Science: No Longer a Sacred Cow

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The technologic euphoria which began about 1600 with Francis Bacon and was continued by the 19th century philosophers of the enlightenment achieved its most extreme expression among the 20th century futurologists, who took it for granted that the year 2000 would see the dawn of a technologic utopia.

—René Dubos, *Beast or Angel?*

America's euphoric awe of science began to ebb with the 1
Pandoran gift to mankind of the atomic bomb. Yet the most extreme expression of the nation's continued reverence for science and technology—dramatized in the tendency to call products "wonders" (as in drugs) or "miracles" (as in fabrics) or "magic" (as in electronics)—awaited the moment that a human foot first touched the moon. That feat, the President of the U.S. assured his countrymen, was to be ranked as the greatest thing since—*Creation.* After that exaltation, there was only one way, by the law of psychological gravity, for Sci-Tech's prestige to go.

Sure enough, down it went. And in its place has risen a new public 2
attitude that seems the antithesis of the former awe. That awe has given way to a new skepticism, the adulation to heckling. To the bewilderment of much of the scientific community, its past triumphs have been downgraded, and popular excitement over new achievements, like snapshots from Mars, seems to wane with the closing words of the evening news. Sci-Tech's promises for the future, far from being welcomed as harbingers of utopia, now seem too often to be threats. Fears that genetic tinkering might produce a Doomsday Bug, for example, bother many Americans, along with dread that the SST's sonic booms may add horrid racket to the hazards (auto fumes, fluorocarbons, strontium 90) that already burden the air.

Increasingly this new skepticism is spreading even among profes- 3
sionals in the world of Sci-Tech. Indeed, it could be heard conspicuously

last week as 4,200 members of the American Association for the Advancement of Science gathered in Denver for their annual brainstorming. Arthur Kantrowitz, head of Avco Everett Research Laboratory Inc. in Everett, Mass., came plugging, once again, for the creation of a "science court" that might help sort out "facts from values" in controversies that have been multiplying in the atmosphere of question and dispute. One of the speakers in Denver, Science Historian June Goodfield, a visiting professor at New York's Rockefeller University, welcomed public skepticism as a healthy development that is basically "a call for science to turn a human face toward society." The new spirit, said Goodfield, marks the end of "mutual myths" long held by society (about the scientist as hero) and science (about its freedom from obligation to society).

The new skepticism can be seen, as well as heard, in the emergence 4
of a fresh willingness to challenge the custodians of arcane technical knowledge on their own ground. It is most conspicuously embodied in the environmental crusade and the consumers' rebellion, but is also at play across a far wider field. It applies public light and political heat to Detroit's automotive engineers, who for generations had dispatched their products to an acquiescent public. It encompasses protests against the location of dams massively certified by science, opposition to the erection of nuclear power plants declared to be safe and sound, open disputes about the real values of scientifically approved medicines, and the increasing willingness of patients to sue physicians to make them account for mistakes in treatment. Sci-Tech, in a sense, has been demoted from its demigodhood. The public today rallies, in its untidy way, around the notion that Hans J. Morgenthau put into words in *Science: Servant or Master?:* "The scientist's monopoly of the answers to the questions of the future is a myth."

The fading of this mythology is the result of Americans' gradual 5
realization that science and technology's dreamy wonders sometimes turn out to be nightmarish blunders. Detergents that make dishes gleam may kill rivers. Dyes that prettify the food may cause cancer. Pills that make sex safe may dangerously complicate health. DDT, Cyclamates, thalidomide and estrogen are but a few of the mixed blessings that, all together, have taught the layman a singular lesson: the promising fruits of science and technology often come with hidden worms.

The public's anxiety, anger and skepticism have been reinforced 6
by the exposure of many remarkably human frailties within the halls of science. Biologist Barry Commoner's *Science and Survival,* documenting an erosion of scientific integrity and denouncing official secrecy and lying about nuclear fallout, came in 1966 as merely an early ripple in a wave of muckraking that has washed away the glowing image of the scientist as some kind of superman. Scientists now appear to be as

fallible as the politicians with whom they increasingly consort. In *Advice and Dissent: Scientists in the Political Arena*, two academic scientists, Physics Teacher Joel Primack of the University of California and Environmentalist Frank von Hippel of Princeton, present case histories documenting the tendency of many scientists to "look the other way" when the Government wants to lie about technical matters. A scholarly polemic by Lewis Mumford, *The Pentagon of Power*, scathes not the scientists but their intimacy with governmental powers. The identification is so complete that scientists, Mumford charges, have until lately "been criminally negligent in anticipating or even reporting what has actually been taking place."

Scientists themselves, like many of those at Denver, have been 7
increasingly questioning their own role. Protesting science's callous use of human guinea pigs for experimentation, Dr. Richard M. Restak, a Washington neurologist, decries the fact that the prestigious National Institutes of Health refused to establish a code governing such experiments until its sponsored researchers were found guilty of injecting live cancer cells into uninformed subjects. Writing on the Op-Ed page of the New York *Times*, Restak voiced "a creepy realization that when left to their own devices, biomedical scientists are capable of some rather nasty mischief indeed." Then he put a central, if often asked, question: "Do we need yet more horrors to bring home the truth that science is too important to be left to the scientists?"

America's current spirit of skepticism toward Sci-Tech is, above 8
all, the popular response to that question. The answer is a no so resounding that when it came, it was mistaken for a mortal war on science. So alarmed was Philip Handler, president of the National Academy of Sciences, that in 1972 he preached publicly on the urgent need to stave off the "crumbling of the scientific enterprise." Today, with that enterprise clearly waxing (federal funding for science this year: $24.7 billion, up 67% in eight years), Handler's excessive reaction may seem like that of a pampered sacred cow at the approach of a foot-and-mouth inspector. The fact is that the new skepticism, at bottom, is not antiscience at all. It is only at war with the once prevalent assumption that science and technology should be allowed utter freedom, with little or no accounting to those who have to live with the bad results as well as the good. If the layman on the street has discovered that science is fallible, that hardly makes him its permanent enemy. After all, everybody has forgiven Newton for thinking that the sun was populated.

So the new skepticism, in its present maturity, turns out to be 9
essentially political in its aspirations. Its successes include the very existence of the Environmental Protection Agency and, as a particular example, the EPA's recent action obliging the Ford Motor Co. to recall 54,000 cars to make sure that they meet emission standards. Skepticism

can be credited with last year's California referendum on nuclear power; the fact that the voters did not veto nuclear expansion misses the point, which is that an arcane subject hitherto considered the sole province of the scientist and engineer was submitted to ordinary citizens. And only a remarkably awakened citizenry could have inspired the self-criticism of the recent Senate committee report that chastised the Senate for laxness in overseeing the agencies that oversee the industries that are conduits of Sci-Tech.

Perhaps the most significant result so far of the new skepticism 10
might be called the Case of the Nonexistent Doomsday Bug. The scene: a session of the Cambridge, Mass., city council, with delegations from Harvard, M.I.T. and the National Institutes of Health in nervous attendance. The issue: Should Harvard and M.I.T. be permitted to go ahead with experiments in so-called recombinant DNA-experiments involving the implantation, in cells of a common bacterium, of alien DNA-borne genes? The crucial question: Do the risks of research that could engender a hypothetical Doomsday Bug—some new strain of bacteria that might find its invisible way into the bodies of the people—outweigh whatever knowledge might be gained?

There was a sobering question. Here is another, just as intriguing 11
and much easier to answer: How on earth did an issue like that wind up in the hands of a political body whose analytical resources are usually tested by questions of stop-light placement? Answer: three years ago, while contemplating the very first recombinant DNA experiments, many researchers themselves grew worried about the unfathomable risks. Instead of merely fretting among themselves, as scientists have usually done, they decided to make their fears public—and more. In a step unprecedented in the history of science, a group of them associated with the discoverer of DNA, James Watson, publicly asked colleagues around the world to suspend recombinant DNA experiments until the risks could be assessed and adequate safeguards established.

Without that, the public might never have heard of the risks— 12
until, perhaps, too late. Nor, last summer, would the Cambridge city council have got word that Harvard and M.I.T. were about to launch the controversial research. The council did hear, though. It thereupon put the experiments under a moratorium until the issue of risk could be studied by a committee of eight citizens—not a scientist among them. When the committee report emerged, it was greeted as a model of brevity, intelligence and balance. The upshot, approved by the council: the experiments could proceed, but only under safeguards a bit more strict than those recommended by the National Institutes of Health.

So the case was closed—but with surprisingly little attention to 13
the transcendent issue that had been settled. It was the issue of science's sovereignty, its traditional right to pursue research in the lab with

neither guidance nor intervention from laymen. That sovereignty, in the Cambridge case, yielded to the public's claim to safety and well-being.

After that, the new skeptics are entitled to feel, so far so good. But 14
their very success has raised, in some minds, the question of how far society should go in exercising control over science. The answer must weigh the obvious danger that society might stifle or thwart the key profession on which it must rely for solutions to inescapably technical problems. One non-scientist at last week's A.A.A.S. convention—New York Lawyer George Ball, former Under Secretary of State—thinks that such a danger is already at hand. Ball sees the Cambridge council's monitoring of DNA experiments as an "ominous opening wedge" of a movement that might end up demanding "a bureaucratic preview of all scientific research to ascertain whether it meets some loosely defined test of social desirability."

Such an outcome would plainly be bad news for science and 15
society. But the good news, so far, is that nobody appears to be either demanding or expecting such a result. Even the most skeptical of the skeptics seem perfectly willing to let science go its way in the pursuit of knowledge. Still, if there is no sign that Americans fear what scientists may discover, there is also little expectation that any of their discoveries will provide answers to the enduring human mysteries that are impelling people these days on many a mystical and spiritual pilgrimage. All the new spirit of skepticism really asks is that science and society together take thoughtful stock when there seems a clear risk, as in the DNA experiments, that the pursuit of knowledge might damage, endanger or even exterminate human life. That seems little enough to ask.

For Discussion and Writing

1. What are the signs, according to Trippett, that an attitude of skepticism was replacing unquestioning reverence for science in the late 1970s? Does this same attitude exist in the 1990s?
2. What are some of the causes Trippett says have brought about this new view?
3. What does Trippett claim should be the reasonable result of the public's skeptical attitude?
4. As reflected by Trippett, the scare over DNA experimentation seems to have been exaggerated, with the huge industry of biotechnology having been spawned since the essay appeared. What kinds of worries about scientific inquiry bother the public today? Write an essay in which you express your sense of the thoughts, questions, fears, or desires people have about the role of science in their lives.