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EDITORIAL

Scientifically Illiterate vs. Politically Clueless

Following the Soviet launch of Sputnik, Congress responded to the perceived technology gap in the United States by passing the National Defense Education Act that funded new science, math, and foreign language programs in American schools. As one college president argued in the 1960s: colleges and universities were now "bastions of our defense, as essential as ... supersonic bombers."

Today, however, cries of technology gaps are viewed skeptically by a nation more concerned with battling the federal deficit than with fighting communism. After four decades of unquestioned federal support for science under the broad justification of superpower competition, the scientific community now finds its long-term benefits evaluated against short-term goals. As observed by a previous director of the National Science Foundation, "the days of throwing money over the wall are over." So far, the response of the scientific community to the change in funding climate has been largely one of denial. Following our deconstructionist instincts, we choose to blame the public's lack of appreciation for our work on their "scientific illiteracy." Presumably, if these people had only been willing to tough out more courses in physics, chemistry, and math, the return on the public investment in basic research would be obvious beyond the requirement of explanation.

To help defend ourselves against future funding shortfalls, we have indignantly come forward with a litany of examples for how science has improved our society. While hailing our successes, we artfully dodge questions about why we have not found solutions to such seemingly simple yet intractable problems as waste disposal, natural hazards, and disease control. In doing so, we gloss over the scientific process and create the impression that our results are answers that are good for all time.

But science is not about providing answers to society's problems. Rather science provides a way to address systematically problems on the basis of an understanding of the natural world. Each conclusion is merely the best hypothesis to fit the available data. When the debate has strong economic, national security, or health implications, the problems become long equations with many variables, only a few of which may be scientific or technical in nature. High-level nuclear waste, for example, will not be buried under Manhattan, no matter how suitable the geology. As scientists, we are called upon to find the best solution that fits within political, social, and economic boundary conditions. As the boundary conditions inevitably change, scientists appear to disagree, the media reports on the controversy, and the public watches in frustration. Uncomfortable with moral implications and value judgments, we remain outside the mainstream of the decision-making and allow policy-makers to set the course while we criticize from afar. The arguments we constructed for the scientifically illiterate now sound self-serving, and we find ourselves among the followers of change rather than the leaders.

Why are the head of the Environmental Protection Agency, the Ambassador to Kazakhstan (a country with concerns over earthquakes, oil reserves, and nuclear contamination), and the chairman of the House Science Committee not scientists? Why are we not training scientists for the leadership positions that so profoundly affect our future?

It starts with universities, where success has historically been achieved through specialization in narrow subdisciplines. Courses for nonmajors are frequently viewed as distractions, and students who depart the so-called nerd herd to pursue careers in business or policy-making are frowned upon. Thus begins the vicious cycle: Bright students do not see science as a way to reach positions of leadership, and science suffers because those in leadership positions have little experience with science.

Our long-term future depends on citizens understanding and appreciating the role of science in our society. No panel report, no unambiguous example, and no well-connected lobbyist can make these arguments for us. In the next generation, we will need not only scientists who are experts in subspecialties, but also those with a broad understanding of science and a basic literacy in economics, international affairs, and policy-making. In the end, our greatest threat may not be the scientific illiteracy of the public, but the political illiteracy of scientists.

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