House Speaker Seeks to Shift Research Away from Government

In Washington, D.C., the dust has yet to settle after the arrival of a host of new Republican Congress representatives to the Capitol at the beginning of the new year. With much adieu and fanfare, House Leader Newt Gingrich (R-Ga.) has rearranged key House Committees and pushed forward his agenda for the "Contract With America," leaving science and technology policy watchers agape at changes proposed.

Calling the budget in preparation "the single most revolutionary document that has been in this town for the last 50 years," Robert S. Walker (R-Pa.) has taken a lead role ensuring science and technology budgets are not left out of this process. He predicts "some real heavy lifting" as committee members craft bills that take into consideration not just the upcoming fiscal year's goals, but also those goals for the next five years.

In a recent discussion with area science writers, Walker and Gingrich emphasized that they consider basic research a high priority. "That's the seed corn of our society," Walker said. Cutting the capital gains tax and adding research and development tax credits are necessary steps for encouraging industry support for that kind of work, they said.

"I don't think science is totally a federal budget issue," Walker said. "In some cases, getting government out of the way is a good idea." They call for the privatization of some parts of government, including the U.S. Geological Survey. A single Department of Science would take the place of the National Science Foundation (NSF), NASA, and EPA. These legislators would also do away with the Departments of Energy and Commerce.

They suggest that companies will readily invest their newfound capital in building new research facilities on university campuses. Those efforts will make it unnecessary for Congress to provide the NSF with the $10 billion it says it needs to bring the infrastructure for academic research up-to-date, Gingrich said.

These Congress representatives also want to pare support for technology development. "I'm not a big fan of ATP [Advanced Technology Program]," Walker said. "Government then has the job of picking technology winners. I think the government is not very good at doing [that]." He said that in the 18 months it takes the federal government to finalize an annual budget, a whole generation of consumer electronics comes and goes. Also, the two legislators argued that ATP does not deal enough with the small and middle-sized companies that they see as crucial to U.S. competitiveness.

How does one pick winners, anyway, Gingrich said. In 1930, one-sixth of the U.S. economy was based on technologies invented by Thomas Edison. Why did the Wright Brothers succeed in flying, leaving Smithsonian aeronautics pioneers in the dust? "We're not sure how you figure out where the next 30 Edisons are," he said.

They warn that without changes in both the tax structure and in federal regulations, areas where the United States has clearly been the leader in basic research will become dominated by other countries in the marketplace. By the year 2002, biotechnology will merge with materials science, creating a powerful synergy that the United States should cash in on. But there should be no need for a government bureaucracy created to prop up these new technologies. Good ones will succeed on their own, they said.

This rhetoric runs counter to what policymakers were saying five years ago when programs such as ATP began. These programs were created to keep the United States competitive in global markets. By themselves neither U.S. companies nor government-supported research seemed able to develop research advances that were high-risk, long-term endeavors. Since 1990, ATP has expanded from a $10 million-a-year program to a $431 million-a-year one. About half that funding goes to those critical small and medium-sized companies, according to the National Institute of Standards and Technology (NIST), which administers ATP.

Moreover, "the entire ATP program is structured to avoid government picking technology," said NIST's public affairs specialist Michael Baum. Companies propose technologies worth developing and ultimately invest much more time and money in the research than does the federal government, added John Gudas, with ATP.

"All ATP does is provide stability for high-risk research," Gudas said.

ELIZABETH PENNISI

DOE Offers Energy Sciences/ Materials Sciences University-Industry Grant Program

The Department of Energy's Office of Basic Energy Sciences (BES) supports basic science and engineering research efforts in a variety of disciplines of strategic importance to the Department of Energy including materials sciences and its related subfields. It also has a collaborative university-industry grant research program. The primary intention is to support university investigators to carry out pre-competitive scientific or engineering research that is commensurate with academic thesis requirements and also is of industrial importance. The collaboration might be achieved by personnel interchanges such as university personnel carrying out a portion of research at an industrial site or other significant collaborations between university and industry researchers. A letter of intent from the industrial collaborator(s) that explains their role in the research and how it is important to their business should be a part of such proposals. Potential proposers are encouraged to obtain other program information by requesting a copy of the report *Materials Sciences Programs Fiscal Year 1994* by calling the Materials Sciences program office at 301-903-3426,7,8.

NSF-AMPP Workshop Reports Milestones and Society Impacts

A balanced panel of industrial R&D leaders and university and government laboratory scientists and engineers has issued a preliminary report on its workshop held on January 12, 1995, on behalf of the National Science Foundation's Advanced Materials and Processing Program strategic area. The report identifies areas of materials research that are both scientifically exciting and have the potential for significant impact.

While the report concurs that many areas of study fit the criteria, panelists were instructed to choose only a few critical or key areas, proposing milestones and identifying predicted impact of each area. The areas of opportunity chosen are Bio/Biomolecular Materials, Materials for the Information Age, and Special Materials. The third area is further divided into categories of carbon-based materials, packaging materials, and electrochemical battery and energy conversion materials.

For each area, scientific opportunities are described, five-year milestones are listed, and potential areas of impact are identified. The areas of impact reaffirm the key enabling role of advanced materials and processes for a broad range of industrial innovations and quality-of-life advances. The report offers the breadth of potential impact as further justification for a Federal role in support of the programs since no single company and, in many cases, no single industry would be the sole beneficiary from a specific advance.

Three areas of bio/biomolecular materials are discussed: products from living factories, bio-inspired systems and processes, and biomaterials by design for use in healthcare. Among the milestones listed are identifying biochemical methods that would enable synthesis of new materials or materials intermediates, developing engineering techniques for large-scale bioprocessing and biomimetic processing, and gaining an understanding of structural demands needed for useful biocompatible prosthetic or replacement materials. Among the impacts identified are biocatalytic routes to monomers that would enable the economical synthesis of highly functional polymers, new enzymatic processes that would "revolutionize" chemical and fuels processing toward new products produced at low cost, and improved quality of life for patients dealing with life-threatening diseases.

Under the area of materials for the information age, the panel reports that the challenge for researchers is to anticipate and explore the "limits" to the progress in electronics and to determine what can be done to bypass those limits in materials and processing. The NSF is needed to support the basic research that provides the knowledge base necessary to allow progress when presently predictable limits are reached. Some of the limits are the size, speed, and power dissipation of transistors; the size, power, and manufacturability of large area displays; and the storage density, and read and write time of memories. The report proposes milestones for two areas of materials research as examples with strong impact on the future growth of the information age: the study of nanostructures and the advance of computers in modeling properties of materials.

The report ends with an elaborate description of milestones and impacts in the area of special materials. Among foreseeable benefits to society are applications of newly available carbon-based materials, for example, as made available by recent advances in diamond thin-film syntheses; the worldwide growth of U.S.-based packaging industry; and the broad impact of electrochemistry for power storage and delivery from medicine to portable power tools to distributed power systems along with the improvement of air quality and practical use of alternate energy sources.

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