

## Science, Technology, and *The Public Interest*

*We are sad to report that the journal The Public Interest closed its doors this spring after forty years. It was provocative, sober, and mature from the start—"a middle-aged magazine for middle-aged readers"—and in time it became widely influential. We at The New Atlantis owe an enormous debt of gratitude to the PI's editors and contributors for their incisive writing, intellectual rigor, and fine example—and we only hope that our little journal will have a fraction of the PI's impact on American intellectual and public life. We find some consolation in the fact that the PI's final editor, Adam Wolfson, has joined the Ethics and Public Policy Center, publisher of The New Atlantis, as a senior fellow.*

*Beginning with its first issue, the PI paid serious attention to the questions raised by modern science and technology—both for public policy and for American culture. It published articles on energy, hospitals, computers, demographics, psychology, the environment, and—with increasing frequency in later years—the biotechnology revolution. The following few excerpts, which we are pleased to offer with the permission of the publisher, give just a small taste of the quality of the PI's work on science, technology, and the character of modern life.*

*—The Editors*

### I. Science, Scientists, and Society

*When discussing The Public Interest, one must start with Irving Kristol. In Spring 2001, the journal published his essay "Is Technology a Threat to Liberal Society?" based on a lecture he originally delivered in 1975. In this excerpt, which remains startlingly relevant, he discusses the moral and political education of modern scientists.*

I hope we will approach this problem [the spread of powerful scientific and technological knowledge] with the intention of preserving our liberal democratic society. But that is going to be extremely difficult. It will involve not the training of better technologists, but rather the moral education of scientists and technologists. And this may well turn out to be the biggest single challenge facing the scientific community—its own moral education, its own assumption of moral responsibility for the use and

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abuse of scientific knowledge. For this, you need an education not in science but in the humanities, because you don't get moral education by studying science. You may acquire good moral habits by studying science, but you don't get a moral education. You don't learn to think about problems of good and evil by studying science. That's what the humanities are for. And scientists, I believe, in the decades ahead, are going to have to become much more attentive than they have been to the humanities, in their own self-defense.

I think there is some loose thinking about this whole problem of scientists, engineers, and their social responsibilities. When scientists say they want to live up to their social responsibilities, what they usually mean is that they want more power than they have; it means they want to run things, to take charge. It's always nicer to run things than to be run by them. But that's not what moral responsibility really means. As a matter of fact I am not all that eager to see scientists get involved in politics per se. I think that with the possible exception of businessmen, engineers and scientists are the worst people I've seen working in politics. Businessmen are used to making decisions. They come to Washington and discover that you can spend ten years in Washington and never have the privilege of making a decision; all you're doing is making compromises with other people who aren't making decisions either. It gets terribly frustrating for them, and they go home, back to a nice easy life where if you say "do something," somebody does it.

Scientists and engineers, on the other hand, have the inclination to think that the world is full of "problems" to which they should seek "solutions." But the world isn't full of problems; the world is full of other people. That's not a problem, that's a condition. Politics exist precisely because the world is full of other people. These other people have ideas, different ways of life, different preferences, and in the end, there is no "solution" to the existence of other people. All you can do is figure out a civilized accommodation with them.

So I am not all that eager to see scientists become active in political affairs. I am, however, concerned to see engineers and scientists become interested in themselves—not in improving the rest of the world, but in facing the tasks of their own self-improvement, and learning how to think about their own responsibilities in a more serious and reflective way, rather than the traditional one: We can solve the problem, just give us the power to do it.

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*In a 1971 article on government funding for scientific research, Carl Kaysen examined the differences between the scientific culture and the democratic culture.*

As much less concrete group of problems, which are at least as important as these more specific questions of funding and organization, center on the difference in fundamental orientation between scientists on the one hand and the democratic public and its government on the other. Is our individualistic, egalitarian, utilitarian society ready to make a place for basic science in terms that will permit it to flourish? Once the public and its political leaders recognize that science is, in [former presidential science advisor] Jerome Wiesner's words, the useless frontier, as well as the source whence flows a stream of technological wonders, will they continue to support it? It is, after all, the former and not the latter aspect of science that concerns the successful academic scientist. His standards are esthetic, not utilitarian. Though he is in many ways an individualist, more than most other Americans he participates intensely in a close community culture, cut off from the rest of his society. This is a culture with strong elitist elements, in which judgments of achievement are sharp, and the gradings of status consequent on them are strong. In our universalistic, democratic, and increasingly egalitarian society, the culture of our political leaders is more and more the popular culture of the society. Once academic science is stripped of its utilitarian façade, how well will the representatives of American popular culture be able to provide the sympathy for and understanding of it that are the preconditions of continued public support?

*Science and government move at different speeds and have very different modes of operation. Sometimes, the deliberative character of public policymaking serves as a necessary check on "trendy" science. In other cases, however, the slow responsiveness of government to new modes of science has pernicious consequences, as David Salsburg and Andrew Heath showed in their 1981 article, "When Science Progresses and Bureaucracies Lag—The Case of Cancer Research."*

The notion that the progress of science and technology may unwittingly threaten human life is central to the argument for health and environmental regulations. Such a threat can exist, and justifies some sort of government control. But what are we to do when science progresses still further and finds that the apparent threats to health do not exist, or

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are very much smaller than originally thought? Unfortunately, government regulations and practices change and advance much more slowly than do the research findings of the scientific community, and this leaves a wide gap between the consensus of responsible scientists and those in government. The current state of cancer research is a good example of how this gap can develop and widen, ultimately confusing and harming the American public. . . .

A new scientific and philosophical framework is obviously needed. The concept of carcinogenesis proposed in 1954 is in need of modification, or at least refinement, to accommodate the inconsistent patterns of lesions produced by high doses of chemicals in aged rats and mice. What appears in the animal studies is not at all what was predicted . . . in 1954. One proposal suggests carcinogenesis only be considered when it occurs at moderate doses in healthy, robust animals. Another proposal would consider carcinogenesis only when it is induced by chemicals acting directly on the hereditary mechanism of the living cell. Both proposals would avoid the confusion of “background noise” in testing as it is carried out today. However, these and other proposals have been ignored by the political and regulatory process.

By allowing its old “truths” to set into a rigid matrix, the regulatory authorities run the danger of being unable to adjust even when a new framework is defined. . . . Our only hope is that the bureaucracies of the government might have the courage and honesty to admit that they can be wrong in their fundamental assumptions. Progress in scientific knowledge has always depended upon the ability of scientists to realize when they have made mistakes. A good scientist knows that he will make mistakes because he is exploring the unknown. If government bureaucracies are going to explore the unknown, they also must be prepared to acknowledge their mistakes.

*During The Public Interest's four decades of publication, there were tremendous advances (or changes) in the study of the mind—from new trends in psychology to the birth of modern neuroscience. Some of the most contentious debates related to psychometrics, especially the study of IQ. In 1983, Bernard Davis wrote a PI review of Stephen Jay Gould's book on human intelligence, The Mismeasure of Man, along with an analysis of the effects of Gould's politics on his science. The journal later published a response from Gould, in which he called Davis's review “poorly argued in its general claims and factually false in its specific charges” and “extraordinarily unfair, even cruel, in its personal character-*

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*izations.” Putting aside the specifics of their disagreement, Davis’s larger analysis of the political temperament of modern scientists is worth revisiting.*

In fact, the key to the success of the scientific enterprise is its passionate dedication to objectivity: Its advance depends on accepting the conclusions dictated by verifiable observations and by logic, even when they conflict with common sense or with treasured preconceptions. To be sure, some years ago Marxist philosophers, generalizing from the influence of social and economic arrangements on many aspects of our behavior, initiated an attack on the objectivity of science. Moreover, this view has become rather widely accepted in the social sciences. But the study of the genetics of intelligence is a part of natural science, rather than of social science, even though its findings have relevance for social questions. If the science is well done it will tell us objectively what exists, without value judgments; these judgments will arise only in the social applications of that knowledge. For example, insights into the range and distribution of abilities do not tell us how much of our educational resources to devote to the gifted and how much to the intellectually handicapped; this knowledge simply improves our recognition of the reality with which we must cope.

The main source of confusion here is that the word “science” is used with three different meanings, in different contexts: science as a set of activities, as a methodology, and as a body of knowledge. The *activities* of a scientist certainly depend heavily on non-objective factors. These include the resources and the incentives that a society provides for pursuing particular projects, and also the personal choice of problems, hypotheses, and experimental design. The *methodology* of science is much more objective, but it is also influenced by fashions in the scientific community. The *body of scientific knowledge*, however, is a very different matter. Its observations and conclusions, after having been sufficiently verified and built upon, correspond to reality more objectively and reliably than any other form of knowledge achieved by man. To be sure, attachment to a cherished hypothesis may lead a scientist into error. Moreover, at the cutting edge of a science, contradictory results and interpretations are common. But the mistakes are eventually discarded, through a finely honed system of communal criticisms and verification. . . .

Accordingly, however much the findings in some areas of science may be relevant to our social judgments, they are obtained by a method designed to separate objective analysis of nature from subjective value

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judgments. Long experience has shown that when these findings are well-verified, they have an exceedingly high probability of being universal, cumulative, and value-free. Gould, however, treats the history of science like political history, with which his readers are more familiar: a history in which human motives and errors from the past will inevitably recur. He thus skillfully promotes a doubt that the biological roots of human behavior can ever be explored scientifically. . . .

In effect, we see here Lysenkoism risen again: an effort to outlaw a field of science because it conflicts with a political dogma. To be sure, the new version is more limited in scope, and it does not use the punitive powers of a totalitarian state, as Trofim Lysenko did in the Soviet Union to suppress all of genetics between 1935 and 1965. But that is not necessary in our system: A chilling atmosphere is quite sufficient to prevent funding agencies, investigators, and graduate students from exploring a taboo area. And such Neo-Lysenkoist politicization of science, from both the left and the right, is likely to grow, as biology increasingly affects our lives—probing the secrets of our genes and our brain, reshaping our image of our origins and our nature, and adding new dimensions to our understanding of social behavior. When ideologically-committed scientists try to suppress this knowledge they jeopardize a great deal, for without the ideal of objectivity science loses its strength.

Because this feature of science is such a precious asset, the crucial lesson to be drawn from the case of Stephen Jay Gould is the danger of propagating political views under the guise of science. Moreover, this end was furthered, wittingly or not, by the many reviewers [of Gould's book] whose evaluations were virtually projective tests of their political convictions. For these reviews reflected enormous relief: A voice of scientific authority now assures us that biological diversity does not set serious limits to the goal of equality, and so we will not have to wrestle with the painful problem of refining what we mean by equality.

In scientific journals editors take pains to seek reviewers who can bring true expertise to the evaluation of a book. It is all the more important for editors of literary publications to do likewise, for when a book speaks with scientific authority on a controversial social issue, the innocent lay reader particularly needs protection from propaganda. Science can make a great contribution toward solving our social problems by helping us to base our policies and judgments upon reality, rather than upon wish or conjecture. Because this influence is so powerful it is

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essential for such contributions to be judged critically, by the standards of science.

*The IQ debate reached its peak with the 1994 publication of The Bell Curve by Richard Herrnstein and Charles Murray. Leon Kass reviewed their book in 1995, reflecting on the limits and deformations of value-neutral social science for how we think about human affairs.*

Nearly 400 years ago Descartes invented the mathematical notion of quantity, usable everywhere, to make possible the grand project of modern science, ultimately useful for the conquest of nature. He asked readers to forget their interest in the being of things, for example, of color. What harm would there be, he asked, if we *represented* the *differences* among red, white, and blue as being *like* the differences of three geometrical figures? Plenty of harm: from there it was but a short intellectual step to reducing color colorlessly to wavelength, a move which does provide us predictive power and some control but only at the cost of a shrunken, abstracted, and distorted understanding of ourselves and the world in which we live.

Mysteriously, science's reductive approach works—both in general and here with IQ. Strangely, even though psychometry is deliberately indifferent to the *psyche* that it measures, its measurements do more or less accurately capture some abstractable features of intellect, whatever it is. Yet, the predictive power of knowing IQ for any individual is, as Herrnstein and Murray readily agree, very limited: everyone's fate turns on much more than measurable "cognitive ability." And IQ's statistical predictive power for populations is at once not very surprising and not very deep, given that the dependent variables with which IQ is correlated are likewise mainly quantitative and abstract.

The numbers correlate partly because the world has been reconceived in terms of our reductive modern science, of which the science of psychometrics is itself a part. In a world conceptually and technologically recreated on the basis of mathematical physics, whose truths are found by reducing quality to quantity and manipulating it through equations, and in a world run by people who reduce all thinking to problem-solving, small wonder it is that the problem-solving sort of intelligence confers some selective quantitative advantage, other things being equal.

Other things are not always equal. Indeed, as the authors point out, success in life—even success as reductively measured by social scientists—depends on many things, external and internal. Statistical

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correlation is not yet causation, certainly not in individuals, not even in groups. All things importantly human resist scientific simplification. Some aspects of intelligence may be assessed quantitatively, but what, for example, about character?

Character—the habits of the heart, the disposition of our loves and hates—surely counts a great deal for keeping a job, obeying the law, caring for one’s children. Granted, a strong back and a willingness to work hard may not get one as far today as it once did. Granted, character may even depend somewhat upon intelligence: the ability to love and choose the right thing depends partly on the ability to discern it and largely on having been reared by people smart enough at least to provide adequate moral education. Still, one would have liked the authors to acknowledge the centrality of character as the cause of conduct and to confess the inability of quantitative social science to treat it properly. Where the authors do brush up against the topic, they are in over their heads. . . .

Scientists Herrnstein and Murray deceive themselves into thinking that the world can treat intelligence “as just a noun, not an accolade.” No one takes the term “stupid” as a neutral descriptive, much less as a compliment; as the authors themselves show repeatedly and emphatically, “smarts”—not virtue—are increasingly the prized coin of the realm. Also, almost no one is entirely able to keep statistically based stereotypes of a group from influencing their perceptions or expectations of its individual members, especially for those whose membership in the group is visible at a glance, knowable before anything else can be known about them. The authors claim, speaking, it seems, only for their highly rational selves, that it “matters little” whether the now-considerable black-white difference in IQ is environmental or genetic in origin: “We cannot think of a *legitimate argument* why any encounter between *individual* whites and blacks *need be* affected by the knowledge that an aggregate ethnic difference in measured intelligence is genetic instead of environmental” (my emphasis).

But life as lived is based not on “legitimate arguments” but on opinions and prejudices; and “need not be” rarely translates into “will not be.” Precisely because most people do not—and probably cannot and will not—refrain from stereotypical thinking, and precisely because intelligence is so central to our humanity, it cannot be good for living together to go around broadcasting the low group IQ of blacks or Hispanics, or of Poles or Slovaks, for that matter. Few individuals (smart or dumb) belonging to such a group, “known” or “thought” to be intellectually inferior—



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even if through no fault of its own—are likely to live unencumbered by such opinions, once it becomes noised about and taken as truth.

Murray, in a *Wall Street Journal* article responding to his critics, defends the decision to publish against the charge of irresponsibility:

We said to ourselves that the question of irresponsibility must finally be determined by truth. As Mr. Herrnstein said shortly before his death: If what we say in *The Bell Curve* is not true, then there would be no responsible time to publish it. If what we say is true, there is no irresponsible time to publish it.

However admirable the sentiment, I can think of no more telling indictment of our value-neutral social science. Having banished virtue and justice from its field of study, it blindly confuses the factual with the good. A truer wisdom about human affairs knows when and how to speak, and when to keep silent.

*Most of Leon Kass's work in The Public Interest was an attempt to explore the human significance of the coming biotechnological revolution—and to lay the groundwork for a richer bioethics that reexamines perennial questions about human nature and human dignity. These articles also include insights into the character of modern science, like the following reflection on the effect of new baby-making techniques—and of scientific research generally—on the way we see our place in the world. The following brief excerpt is from his classic 1972 essay, "Making Babies—The New Biology and the 'Old' Morality."*

**F**inally, there may well be a dehumanizing effect on the scientist himself, and through him, on all of us. The men who are at work on new beginnings in life are out to subdue one of the most magnificent mysteries, the mystery of birth and renewal. To some extent, the mystery has already been subdued. Those who do *in vitro* fertilization are in the business of initiating new life. To the extent that they feel that there is nothing unusual or awesome in what they are doing, to that extent they have already lost the appreciation of mystery, the sense of wonder. The same can be said of the heart surgeon who sees the heart simply as a pump, the brain surgeon who sees the brain simply as a computer, or the pathologist who sees the corpse simply as a body containing demonstrable pathology. The sense of mystery and awe I am speaking of is demonstrated by most medical students on their first encounter with a cadaver in the gross anatomy laboratory. Their uncomfortable feeling is more than squeamishness. It is a deep recognition, no matter how inartic-

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ulate, that it is the mortal remains of a human being in which they are to be digging; ultimately it is a recognition of the mysterious phenomena of life and death. The loss of this sense of awe occurs in a matter of days or weeks; mastery drives out mystery in all but a very few.

There is, I admit, no reason in principle why the sense of mystery needs to be lost by the increase of knowledge or power. And, indeed, in the case of the great men of science knowledge served to increase rather than to decrease their sense of wonder and awe. Nevertheless, for most ordinary men of science and technology, and probably for most men in this technological age, once nature is seen as or transformed into material and given over to their manipulation, the mystery and the appreciation are gone. Awed by nothing, freed from all so-called superstitions and so-called atavistic beliefs, they practice their power without even knowing what price they have paid.

## II. Invention and Modern Life

*The very first issue of The Public Interest, in Fall 1965, dealt with what seemed to be the most pressing issue posed by technological advancement—"the great automation question," with essays by Robert L. Heilbroner and Robert M. Solow. In this excerpt from "Men and Machines in Perspective," Heilbroner examines the unemployment crisis that automation and mechanization were expected to cause.*

It is curious that technological unemployment has always been the intellectual stepchild of capitalism. One would think that nothing would have so interested economists as the economic impact—and above all, the impact on labor—of machines that suddenly alter the speed, the technical requirements, the human relationships, not to mention the end products, of the economic process. Instead, a consideration of technology in any guise has always made economists uncomfortable, and the thought of technology as a labor-affecting force has simply been too much for most of them. There was Marx, of course, who put technology and its labor-displacing effects into the very center of his diagnosis of capitalism, but no one paid any attention to him. Alfred Marshall and John Maynard Keynes, the two greatest economists of mature capitalism, managed to conduct their inquiries without admitting the subject of technology at all. Only in the underworld of economic thought, in the intellectual descendents of the Luddites, do we find a persisting concern with machines as things that do man's work and thereby

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lessen the need for his labor. But to the great majority of recognized economists these rude doubts remained as inadmissible as they were unexamined.

In itself, this is no doubt a subject for fruitful investigation—the problems society avoids are usually significant. But the long neglect of technology as a labor-displacing force also has an immediate relevance for our subject. It helps explain why automation catches us so intellectually unprepared. The necessary empirical data concerning technology, the essential statistical indicators of its impact on employment, simply do not exist, or are only now being hurriedly assembled. More important, in regard to the most elementary problems of theory—which is to say, in regard to the question of how to think about the question of technological unemployment—we find the same fuzzy notions, or the same dogmatic assertions masquerading as thought, that thirty-five years ago characterized our first attempts to explain the Great Depression.

So it is not surprising that the debate on automation is something less than a model of clarity. On the one hand we have the bland assurances of the Establishment that technological unemployment has never been more than a “frictional” problem for the economy; on the other hand, organizations with chilling names like “cyberculture” schedule the arrival of Total Unemployment for the day after tomorrow. In this fruitless exchange, two things are essentially missing. First, we lack some very important knowledge, the nature of which I will have a chance to point out as we go along. Second, we lack some kind of framework, compounded of history and theory, into which to put the current debate. . . .

But I suspect that the main line of defense against unemployment, whether caused by the incursion of technology or by the burgeoning of the labor force, will have to come from a different direction. What is needed above all is a new expansive group of employments to offer the same absorptive cushion once given by office and service jobs. And if this is the objective, it is not difficult to know where to look to find such employments. We have merely to ask ourselves: what tasks in society are clearly and admittedly undermanned? The answer is provided by every city, in its shortage of adequate housing, its unbeautified and ill-maintained streets and parks, its under-protected citizens, under-educated children, under-cared for young and old and sick. The trouble is, of course, that all these employments, the need for which seems incontestable, require for their realization vast new funds for the public or private philanthropic agencies if they are to be tomorrow’s employers of today’s unemployed. If those funds

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are to be sufficient to rebuild the warrens of our cities, and to offer good work to the five to ten million who seem the minimal number of the otherwise unemployed, what is needed is nothing less than a whole new attitude toward the appropriate public-private mix for the peace-time economy.

There will be difficulty enough in creating such a new attitude in time to meet the inrush of technology and the pressure of the growing labor force. Yet in this essay that covers so much ground, albeit so casually, it must be admitted that even this necessary redirection of social effort is only a palliative. In the end, as machines continue to invade society, duplicating greater and greater numbers of social tasks, it is human labor itself—at least, as we now think of “labor”—that is gradually rendered redundant. The underworld of economic thought, where wish and fantasy often take the place of thought and fact, is nonetheless right in its basic premonitions. The machine does challenge man, mechanical energies do replace human energies, the harnessing of nature does imply the releasing of humanity. The question is—and it is not too early to ask it, even though the answers be only visions for the future—for what is it to be released?

*George A. Miller examined another aspect of the automation question in the journal's second issue: the incredible potential of computers. He was pessimistic about some of the promises made for “thinking machines”—which made him optimistic about the human future.*

**W**e have recently heard a great deal about the disruptive effects of computing machines on our social and economic institutions. In industry, computers mean automation, and automation is supposed to mean unemployment. The United States, with its extravagant investment in computers, is plagued by unemployment for unskilled workers; it is frequently argued that these facts are causally related. Already the computers have begun to displace workers whose tasks are simple and repetitive; clerical workers, workers on assembly lines, and the like. The variety of jobs formerly done only by humans that the machine can perform more rapidly, accurately, and economically increases with each new generation of computers. If we extrapolate this trend, say the pessimists, we are faced with the prospect of mass unemployment for all but a handful of highly trained, highly intelligent professionals, who will then be even more influential and over-worked than they are at present. Only recently a distinguished English physicist predicted that within twenty years electronic engineers might have to become conscientious objectors in order to

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prevent these pernicious machines from wrecking our social and economic institutions.

According to the prophets of doom, our situation is hopeless. The computer is already stirring up industrial strife as management desires and labor resists the effects of automation. Great masses of people will soon be unemployed, and the devil will surely find work for their idle hands. The gap between advanced and developing nations will increase, thus heightening international tensions. People will become demoralized when the personal identification and self-respect that work confers is suddenly withdrawn. The educational system will be unable to educate citizens for life in the Leisure State. All the industrial and commercial machinery of production and distribution of commodities will have to be taken over by the state, which will lead inevitably to tighter economic controls or even dictatorship. And so on and on runs this hopeless catalogue. I find it difficult to state these awful anticipations convincingly, because I do not believe in them, but those who do believe can make Aldous Huxley's *Brave New World* and George Orwell's *1984* sound like optimistic promises of salvation.

What can we do about it? It is foolish to dream of reversing history. We cannot pass laws forbidding science and technology. The computing machines are here, and they will not merely stay; they will grow bigger, faster, and more useful every year. They will grow because engineers want to build them, scientists want to use them, industrialists want to employ them, soldiers want to enlist them in new weapons systems, politicians want their help in the processes of government. In short, they will flourish because they enable us to accomplish tasks that could never before have been undertaken, no matter how many unskilled laborers we might have set to work. Computers will continue to amplify our intelligence for just the same reason that engines continue to amplify our muscles. The question we must ask is not whether we shall have computers or not have computers, but rather, since we are going to have them, how can we make the most humane and intelligent use of them?...

In the future we will become increasingly better able—on the basis of our increasing understanding of what men can and cannot do—to use machines to supplement our own competencies. Surely, this prospect is nothing to inspire dread or despair. In my private catalogue of absurdities, I put the man who fears the mechanical aids of the future along with the teacher who fears the printing press because its books may put him out of business. If it is possible to spare ourselves the onerous mechanical chores,

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we will be just that much freer to do those things that only human beings can do, or want to do. I expect that the division of labor between men and machines, described in the most general terms, will ultimately correspond to a division between finding problems and solving them, but exactly what I mean by that distinction is not yet clear, even to me.

I am, as you can see, an optimist about the future course of the industrial revolution. I do not grant that the introduction of computing machines has changed the larger historical trend of technological progress, or that we are any less able to cope with the consequences of this new advance than we have been to cope with the inventions of the past. But it is obviously the case that all our imagination and good will will be needed to ensure that these new machines serve the public interest; and that we shall have to modify our social, economic, and educational institutions to harmonize with a future that we all know is coming.

*In his 1971 essay "Making the Future Safe for Mankind," E.J. Misham discussed the thoughtless acceptance of the notion that technological acceleration leads to the good life. In particular, he made the following incandescent attack against the automobile.*

Once wrote that the invention of the automobile was one of the greatest disasters to have befallen mankind. I have had time since to reflect on this statement and to revise my judgment to the effect that the automobile is *the* greatest disaster to have befallen mankind. For sheer, massive, irresistible destructive power, nothing—except perhaps the airliner—can compete with it. Almost every principle of architectural harmony has been perverted in the vain struggle to keep the mounting volume of motorized traffic moving through our cities, towns, resorts, hamlets, and, of course, through our rapidly expanding suburbs. Clamor, dust, fume, congestion, and visual distraction are the predominant features in all our built-up areas. Even where styles of architectures differ between cities—and they differ less from year to year—these traffic features impinge so blatantly and so persistently on the senses that they submerge any other impressions. Whether we are in Paris, Chicago, Tokyo, Dusseldorf, or Milan, it is the choking din and the endless movement of motorized traffic that dominate the scene.

I need not dwell on our psychological dependence on the automobile. It is the very staple of automobile advertisements to depict it as a thing with sex appeal, to depict it as a status symbol or as a virility symbol. And,

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over the decades, as the automobile population has grown, along with vast industrial empires that produce and cater to it, the annual sales of new cars has become a separate indicator of the “prosperity” of the economy. We have, that is, mesmerized ourselves also into the belief that we are economically dependent upon the automobile.

Our physical or environmental dependence upon this vehicle is, however, in fact the direct result of its adoption. Our cities and suburbs have, in consequence, expanded without pause for the last quarter of a century, and have promoted a demand for massive road-building projects that encourages the flow of traffic—which, in turn, further promotes the demand for traffic projects. Because the motorist wants to see everything worthwhile from his motor car, the choicest bits of the countryside tend to be built over. The motorist wishes to “get away from it all” and the highway-builders, in an attempt to provide him with the means to do so, succeed ultimately in ensuring that it is virtually impossible to get away at all. And believe me, people do need to get away. The one economic activity showing really impressive postwar growth is the creation of places we all want to get away from.

One could go on, for the extent of the automobile’s subversive influence is unlimited. Robbery, crime, violence all today depend heavily on the fast get-away car. Motorists kill off other people at the rate of 130,000 a year (55,000 a year in the United States alone), and permanently maim over a million. Through the emission annually of millions of tons of foul gases the automobile’s contribution to sickness and death from cancer and from bronchial and other disorders is just beginning to be understood. What, in contrast, is already fully understood—but about which, for commercial reasons, nothing at all is being done—is the connection between air and automobile travel and the greatest holocaust of natural beauty since the beginning of history. The postwar tourist blight has ravaged the once-famed beauty of almost every resort along the coast-line of the Mediterranean, and much of the hinterland besides.

And not only has the physical environment and the economic structure of each Western country been transmogrified to accommodate this infernal machine, but inevitably also our whole style of life—the sort of food we eat, the clothes we wear, the way we court, the forms of entertainment, all bear its stamp. Indeed, our speech, our manners, our health, and our character have been molded, cramped, distorted in order to maintain the momentum of an industry whose chief visible achievement has been to transform a society of men into a teeming swarm of motorized locusts

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that have already eaten the heart out of their towns and cities, and now scurry hungrily over the captive earth along bands of concrete spreading in all directions. The better life we overtly aspire to—and the ease, space, leisure, beauty, and intimacy that are conceived as essential features of such a life—can never be realized in the automobile economy.

In view of their far-reaching and interrelated influences on modern society, a proposal to evaluate the full range of the spillover effects of the automobile cannot be seriously contemplated. A large political decision is called for: Either continue to build roads and automobiles until “something gives,” or in some degree to de-escalate—that is, to promote a changeover from private to public transport and to direct the resources released from automobile production and maintenance to the rehabilitation of our cities, suburbs, towns, and villages. . . .

Increased mobility is not a force making for increased friendship, least of all when one is for the most part encapsulated in one’s automobile. A person can extend the number of his acquaintances indefinitely without really caring for any of them. A week in the mountain hotel, a package tour in the Mediterranean, may have its moments of elation—though the borderline between elation and anxiety is sometimes difficult to define. But there is time enough only to throw postures, to go through the conventional motions of revelry, and hope that something or somebody will turn up. The flurry of emotions, the stylized infatuations, that such opportunities offer to the young, and the would-be young, do not have any affinity with the serenity of spirit with which I am concerned. As the late Somerset Maugham observed, “We never know when we are happy; we only know when we *were* happy.” And part of the reason is simply that (*pace* the American Declaration of Independence) the pursuit of happiness is a fruitless enterprise. For the state of happiness is one that cannot be directly realized, least of all by trying. It appears, to quote the late Aldous Huxley, “only as a by-product of good living.” And good living, in this context, means neither fleshpots nor sanctity, but something akin to Plato’s ideal of harmonious living. It presupposes a dependable institutional and moral framework held together by common beliefs; one that establishes an external order that does no violence to man’s internal order; one which permits his instincts to range without hurt to himself or others. In particular, a society congenial to man is one that strengthens his roots in the earth and makes him a part again of that eternal rhythm of nature in which there is time enough for things to grow slowly; in



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which there is time enough for trust between people to form; in which there is time to learn to care, and time to wonder and to perceive beauty.

If there is any truth in these reflections, it should be apparent that further economic growth predicated on accelerating technical change can only take us farther from the good life. Can one reasonably hope for an easy, open-hearted relationship with one's fellows in a highly competitive and mobile society, where work has become an endless struggle for material rewards and status? The indispensable ingredient of such a relationship is mutual trust, a quality that was nurtured in the pre-industrial small-scale society held together by overt mutual dependence. The resulting intimacy arising from this close personal interdependence, is the first casualty of technological growth. For in the unending search for greater efficiency, technology seeks expressly to emancipate men from direct forms of dependence on one another. Machines come to mediate between them, and they come to depend ultimately for their wants, not on the care of others, but on a row of buttons and switches.

Unavoidably, then, technological progress provides men increasingly with the elegant instruments of their mutual estrangement, and thus constricts further the direct flow of understanding and sympathy between them.

*In 1977, Michael J. Robinson discussed the effects of television on American politics, especially on the shifts in the political climate from "from conservative to liberal and back to conservative." He concluded that television had so far had no damaging effect on American political life.*

Against the backdrop of the widespread fears and hopes of the 1950s and 1960s, national television has had more varied and more subtle effects on the political process than many had originally predicted, and some still believe. Television ad campaigns have never had the direct mesmerizing effect on voters that people once assumed; network news has not often made or broken public opinion overnight; entertainment television has not really served to anesthetize or conventionalize the national electorate. Given the original expectations and the actual developments, perhaps the best single word to describe these effects would be "ironic."

Television journalism has helped to make us more aware of domestic politics, to activate our latent sense of ideology, and to make us more sensitive to what the national government has been doing for the last twenty years—in that, it has ironically exerted a conservative influence. Entertainment television has helped give us insights into the traditional

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social values we have maintained longer than most other Western societies—in that, it has exerted a liberal influence.

If there is a common denominator between the effects of television journalism and entertainment television, it is perhaps that television in general has been *de-romanticizing* both government and social institutions for a long time. Television obviously does not offer reality, but it now moves more and more away from romanticism in news and entertainment. Interestingly enough, de-romanticizing government gets billed as conservatism; de-romanticizing society gets labeled as liberalism. But what is crucial is the tendency to denigrate, overtly in news or covertly in drama, the notion that either government or our common American social institutions are virginal. The final irony may be that television, on balance, has been “bipartisan” in its de-romanticizing. A little left socially and a little right politically puts us somewhere near the place we started.

In keeping with this theme of balance, one might conclude that television has not overwhelmingly proved to be either a public benefit or a public nuisance. At various times it has clearly been both. Free television, like the free press, remains a case study for cost-benefit analysis. It may be that we got a better deal from free press than from free television—but I’m not even sure of that. After all, television has not done badly as an institution, as far as its popularity, imaginativeness, success, or durability are concerned; at times, it has enriched our lives and made us more aware of and concerned about our politics and our government. But television is television—and television news is essentially television, too. Perhaps the one conclusion that should be drawn is that in a free society, *the medium providing the major source of both news and entertainment must fundamentally influence the public, the government, and the relationship between them.* It would be hard to argue that television has not profoundly altered our politics in the last two decades. It would be ludicrous to think that television will not be a major factor in the next two decades as well, as it moves itself and us from theme to theme.

*In recent years, another technology has begun to shape American politics: the Internet. In 2002, Yuval Levin argued that the speed of online discourse, especially on blogs, is not always conducive to wisdom in politics and government.*

A third way in which the Information Age may create difficulties relates to the pace of politics. Put simply, politics will largely be more of the same, but *faster*. Information technologies eliminate obstacles and reduce

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frictions in the various stages of political action, and this means that political action will tend to be more immediate. Political leaders may not be more decisive, but they will be subject to a more furious flow of information, interests, and pressures. Leaders and citizens alike will need to act with greater speed to keep up, and both will be forced to make hastier judgments.

There are certainly situations in which faster is better. A system quicker to react to pressure is more responsive and more representative. And since events in general now seem to move faster than ever, it may be good that our political system can keep up. But for most political deliberation and thoughtful policymaking, faster is not better. The delays that occur at every step of the American political process give us time to think and rethink, to reason, consider, and decide. They allow time for opposing views to be raised, for research to be conducted and presented, for perspectives to change and true priorities to become clearer. By drastically diminishing the element of time in politics, the Internet will lead to careless decision-making. The shrinking “sound-bite,” which tends to suck the content out of media coverage of political issues, has already given us a sense of what the loss of time can mean in politics, and the instantaneity of the Internet threatens to make this condition worse.

Consider one form of the instant decision: “instant polling dials.” Voters are placed in a room and asked to move a dial in response to what they hear the candidates say. They must react instantly, and thus their responses are pure gut reactions. The results, displayed as lines upon the screen, are said to be indicative of voter attitudes. The assumption behind this method is that the instant reaction, not the reasoned judgment, is what counts. In the Information Age, this assumption may grow increasingly true.

Another example of the quickening of politics in the Information Age—and its mixed consequences—can be found in the first real new political institution of the Internet: the “blog.” Many blogs—or “web logs,” online diaries and sites of instant commentary and opinion—are homes for genuine political reflection. And in their interactions with one another, bloggers sometimes resemble a genuine community of citizens. However, this burgeoning institution embodies many of the Internet’s deficiencies: It often has the feel of an echo-chamber; it is placeless; and it thrives on instant responses to the latest events. Above all, blogging is immediate. This is part of its charm, for both the writer and the reader. But it is also its greatest drawback as a forum for political discourse and

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action. Blogging is a new outlet for political opinion, but for the most part it is unreflective opinion. Insulated from refining influences and institutions and unconnected to the direct political life of any particular place, blogging is mere instantaneous reaction. But the institutions of political life exist, to a great extent, to mediate, and hopefully to elevate, public opinion. This is why their practical effect is often to slow things down, and why the rise of unmediated institutions like blogging is a mixed blessing at best.

The narrowing of interests and the shrinking of distances will further intensify the quickening of our politics. Those citizens who are interested in politics will know just what they want and will demand it right away, and a system free of the shackles of distance and place will respond quickly to such demands.

The framers of the Constitution certainly perceived a need for dispatch and energy in government, and the system they designed reflects that concern in some respects, particularly in its relation to foreign nations. But at the same time, they understood the danger of too much speed in politics. In its internal operations, the American system seems designed to work at a snail's pace, to avoid, as Alexander Hamilton put it, "haste, inadvertence, and a want of due deliberation." The politics of the Information Age will break down these barriers to haste.

### III. Technology and Its Discontents, At Home and Abroad

*In our own minds and in the eyes of the world, industry and innovation are linked as supremely American characteristics. But what does it mean for America to be a modern technological society? This was one of the questions asked by Public Interest co-founder Daniel Bell in his 1976 book, The Coming of Post-Industrial Society. In 1967, he presented some preliminary ruminations on the subject in a collection of "Notes on the Post-Industrial Society." In this excerpt, he discusses the technocratic mindset.*

Saint-Simon, the "father" of technocracy, had a vision of the future society that made him a utopian in the eyes of Marx. Society would be a scientific-industrial association whose goal would be the highest productive effort to conquer nature and to achieve the greatest possible benefits for all. Men would become happy in their work, as producers, and would fill a place in accordance with their natural abilities. The ideal industrial

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society would by no means be classless, for individuals were unequal in ability and in capacity. But social divisions would follow actual abilities, as opposed to the artificial divisions of previous societies, and individuals would find happiness and liberty in working at the job to which they were best suited. With every man in his natural place, each would obey his superior spontaneously, as one obeyed one's doctor, for a superior was defined by a higher technical capacity. In the industrial society, there would be three major divisions of work, corresponding, in the naïve yet almost persuasive psychology of Saint-Simon, to three major psychological types. The majority of men were of the motor-capacity type, and they would become the laborers of the industrial society; within this class, the best would become the production leaders and administrators of society. The second type was the rational one, and men of this capacity would become the scientists, discovering new knowledge and writing the laws that were to guide men. The third type was the sensory, and these men would be the artists and religious leaders. This last class, Saint-Simon believed, would bring a new religion of collective worship to the people that would overcome individual egoism. It was in work and in carnival that men would find satisfaction; and in this positivist utopia, society would move from the governing of men to the administration of things.

But in the evolution of technocratic thinking, things began to ride men. For Frederick W. Taylor, who—as the founder of scientific management—was perhaps most responsible for the translation of technocratic modes into the actual practices of industry, any notion of ends other than production and efficiency of output was almost nonexistent. Taylor believed strongly that “status must be based upon superior knowledge rather than nepotism and superior financial power,” and in his idea of functional foremanship he asserted that influence and leadership should be based on technical competence rather than on any other skills. But in his view of work, man disappeared, and all that remained was “hands” and “things” arranged, on the basis of minute scientific examination, along the lines of a detailed division of labor wherein the smallest unit of motion and the smallest unit of time became the measure of a man's contribution to work.

In the technocratic mode, the ends have become simply efficiency and output. The technocratic mode has become established because it is the mode of efficiency—of production, of program, of “getting things done.” For these reasons, the technocratic mode has spread in our society. But

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whether the technocrats themselves will become a dominant class, and in what ways the technocratic mode might be challenged are different questions.

*By the late 1960s, American preeminence in science and technology and America's booming economy led to discussions about Europe's comparable decline. Robert Gilpin discussed this in his Winter 1968 essay "European Disunion and the Technology Gap."*

In late 1964, President Charles de Gaulle of France circulated to the members of his government a study which warned that France, and indeed all of western Europe, must either adapt to the contemporary scientific-technological revolution or risk economic and political subjugation by the world's foremost scientific power, the United States. The independence of France, de Gaulle warned, was being threatened by the technological gap between the United States and western Europe. He declared that, unless France took appropriate steps to meet this challenge, she would become a relatively underdeveloped nation in a world dominated by scientific superpowers.

In the three years since de Gaulle's warning, the issue of the technological gap has become a sore point in American-European relations and a rallying cry among the Europeans. Europeans are almost unanimous in their opinion that the technological gap is real, is threatening to their long-term well-being, and is widening. It was in response to this generally shared European concern that Prime Minister Harold Wilson declared that Europe is threatened by an "industrial helotry" and that Europe needs Britain's scientific and technical capabilities if it is to meet the American challenge.

For Washington, on the other hand, the technological gap is an official nonissue. When Europeans bring it up, which they frequently do, American responses normally take one of several forms. The usual official American response is to reply that the problem is not really a technological gap but a managerial gap or an organizational gap—or, as former Commerce Secretary John Connor put it, an "industrial disparity." On other occasions, American officials will grant that a technological gap of some sort exists, but then go on to point out to the Europeans that it is their problem, not ours. Most ingenious of all is a response which goes like this: "Look! You Europeans do what you're good at, and we'll do what we're good at. You French stick to your wine-making and perfumes; leave the computers and high-performance aircraft to us." American academic economists, who tend

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to share the official position on the technological gap, phrase this in more sophisticated terms. Committed to the doctrine of free trade and the principle of comparative advantage, these American economists point out that the technological gap represents a rational division of labor among the members of an emerging Atlantic economic system.

Actually the expression “technological gap” symbolizes many things which trouble Europeans. In the first place, it symbolizes American leadership in basic scientific research. Another element is the European dependence on the United States for advanced technologies and especially those technologies of military significance: computers, electronics, atomic energy, and aerospace. A third aspect is the “brain drain” of European engineers and scientists to the United States. And fourth, the expression “technological gap” is a shorthand for all the European concern about the invasion of western Europe by large American corporations whose financial and managerial resources are seen to be far greater than those of their European competitors.

Imbedded in these European anxieties are many practical and theoretical issues to which economists and political scientists have no clear answers. For example, does a strong, national capability in basic research confer an advantage in technological innovation, or do the findings of basic research become a free good equally available to all? Second, what is the role of technological innovation in economic competitiveness? Is innovation displacing price as a factor in economic competition, as the French believe? Or third, what is the effect on western Europe of the movement of European scientists westward and of American corporations eastward?

*In the Summer 1968 issue, Theodore Levitt responded to Gilpin—arguing that Europe’s economic woes weren’t the result of scientific-technological inferiority but instead a deeper set of cultural problems. The following is an excerpt from his article “The Gap is Not Technological.”*

**T**he fact that the creation of new knowledge is not essential to, or a guarantee of, economic success can be demonstrated in Europe itself. In the aerospace and other high-technology areas, during recent years, Europe’s record is far from the consistent lag that is so commonly depicted. The swing-wing plane and the hovercraft were initially developed in Europe. Laser technology and cryogenics came from Europe. Most of the underlying inventions for the office copying machine industry were European. The basic work in fluidics and holography was European.

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Yet, in each of these it was in the United States that the translation of this creativity into commercially viable innovation occurred. Europe was the creator, America the innovator. It is not scientific brains that Europe lacks; it is entrepreneurial brawn. It is not an inability to support basic research; it is an inability to get moving. There is, moreover, the corrosive presence of an almost ideological antipathy to the commercialization of knowledge. It is okay and even prestigious to work at science and the creation of new scientific knowledge. To exploit it commercially is vulgar—perhaps okay only for the American barbarians. . . .

One needs not only to do what the market requires, but also to do it well. This requires a kind of managerial dedication that often repels Europeans. Somehow, many European executives feel that business is simply not worthy of their best efforts, that business is simply not important enough to get all that excited about. You work at your job, but save your best energies for after work. Some years ago Britain developed the world's first fast all-weather military interceptor aircraft, the Javelin. The United States Department of Defense literally drooled. It would have bought all that Britain could produce. Even France stood in line. Britain was at least three years ahead of any other developer. But no benefit accrued to Britain—it was unable to manage the complex on-line production job to make adequate deliveries. The deficiency was not scientific brains; it was management talent and a proper sense of urgency.

There is no doubting the enormous importance in today's world of science. But whether modern science is all that important for economic growth and competitive strength is not so certain. A quick tour of any department store, any supermarket, any office, or any factory quickly shows that electronics, biophysics, cryogenics, and optics constitute a miniscule part of even America's vaunted economic power or resources. To say that there is a lag in these areas that accounts for Europe's problems is to focus on our own biases. We dismiss almost with contempt the vital importance to our economic vigor of the headache remedies and detergents whose advertisements we so much abhor. Yet the enormous, if seemingly obtrusive and vulgar, effort that sustains headache remedies, detergents, false eyelashes, bucket seats, and electric pencil sharpeners is central to America's success. It is great entrepreneurial energy, managerial effort, and involved preoccupation with the consumer's motivations and needs that distinguishes American from European business enterprise. Science is what makes news, especially among men who prefer



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brains to brawn. But science and advanced technology are not what primarily make the American economy run so fast and well.

*America's technological superiority and the American culture of technology have bred distaste and resentment in many corners of the world. In a 2003 essay, James W. Ceaser argued that our technocratic productivity is one of the major causes of anti-Americanism.*

The fourth stratum in the construction of anti-Americanism was created during the era of heavy industrialization in the late nineteenth and early twentieth centuries. America was now associated with a different kind of deformation, this time in the direction of the gigantesque and the gargantuan. America was seen as the source of the techniques of mass production and of the methods and the mentality that supported this system. Nietzsche was an early exponent of this view, arguing that America sought the reduction of everything to the calculable in an effort to dominate and enrich: "The breathless haste with which they [the Americans] work—the distinctive vice of the new world—is already beginning ferociously to infect old Europe and is spreading a spiritual emptiness over the continent." Long in advance of Hollywood movies or rap music, the spread of American culture was likened to a form of disease. Its progress in Europe seemed ineluctable. "The faith of the Americans is becoming the faith of the European as well," Nietzsche warned.

It was Nietzsche's disciples, however, who transformed the idea of America into an abstract category. Arthur Moeller Van den Bruck, best known for having popularized the phrase "The Third Reich," proposed the concept of *Amerikanertum* (Americanness) which was to be "not geographically but spiritually understood." Americanness marks "the decisive step by which we make our way from a dependence on the earth to the use of the earth, the step that mechanizes and electrifies inanimate material and makes the elements of the world into agencies of human use." It embraces a mentality of dominance, use, and exploitation on an ever-expanding scale, or what came to be called the mentality of "technologism" (*die Technik*): "In America, everything is a block, pragmatism, and the national Taylor system." Another author, Paul Dehns, entitled an article, significantly, "The Americanization of the World." Americanization was defined here in the "economic sense" as the "modernization of methods of industry, exchange, and agriculture, as well as all areas of practical life," and in a wider and more general sense as the "uninterrupted, exclusive, and relentless striving after gain, riches, and influence."

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## IV. A Prudent Moderation

*In the end, the great question facing modern America—the challenge that The New Atlantis exists to clarify and answer—is that of living well with technology, conscious of its burdens as well as its blessings. The final editor of The Public Interest, Adam Wolfson, put this well in the conclusion to his 2001 essay, “Politics in a Brave New World.” In some ways, The New Atlantis begins where he ends.*

No discussion of technology in America would be complete without mention of Martin Heidegger, though this is a subject to which I can hardly do justice. In his magnificent book *Reconstructing America*, James W. Ceaser describes the powerful influence Heidegger’s philosophy has had on how we think about our country and technology. As Ceaser summarizes Heidegger’s philosophy, the modern age represents technology’s final triumph, and America technology’s ultimate symbol. The importance Heidegger assigned to technology can be seen, as Ceaser shows, in that he did not analyze the different political regimes by their forms of government or principles of justice; instead, he asked which ones could spark a genuine confrontation with technology. In this reductive analysis, Nazi Germany, the Soviet Union, and America’s liberal democracy were all one and the same, all embodying the catastrophe of technology. None could adequately confront technology because all were products of technology. So extreme was Heidegger’s analysis that he notoriously claimed that “as for its essence, modern mechanized agriculture is the same thing as the production of dead bodies in gas chambers and extermination camps.”

The falsity (and wickedness) of this claim should be obvious enough, but it illustrates the pitfalls that await any attempt to appraise technology’s impact on America. There will always be the temptation to exaggerate technology’s influence, to view our society, as Heidegger did, as some sort of techno-monstrosity. But there is another temptation: to view America as a grand techno-amusement park, and objections to this or that new invention as instances of Luddism or un-Americanism. In this distorted view, as in Heidegger’s, America’s democratic form of government and liberal ideals as well as its Judeo-Christian heritage are just so much background noise to its true essence: Technological Innovation.

What’s needed is a deeper understanding of the relation between technology and the principles of liberal democracy. To some extent one is not

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possible without the other. Could we have had Locke without Bacon? The former's ideals of equality and freedom without the latter's quest to master nature for the relief of man's estate? The very Constitution that secures our rights and liberties and establishes our democracy also empowers Congress "to promote the Progress of Science and useful Arts." And yet, if the political and scientific projects are inseparable from one another, they are not necessarily of equal rank and dignity.

Of all the Founding Fathers, Benjamin Franklin most embodied the spirit of scientific progress. In *The Autobiography*, he proudly recounts his invention of a new stove and enthusiastically declares this the "age of experiments." Yet one can find even in Franklin, discoverer and inventor, an awareness that science should not be a self-justifying pursuit. "There is," Franklin once counseled an aspiring student, "a prudent Moderation to be used in Studies of this Kind [natural science]." And Franklin continued: "If to attain an Eminence in that, we neglect the Knowledge and Practice of essential Duties, we deserve Reprehension. For there is no Rank in Natural Knowledge of equal Dignity and Importance with that of being a good Parent, a good Child, a good Husband or Wife, a good Neighbour or Friend, a good Subject or Citizen." Here is a promising opening for discussing and evaluating the new technologies, one that is tainted by neither Luddism nor nihilism. It balances the benefits of science and technology against the experience of our humanity in its most fundamental relations of parent, spouse, friend, and citizen. At least it's a start.