Public Attitudes to Technological Progress

Scientists fear engineering accidents of 1979 may turn public against science, but polls show bedrock public confidence

Although the national polling companies have found little evidence to justify it, there is an abiding suspicion in the scientific establishment that the public just does not understand science and distrusts its practitioners. This suspicion ebbs and swells like an ocean tide in response to intuited shifts in public opinion. Just now the tide of concern is rising. On this point, the professional critics of technocracy, such as author Theodore Roszak, agree with science's senior statesmen, such as Philip Handler, president of the National Academy of Sciences. Both told *Science* they believe the public is growing more skeptical of the notion that science and technology make entirely positive contributions to human welfare.

A nuclear reactor (at Three Mile Island), a sophisticated satellite (Skylab), and a new model passenger airplane (the DC-10) went amok this spring, making the engineers who created these machines vulnerable to charges of ineptitude and negligence. This bad news sent a tremor through the ranks of technology's defenders, some of whom are now scanning the horizon for signs of unrest.

One party of scouts gathered at Harvard University's Kennedy School of Government on 12 June to review the public relations problem and try to suggest ways that public confidence in scientific enterprise might be maintained. The meeting was sponsored by Paul Doty, director of the Center for Science and International Affairs at Harvard, and by Alan McGowan, president of the Scientists Institute for Public Information, with support from the Aspen Institute for Humanistic Studies. The purpose, as stated in an invitation, was to discuss the Three Mile Island nuclear accident, consider to what degree the public's "loss of confidence in the scientific and technical community is justified," and try to determine the "special responsibilities of this community" to communicate with the public during and after such debacles. About 24 discussants came, most from the faculties of Harvard and the Massachusetts Institute of Technology.

Although they agreed on little, the majority of those who spoke seemed to come together on a few points. Several said the nuclear industry seemed to have suffered a devastating, if not fatal, blow because of the bad publicity it has received since April. The publicity was unfair, they believed. Aside from the detail of the hydrogen bubble becoming trapped in the reactor core, the accident was not an unanticipated event, one nuclear engineer claimed. He and others argued that the television cameramen who focused on the cooling towers of Three Mile Island behaved irresponsibly because there was essentially nothing new or shocking about the accident. In this interpretation, the press exaggerated a perfectly ordinary fact known to scientists for years—that reactors will malfunction seriously from time to time. It was a pity, Doty said, that during the accident "no one was smart enough to say that this was in the realm of what had been predicted."

There were a few vigorous dissents, including one from Harvard physics professor Gerald Holton, who thought it would be a profound mistake to try to

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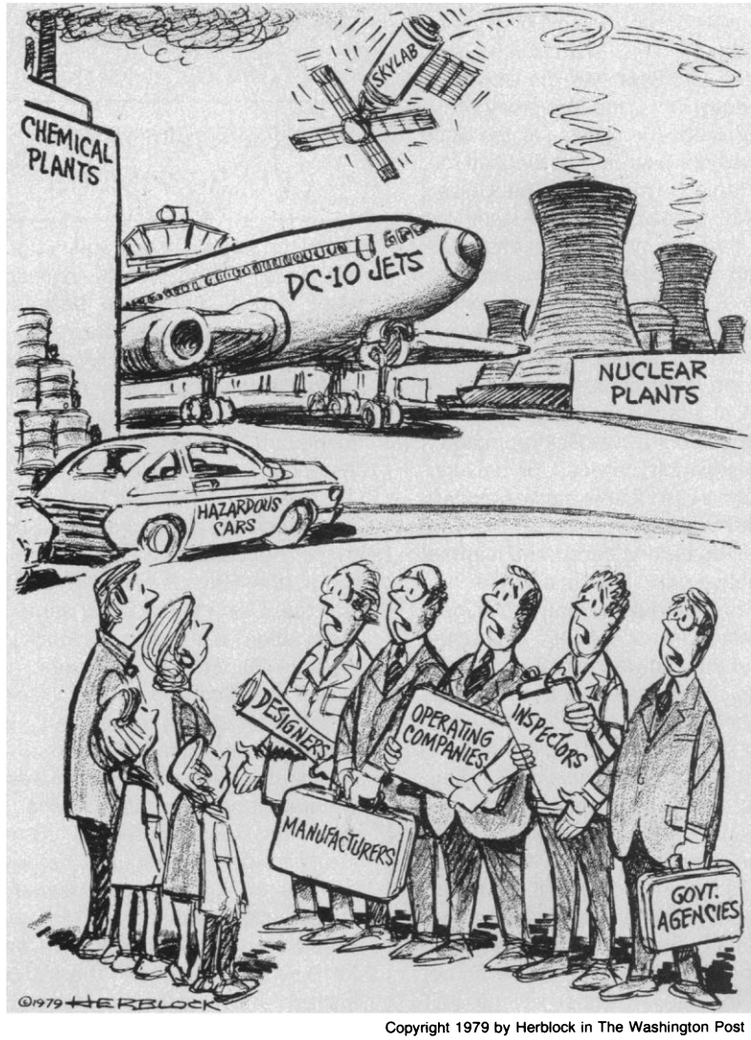
"YOU CAN'T EXPECT PERFECTION"



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Air Is Once Again Rent by Drug Lag Claims

After wading for nearly 2 years through the swamp of conflicting theories about whether a "drug lag" exists in the United States, the General Accounting Office has concluded what most people knew to begin with: regulators in the United States do indeed take longer than their overseas counterparts to approve a new drug. The result is that some new therapeutics have been available in foreign countries before the United States.

The GAO was able to come up with only a few examples, including a drug used to treat hypertension (prasozin hydrochloride) and one used to treat duodenal ulcers (cimetidine). Each was available overseas before they were made available to patients in the United States. The GAO showed that other drugs were also made available overseas first, but in most cases, the delay was due to the reluctance of manufacturers to seek approval in the United States until much later than approval had been sought in Europe. Pharmaceutical firms claim their reluctance is prompted by the FDA's inordinate delay—thereby creating a self-fulfilling prophecy.

The GAO did find that the FDA regularly exceeded its statutory limit for review of a new drug (6 months), frequently by as much as 14 extra months. Most of the European nations studied required between 8 and 13 months, but then many of them have less stringent drug regulation laws.

During recent congressional hearings on the GAO report, former FDA Commissioner Donald Kennedy said the question the Congress ought to address is whether the FDA is taking too long, given the law it has to work with. The GAO answered this in part: FDA delays its reviews by changing reviewers in midstream, by failing to use a computerized information system, by writing vague guidelines, and by failing to provide feedback swiftly to interested companies. The industry, on the other hand, often fails to submit correctly completed new drug applications, or to correct swiftly the deficiencies FDA detects, the GAO says. What all this will contribute to a debate that has gone on for years and years is unclear.

R. Jeffrey Smith

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"fix up the image" of science. He suggested that the image conveyed to the public may be exactly correct, but that the number of people who dislike what they see in it may be growing. Holton referred to them as "the Dionysians," after the Greek nature-worshiping cult. Unlike the reason-worshiping Apollonians, he said, they revere instinct, emotion, and primitiveness. Holton thought more could be accomplished by studying the Dionysians than by polishing the image of science.

Most of those present seemed to think the press had exaggerated the radiation hazards at Three Mile Island and scared the public unduly. This led to a general lament over the inability of news people to understand or convey the subtleties of scientific debate. Joseph Nye, Jr., Harvard professor of government, said that reporters tend to search out opposite poles of opinion and then balance one extreme against another to create an artificial form of objectivity. In this way, he said, the middle ground is left undefended and ignored. There ought to be a troubleshooting institution of some sort, Nye and Doty said, that could sweep in and set up shop on short notice. It would fill the ignorance gap with unbiased information not collected to support any preordained political or mercenary objective. The National Academy of Sciences is not equipped to provide that sort of service, Nye and Doty said, because it requires months simply to assemble the volunteer experts.

Jeremy Stone, director of the Federation of American Scientists, proposed that funds be collected to support a full-time professional organization in Washington, D.C., whose staff would be available to work on complex policy issues as they arose. People nodded, but nothing was agreed on.

Roszak, author of *Where the Wasteland Ends*, said in a separate interview that "as scientists get called in to testify on these technical matters, they get tarred with the failures of technology." People have learned that "expertise can be bought," he said, and that we have "government by control of the experts." Technicians often provide sanction for political action, as church officials once did, and they lose public sympathy as a result. His general impression is that in the last 10 years there has been a "greater willingness to question technical competence and political authority than before, but that it often takes the form of a resigned cynicism." The trend would be encouraging if it were producing new ideas and new leaders. But he feared that people might become bogged in a self-pitying cynicism that distrusts all leadership.

NAS president Handler said that he resented attempts to "smear" science and scientists with the engineering disasters of 1979. The average citizen understands the difference between science and applied science, he said. "Don't use S-and-T [for science and technology] as though they were one word," he pleaded. There has been little change in public attitudes about research, Handler believes, but he said there has been a significant increase in the number of people who harbor doubts about its applications.

Alexander Morin, director of the National Science Foundation's office of science and society, said there has been "an enormous shift in the relationship of science and technology to authority; they are now an instrument of state power." If you do not like the authority structure, you do not like the people who are working for it, he added. People say, "I want to be involved in the technical decisions that affect my life, and I don't trust the scientists who are speaking for the people I don't trust," However, Morin detected no fundamental distrust of science or technology.

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"The scientific community has shown some signs of running for cover" in the wake of the Three Mile Island accident, Alan McGowan said. "No one's saying it publicly, but there's some sentiment that these scientific disputes should not be aired in public." McGowan was disturbed by articles in *Time*, the *New York Times*, and the Washington *Post* "attempting to discredit or saying everybody else was trying to discredit the scientific community." He had seen no opinion polls demonstrating a loss in public confidence, but he feared that people might lose faith if they were told often enough that they had, or if scientists unilaterally withdrew from the public arena.

Harvard sociologist Daniel Bell said

that he was "taken aback by the sense of incompetence manifest by the Nuclear Regulatory Commission in their backing and filling in the published transcripts" of their deliberations. He concluded that there was some "slackness" among the regulators, but that few people would construe this as a disaster for science. Of public opinion, he said simply that he "learned long ago not to trust the polls."

The opinion polls may be an untrustworthy technology themselves, but they give a sketch of popular sentiment that is at least as reliable as a month's file of newspaper clippings. They show that Americans are remarkably steady and optimistic supporters of technological enterprise. The Opinion Research Corporation poll, taken for the National Science Foundation's *Science Indicators*, found that scientists were described in favorable terms by 86 percent of the respondents in 1972, by 89 percent in 1974, and by 81 percent in 1976. (The margin of error is usually considered to be three or four points.) Scientists invariably rank higher in public esteem than ministers, architects, bankers, lawyers, businessmen, and congressmen.

An official at the polling firm of Yankelovich, Skelly, and White said that he has seen no evidence that technology has fallen into disrepute. Every year since 1974 Yankelovich surveys have included a question asking pollees to agree or disagree with the following statements: "Science and advanced technology have brought us more benefits, through better products and an easier, healthier life, than the problems they may have created." The response has been "absolutely steady," according to a Yankelovich official, always falling within a range of 81 to 84 percent agreeable. He added that people under 35 are generally more inclined to think well of new technologies (such as electronic banking and the use of computers) than older people. The exception is nuclear power, which has more support among older people than among the young. There is one indication, however, that the young expect less of technology than their parents. A recent Yankelovich poll found that while 52 percent of the respondents agreed with the statement that "technology will find a way of solving the problems of shortages in natural resources," only 29 percent of people between the ages of 18 and 24 attending college agreed that resource problems would be solved.

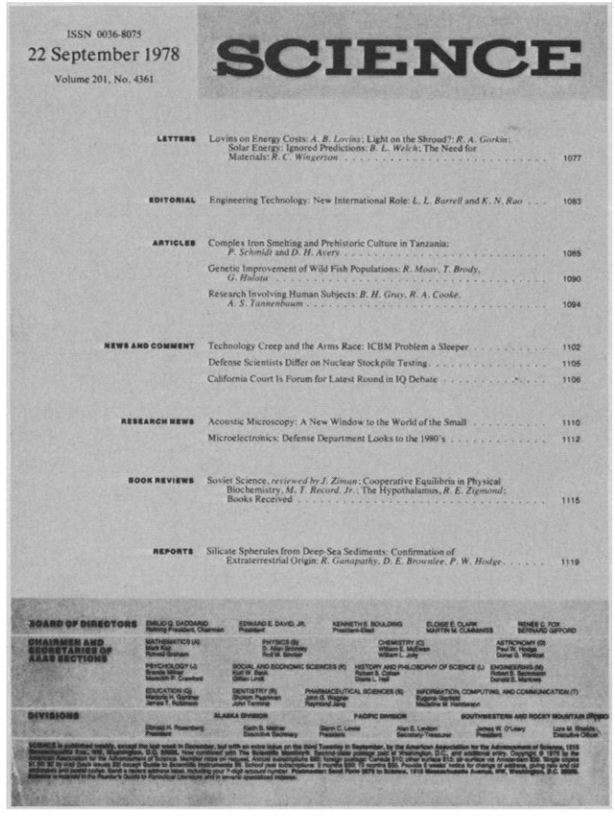
A poll taken last year by Cambridge Reports, Inc., for Union Carbide found that people "regard science and technology favorably. They feel that technological progress creates more jobs

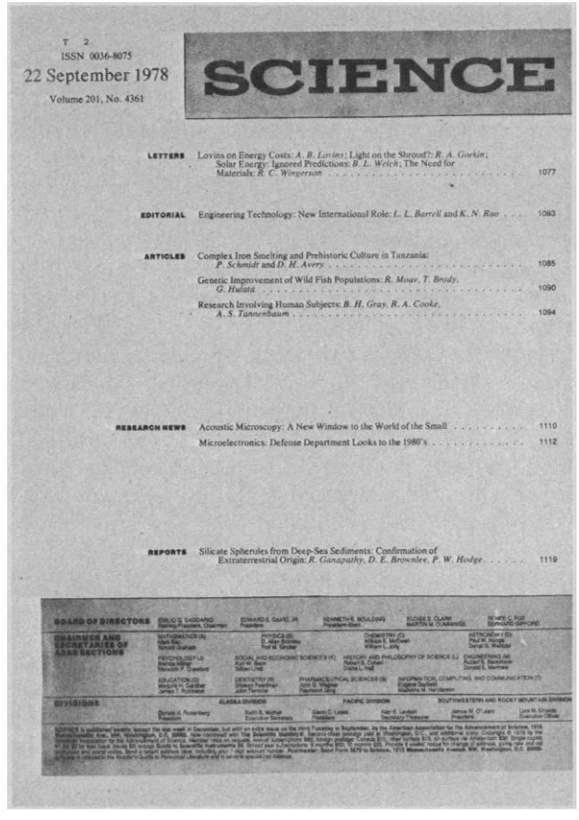
Science in Russia Is Full of Holes

The Soviet edition of *Science*, a facsimile of the English language edition, continues to be heavily censored. Only six in a recent sample of 20 issues were wholly uncensored.

Material about Soviet internal affairs is regularly deleted, as are articles on strategic arms and American-Soviet scientific exchange. Reference to religion also seems taboo: a story about the scientific tests being applied to the Shroud of Turin was cut from the issue of 21 July 1978.

The contents page of the 22 September 1978 issue affords a typical example of the Glavlit censor at work (below right). The cover of that issue featured the first Soviet spacecraft to carry U.S. scientific experiments.—N.W.





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than it destroys and solves more problems than it causes." However, it also found a trend in favor of slower economic growth. These slow-growth advocates are "most likely to be younger respondents—in the 18 to 25 age group, blacks and lower-income and less-educated respondents. It is somewhat ironical," the survey noted, "that these groups, who are most in need of jobs . . . are most skeptical about growth and technological progress." Overall, 60 percent said they thought science and technology do more good than harm, and only 5 percent said they do more harm than good.

Other polls commissioned since the nuclear accident at Three Mile Island—such as those done by CBS News and the *New York Times*, and by Harris for ABC News—registered a 16- to 23-point decline since 1975 in the support for nuclear plant construction programs. In addition, a poll released by Harris in May reported that Americans in the last 3 years have lost confidence in the ability of science to conquer disease. The clearest indication of the decline was a drop in the number of respondents—from 71 percent in 1976 to 55 percent in 1979—who thought a cure for cancer would be discovered by the end of the century. It may be wrong to interpret these findings as a decline in support for science and technology. They probably signal the growth of a more realistic public understanding of the limits of technology.

Amitai Etzioni, director of the Center for Policy Research at Columbia University, reads the declining figures as the manifestation of a general decline of faith in American institutions. He and a colleague, Thomas DiPrete, reviewed a group of Harris polls published over the last decade and concluded that they did not measure the weakness of particular institutions, but recorded a common and generalized feeling of alienation. "It follows," they wrote in a paper titled *The Decline in Confidence in America*, "that a problem largely common to all institutions cannot be remedied in any one alone; what is required of reformers is greater attention to the underlying societal structure." Incidentally, they found that the institution of science ranked second only to medicine, which ranked first every time in 10 years of polling.

Of the Three Mile Island accident, Etzioni said, "I don't think scientists are identified with it at all. It's executives, engineers, irresponsible operators. . . ." The public will have no difficulty making the distinction between nuclear physicists and utility company employees, he said, "unless a lot of nuclear scientists start running around defensively explaining that they're not at fault."

—ELIOT MARSHALL

Proposals for Ethics Boards Stir Debate

Recent shifts in policy have brought "widespread confusion" to Institutional Review Boards; and it may get worse

If you participate in this study, you will be exposed to certain risks of physical injury in addition to those connected with standard forms of therapy. These risks include (examples). In addition, it is possible that in the course of this study, new adverse effects that result in physical injury may be discovered. Medical therapy will be offered at no cost to you for any of the aforementioned physical injuries. You or your insurance carrier will be expected to pay the costs of medical care for physical injuries and other complications not mentioned in this paragraph since these are either associated with your disease or commensurate with the usual therapies for your disease. Federal regulations require that you be informed that—except as specified above—no financial compensation for injury is available.

The preceding was brought to you by the Human Investigation Committee of the Yale University School of Medicine, one of the nation's nearly 500 Institutional Review Boards (IRB's) that have been set up during the past decade to protect the rights of research subjects. The risk statement may not make you want to run out and volunteer for a research project at Yale, but don't bother looking somewhere else. As of 2 January 1979, all institutions that receive funds from the Department of Health, Education, and Welfare (HEW) must inform research subjects of the availability of financial compensation and medical treatment. Informing the patient is simple enough, but observers say that defining physical injury, for example, is almost impossible and that the regulation has caused "widespread confusion" at IRB's across the country. And it may get worse. In July, HEW will announce regulations that will *require* compensation to subjects for injuries suffered in HEW grant research. The federal government will not provide any coverage, however. Individual institutions and their IRB's are to foot the bill.

These changes are just the tip of the iceberg. New policy proposals are now circulating at several federal agencies, and the operation of IRB's may change drastically in other ways during the next few months. Changes called for include putting more lay members on the IRB's, testing the risk comprehension of research subjects, keeping records of IRB meetings for 5 years, and opening IRB meetings to the public.

Some say the changes will make IRB's more effective and will better protect the rights of research subjects. Others claim the proposals will tighten the grip of government to the point that research on humans will come grinding to a halt. Still others fear that increased visibility for IRB members will raise the risk of malpractice suits. Whatever the outcome for the IRB's themselves, the changes will be significant for the biomedical community, as some scientists complain that red tape and administrative delay have already slowed the research on human subjects.

The current confusion at IRB's and the spate of pending regulations have been greeted by a new journal that hopes to clarify some of the problems. *IRB: A Review of Human Subjects Research* will be published ten times a year by the Hastings Center. Its first issue came out this past March. The IRB proposals first surfaced last fall, when both the Food and Drug Administration (FDA) and the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research issued recommendations that are now becoming bureaucratic fact.

Not unexpectedly, debate over the

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