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Science: Matters of Scale and Purpose

At a recent symposium honoring the late Allen Astin, remembered for his integrity under political fire as head of the National Bureau of Standards, a speaker observed that Astin knew something about the "advancement of science" that tends to be obscured now. He knew that science advances not always by leaps and hurdles but more often on its hands and knees. The texture of his science was a texture of wonder, not of the imperium.

What shapes the public understanding of science under present conditions is science's new centrality in the fast lanes of competitive national security and economic advantage. Resources—human, financial, and organizational—are massed to advance political and economic goals through science and engineering. It is not easy for the layman to disaggregate the mass and recognize the creative elements that keep science going. This could partially explain the stuttering response to serious infirmities in science and mathematics education. With the floodlights beamed on weapons systems, prophecies of technological salvation in the nuclear age, orbiting stations in space, smart tools for the information era, and a banquet of benefits through biotechnology, science's image as a laborious process of search, disappointment, surprise, and discovery is in some peril of becoming an image of thaumatology. This we do not need.

Before much time passes, a deep and pensive look must be taken at the emerging formation of our scientific and engineering directions. The gratifying upward spiral of federal funds for research and development is bound to slow or level off soon because consensus politics demands that deficits be dealt with. If the defense budget alone proposes to consume 72 percent of federal research and development funds in 1986, with built-in commitments that promise to drive the share ever onward and upward, downstream displacement impacts on other sectors of research are predictable. As resources are taken for preferred scientific and technical goals while the spectrum of general science recedes for want of support, scientific and technical manpower distributions are certain to respond to the pull of the tides. Where such outcomes might leave this country's claims to excellence in many areas of science is no idle question.

Straightforward answers to these problems of choice are hard to come by. Trade-offs among strategic requirements and general science are judgmental rather than explicit. The process for arriving at them is shaky at best. Yet, to allow policies for science to edge toward deadlock is to store up trouble. If the superpowers were to come to terms that might abate the mutual surge in weapons research and development, or if the United States and its international partners would agree to pool investments in such expensive areas as space, high energy physics, and long-range investigations of energy alternatives, the approaching crunch might ease. None of this relief will come easily or soon, and some of it may not come at all.

The realization that science and engineering are increasingly embodied in the pursuit of imperatives of national security and national interest puts a new coloration on the scale and the purposes of the research enterprise. Science, it appears, has transited its long postwar stage of lively and eclectic growth into the stage of instrumentalism for mega-objectives. That this evolution is setting the long-term pattern seems, on the evidence, clear. That it will define public and legislative expectations for science and engineering, in the absence of balancing policies, is no less likely. What it signifies for a world with unmet human needs and an increasingly fragile environment bears sober thinking.—WILLIAM D. CAREY