here should be construed as necessarily reflecting the views of the National Center for Policy Analysis or as an attempt to aid or hinder the passage of any bill before Congress.

Notes

- ¹ This publication is adapted from a presentation to the Mont Pelerin Society, London, October 6, 2002.
- ² Friedrich von Hayek, *The Constitution of Liberty* (Chicago: University of Chicago Press, 1978), page 11.
- ³ *Ibid.*, page 12.
- ⁴ *The American Heritage Dictionary of the English Language* (New York: Houghton Mifflin, 2000), quoted in <http://www.dictionary.com>.
- ⁵ See <http://www.cnet.com>.
- ⁶ See “Untangling e-economics,” *The Economist*, Sept. 21, 2000.
- ⁷ See International Telecommunications Union Web site at <http://www.itu.int>.
- ⁸ National Telecommunications and Information Administration and Economic Statistics Administration, U.S. Department of Commerce, using U.S. Bureau of the Census Current Population Survey supplements, see <http://www.ntia.doc.gov>.
- ⁹ “Biotech Acres: Global Farmers Adopt Plant Biotechnology at Record Pace,” Council for Biotechnology Information, 2002, at <http://www.whypiotech.com/index.asp?id=1808>.
- ¹⁰ See “Untangling e-economics,” Sept. 21, 2000.
- ¹¹ Theodore Caplow, Louise Hicks and Ben J. Wattenberg, *The First Measured Century* (Washington: AEI Press, 2001), page 137.
- ¹² Energy Information Agency, U.S. Department of Energy, <http://www.eia.doe.gov>.
- ¹³ Caplow, Hicks and Wattenberg, *The First Measured Century*, page 29.
- ¹⁴ David Landes, *The Fourth Great Awakening* (Chicago: University of Chicago Press, 2000), page 44.
- ¹⁵ *Ibid.*, pages 81-83.
- ¹⁶ Value Line Investment Survey, July 19, 2002, page 1109.
- ¹⁷ *Ibid.*, Aug. 30, 2002, page 2202.
- ¹⁸ William J. Baumol, *The Free Market Innovation Machine: Analyzing the Growth Miracle of Capitalism* (Princeton, N.J.: Princeton University Press, 2002).
- ¹⁹ Paul M. Romer, “Economic Growth,” from David R. Henderson, ed., *The Fortune Encyclopedia of Economics* (New York: Warner Books, 1993), page 184.
- ²⁰ *Ibid.*, page 185.
- ²¹ Virginia Postrel, “The Future and Its Enemies: Dynamism vs. Stasis,” from Richard Ebeling, ed., *Competition or Compulsion?* (Hillsdale, Mich.: Hillsdale College Press, 1998), page 93.
- ²² Romer, “Economic Growth,” page 195.
- ²³ Henry Petroski, *The Evolution of Useful Things* (New York: Alfred K. Knopf, 1994), page 22, quoted in Postrel, “The Future and Its Enemies,” page 99.
- ²⁴ Hayek, “Two Pages of Fiction: The Impossibility of Social Calculation,” from *Economic Affairs*, April 1982.
- ²⁵ *Ibid.*
- ²⁶ Joseph Schumpeter, *Capitalism, Socialism and Democracy*, (New York: HarperCollins, 1984).

- ²⁷ Arthur Schlesinger Jr., “Has Democracy a Future?” *Foreign Affairs*, Sept.-Oct. 1997, quoted in Postrel, “The Future and Its Enemies,” page 90.
- ²⁸ On the environment, numerous studies, presented by the World Bank *World Development Report 1992*, and by G. M. Grossman and A. B. Krueger, “Economic Growth and Environment,” *Quarterly Journal of Economics*, 112(2), 1995, have found an environmental Kuznets curve, which shows that degradation to the environment declines in individual countries once per capita wealth gets beyond a certain level – perhaps around \$8,000 per capita GDP.
- ²⁹ The CDA was struck down by a 7-2 vote of the U.S. Supreme Court on July 26, 1997. It is a sad and fascinating story. See the documents at <http://www.epic.org/CDA>.
- ³⁰ “Working Document of the Commission Services on Traceability and Labelling of GMOs and Products Derived from GMOs,” European Commission, November 2000.
- ³¹ European Commission memorandum 00/43, Brussels, July 13, 2000.
- ³² Reuters, July 13, 2000.
- ³³ See <http://www.checkbiotech.org> for a discussion of golden rice.
- ³⁴ For full details, see “Natsios Says Disinformation Campaign Is Slowing African Famine Relief Effort,” U.S. Department of State, International Information Programs, Aug. 29, 2002, at <http://usinfo.state.gov/topical/develop/02082903.htm>.
- ³⁵ Ibid.
- ³⁶ Gary S. Becker and Guity Nashat Becker, “NAFTA: The Pollution Issue Is Just a Smokescreen,” in *The Economics of Life* (New York: McGraw-Hill, 1996).
- ³⁷ Milton Friedman, “Foreign Economic Aid: Means and Objectives,” *Yale Review*, No. 47 (Summer 1958), from Chiaki Nishiyama and Kurt R. Leube, eds., *The Essence of Friedman* (Palo Alto, Calif.: Hoover Institution Press, 1987), page 80.
- ³⁸ Brian Ligomeka, “Genetically Modified Food to Save Starving Africans,” Sept. 18, 2002, at <http://www.allafrica.com>.
- ³⁹ Reuters, Aug. 28, 2002.
- ⁴⁰ Hayek, “Competition as a Discovery Procedure,” lecture to the Philadelphia Society, Chicago, March 29, 1968, reprinted in Nishiyama and Leube, *The Essence of Friedman*, page 264.
- ⁴¹ A good history of the lawsuit is available at <http://www.washingtonpost.com/wp-dyn/technology/specials/microsoft/timeline>.
- ⁴² Craig Mundie, “The Commercial Software Model,” speech to the New York University Stern School of Business, Nov. 1, 2001.
- ⁴³ See <http://www.grulic.org.arg>.
- ⁴⁴ See <http://www.camera.it> and <http://www.senato.it>.
- ⁴⁵ Hayek, “Competition as a Discovery Procedure,” page 255.
- ⁴⁶ Virginia Postrel resuscitated Hayek’s term and used it as the title of the second chapter of *The Future and Its Enemies* (New York: Basic Books, 1998).

About the NCPA

The NCPA was established in 1983 as a nonprofit, nonpartisan public policy research institute. Its mission is to seek innovative private sector solutions to public policy problems.

The center is probably best known for developing the concept of Medical Savings Accounts (MSAs). The *Wall Street Journal* called NCPA President John C. Goodman “the father of Medical Savings Accounts.” Sen. Phil Gramm said MSAs are “the only original idea in health policy in more than a decade.” Congress approved a pilot MSA program for small businesses and the self-employed in 1996 and voted in 1997 to allow Medicare beneficiaries to have MSAs. And a June 2002 IRS ruling frees the private sector to have a flexible medical savings account and even personal and portable insurance. A series of NCPA publications and briefings for members of Congress and the White House staff helped lead to this important ruling.

The NCPA also outlined the concept of using tax credits to encourage private health insurance. The NCPA helped formulate a bipartisan proposal in both the Senate and the House, and Dr. Goodman testified before the House Ways and Means Committee on its benefits. Dr. Goodman also helped develop a similar plan for then presidential candidate George W. Bush.

The NCPA shaped the pro-growth approach to tax policy during the 1990s. A package of tax cuts, designed by the NCPA and the U.S. Chamber of Commerce in 1991, became the core of the Contract With America in 1994. Three of the five proposals (capital gains tax cut, Roth IRA and eliminating the Social Security earnings penalty) became law. A fourth proposal — rolling back the tax on Social Security benefits — passed the House of Representatives last summer.

The NCPA’s proposal for an across-the-board tax cut became the focal point of the pro-growth approach to tax cuts and the centerpiece of President Bush’s tax cut proposal. The repeal by Congress of the death tax and marriage penalty in the 2001 tax cut bill reflects the continued work of the NCPA.

Entitlement reform is another important area. With a grant from the NCPA, economists at Texas A&M University developed a model to evaluate the future of Social Security and Medicare. This work is under the direction of Texas A&M Professor Thomas R. Saving, who was appointed a Social Security and Medicare trustee. Our online Social Security calculator (www.mysocialsecurity.org) allows visitors to discover their expected taxes and benefits and how much they would have accumulated had their taxes been invested privately.

An innovative nationwide volunteer campaign called Team NCPA (www.teamncpa.org) is under way to raise awareness of the problems with the current Social Security system and the benefits of personal retirement accounts. Former Sen. Daniel Patrick Moynihan (D-N.Y.), speaking at an NCPA Summers Lecture, said that there is no serious proposal anywhere in the United States that would cut benefits for current retirees.

In the 1980s, the NCPA was the first public policy institute to publish a report card on public schools, based on results of student achievement exams. We also measured the efficiency of Texas school districts. Subsequently, the NCPA pioneered the concept of education tax credits to promote competition and choice through the tax system. To bring the best ideas on school choice to the forefront, the NCPA

and Children First America published an Education Agenda for the new administration, policy makers, congressional staffs and the media. This book provides policy makers with a road map for comprehensive reform. And a June 2002 Supreme Court ruling upheld a school voucher program in Cleveland, an idea the NCPA has endorsed and promoted for years.

The NCPA's Environmental Center works closely with other think tanks to provide commonsense alternatives to extreme positions that frequently dominate environmental policy debates. A pathbreaking 2001 NCPA study showed that the costs of the Kyoto agreement to halt global warming would far exceed any benefits. The NCPA's work helped the administration realize that the treaty would be bad for America, and it has withdrawn from the treaty.

NCPA studies, ideas and experts are quoted frequently in news stories nationwide. Columns written by NCPA scholars appear regularly in national publications such as the *Wall Street Journal*, the *Washington Times*, *USA Today* and many other major-market daily newspapers, radio talk shows, television public affairs programs and public policy newsletters. According to media figures from Burrelle's, nearly 3 million people daily read or hear about NCPA ideas and activities somewhere in the United States.

The NCPA Internet site (www.ncpa.org) links visitors to the best available information, including studies produced by think tanks all over the world. Britannica.com named the NCPA Web site one of the best on the Internet when reviewed for quality, accuracy of content, presentation and usability. NCPA Web sites average 4 million hits per month.

What Others Say about the NCPA

"...influencing the national debate with studies, reports and seminars."

- TIME

"Increasingly influential."

- EVANS AND NOVAK

"I don't know of any organization in America that produces better ideas with less money than the NCPA."

- SEN. PHIL GRAMM

"Oftentimes during policy debates among staff, a smart young staffer will step up and say, 'I got this piece of evidence from the NCPA.' It adds intellectual thought to help shape public policy in the state of Texas."

- FORMER TEXAS GOV. (NOW PRESIDENT) GEORGE W. BUSH

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