PUBLIC ATTITUDES

Support for Science Stays Strong

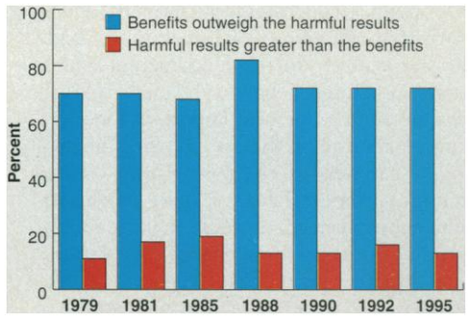
R&D budgets may be under attack in Washington as politicians debate spending priorities, but two recent surveys show that the public's support for science and technology remains strong. At the same time, public understanding of basic scientific concepts is shaky at best.

Results from a poll of 2006 U.S. adults, released last week by the National Science Foundation (NSF), found that 72% believe that the benefits of research to society outweigh the harmful effects. The survey also found that leaders in the scientific community rank second only to physicians in public esteem. These findings mesh with the results of a separate survey by an advocacy group for medical research, which found that more than half of all Californians want the federal government to spend more money on university research. "Many scientists believe there is an anti-science attitude" among citizens, says Jon Miller, vice president of the Chicago Academy of Sciences, who conducted the NSF-funded survey. But he says the data suggest the opposite: "Americans believe in science almost as an article of faith."

The biggest change in attitudes since the surveys began in 1979 was a temporary jump in support for science in the mid-1980s. Ironically, Miller attributes this surge to the increased focus on scientific and technological issues stemming from two tragedies: the Challenger and Chernobyl accidents. The unwavering support is also a clear sign that Americans are satisfied that investing in science delivers tangible benefits, says Marcel LaFollette, a science and technology policy professor at George Washington University in Washington, D.C.

Within that steady support, however, are some minor fluctuations in attitude. Fewer people today fear that the risks associated with genetic engineering outweigh the benefits than was the case in 1985, while a declining number of people believe the benefits of nuclear power outweigh potential harm. The public is divided over whether the space program is worth the risk, although the number who think the benefits to society exceed the possible dangers has grown slightly in the past 5 years.

The California survey, released this week at a meeting in Sacramento organized by the University of California, shows that residents overwhelmingly approve of federal spending for academic research. Only 10% of 1000 adults in the California poll disapproved of such expenditures, and only 4% did not express an opinion. Just over half of those polled agreed that government research spending should be increased, with 42% arguing it should remain the same and 6% calling for a cut.



Vote of confidence. The public sees considerable value from research.

The survey was conducted by the Charlton Research Co. for Research!California, an affiliate of Research!America, which backs medical research. More than half of those polled said they would be willing to pay $1 more for each prescription drug, or $1 more a week in taxes or health care insurance, to bolster research spending. But while support for medical research was strong, only 4% knew that the National Institutes of Health funds most medical research paid for by taxpayers.

Despite the favorable rating that science earns, R&D advocates remain nervous about public ignorance of science and the scientific process. "The good news is that there is still a great deal of support for science," says Shirley Malcom, a National Science Board member and head of the directorate of education and human resources programs at the American Association for the Advancement of Science (which publishes *Science*). "The bad news is that it is not very deep." The comment refers to Miller's finding that just over one-fifth of Americans surveyed could adequately explain a scientific experiment, while 64% have "no understanding" of scientific inquiry.

On the bright side, more than two-thirds of those surveyed correctly answered that the center of the Earth is very hot, that the oxygen we breathe comes from plants, and that the continents are in motion. But less than half knew that electrons are smaller than atoms, that the universe began with a big explosion, or that antibiotics kill bacteria but not viruses. And only 44% said that humans developed from earlier species of animals. This skeptical attitude toward evolution, Miller notes, is unique among industrialized countries.

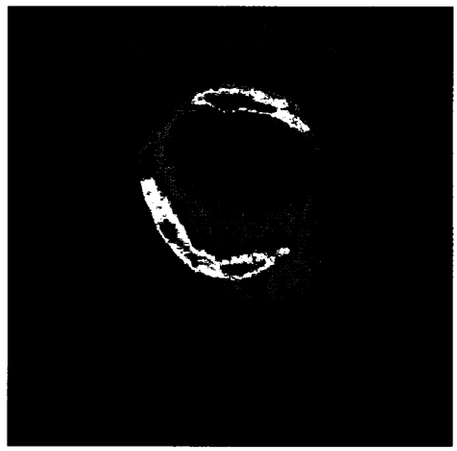
Such statistics lead many scientists to fear that public support for research is fragile. But LaFollette warns that understanding of and support for science are separate issues, and that the data do not make clear what people feel they need to know to make informed decisions about science and technology. The National Academy of Sciences is sufficiently concerned by the NSF data, however, that it is planning a major effort to improve scientific literacy. Although details of the program, which will be launched this summer, are not yet available, one academy source says "we want to be more active than gathering data."

–Andrew Lawler

PHYSICS

The Aurora by Night and by Day

For watchers on the ground, the delicate curtains of the aurora fade by day. But for imagers aboard the new Polar satellite, the day-side aurora (near side of this 6 April image) can actually outshine its nighttime counterpart. Launched last February, Polar watches the auroral region from high above the North Pole from a highly elongated orbit, recording the ultraviolet (UV) and x-ray radiation that is emitted along with visible light when charged particles slam into the upper atmosphere, much as electrons slamming into a TV screen create light. Unlike earlier auroral imagers, the UltraViolet Imager (UVI) aboard Polar can filter out the UV emission triggered by sunlight, allowing the first accurate measurements of the energy entering the day side.


NASA

That energy input may be even higher than on the night side, because day-side energy can arrive continuously in charged particles blown in by the solar wind, whereas night-side particles arrive in bursts after going down the tail of Earth's magnetic field and being accelerated intermittently back toward the atmosphere. "People have seen the day-side aurora," says UVI principal investigator George Parks of the University of Washington, "but nothing was spectacular, so they forgot about it. Now we're saying: hey, probably the most important energy transfer is on the day side, instead of the night side. That's exciting."

–Richard A. Kerr