Reagan and Mondale: Where each stands on science policy

WHITE HOUSE/KARL H. SCHUMACHER

ELECTION '84

Science policy and scientific research are not important issues in the 1984 presidential election, except as these matters impinge on defense projects and arms control. The party platforms of both Democrats and Republicans say remarkably little about science beyond hailing the benefits of high technology and the virtues of basic research as precursor to commercial innovation. In view of this, it seemed fitting for the American Physical Society to send a set of questions on science policy to the principal presidential candidates, as it has done before previous national elections. Accordingly, last August APS President Mildred S. Dresselhaus of MIT addressed the questions to Ronald Reagan and Walter F. Mondale. The questions and the candidates' responses follow:

BOB BURGESS

Reagan

The scientific leadership of the United States is being challenged by other countries. Moreover, the cost of research at the frontiers of science is rising steeply. How would your Administration ensure that the US retains its scientific leadership? How would you develop international scientific cooperation on projects too large for any single nation to undertake?

My Administration inherited a situation in which Federal funding for the most far-reaching science had been allowed to stagnate and even decline. Our response has been to increase support for basic research by 30% in real terms between 1981 and 1985. It's now the second fastest growing part of the whole budget.

Combined with a drastically reduced rate of inflation, this translates into substantial new resources at places like the National Science Foundation and the Department of Energy for frontier research.

It is also true that the most exciting science can be very expensive to perform—a situation that members of the APS know very well. In those cases where next-generation science requires very large, unique facilities—for example, for particle physics or space research—we are actively exploring the possibilities of sharing the responsibility with other countries. So far the response has been encouraging.

But scientific leadership requires more than facilities. Continued US scientific leadership demands that we focus our attention on the quality of our technical talent—the people pushing on those knowledge frontiers as well as the

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Mondale

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America cannot remain the world's leader in science and technology unless we reaffirm our commitment to providing the resources necessary, training the personnel needed, and fostering an economic and scientific atmosphere which will translate the research being done into tangible benefits for our country. To do this I have proposed the following program:

We should increase the real Federal investment for civilian research by at least 3% each year, in part by enlarging the competitive grant systems administered by the National Science Foundation, National Institutes of Health, Department of Energy, National Aeronautics and Space Administration, and the National Oceanographic and Atmospheric Administration. We should also explore various means of increasing the amount of support by industry for research by universities and private institutions.

We should maximize basic research supported by the Department of Defense, while assuring that restrictions on scientific discussions are reduced only to what is required to safeguard national security.

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people turning new findings into technological advances.

In effect, we have to show our brightest young people that excellence in science and technology is a national priority today and will continue to be a priority in the future.

For that reason we have greatly increased support for research at universities, the places where young people are drawn into and prepared for careers in science and engineering by the very people doing research at the frontiers of knowledge. There is no better way to provide for tomorrow's scientific leadership than to strengthen the environment for research and learning in our universities.

■ *Each year many worthy scientific projects are abandoned or deferred for lack of funds. Each such instance represents a technological risk for the United States. Yet some projects continue to be funded by direct congressional action, avoiding the process of peer review. How can the Federal government ensure that the advice of our leading experts is considered in establishing priorities for the most essential and promising scientific projects?*

Government should spend public funds only on what is necessary. In applying this principle to science and technology, my Administration has benefited from a broad base of advice from experts in universities, industry and government.

Over the past four years, we have been guided by the collective wisdom in the science and technology community. Together, we have brought about significant changes in priorities among the programs being supported by government, such as the increase in basic research and the decrease in many well-intended but unpromising energy demonstration processes. The substantial progress being made in American science today might not be happening without this input from the scientific community.

I would also add that we can set priorities for science and technology with more rigor and rationality than for almost any other federally supported program. The few examples in which Congress bypassed the proven review processes appear all the more glaring because of the overall effectiveness of that process. Those lapses were clearly the exceptions, not the rule. While the potential hazards of such precedents can't be minimized, I believe Congress became more sensitive to the problem once the situation became well known.

Both our Administration and Congress are generally in strong agreement on the importance of funding only the highest quality science and technology programs. I am confident that, with the continued help of the scientific community, we can ensure the most productive use of science and technology.

■ *The economic and military security of the United States is dependent on our continued technological superiority. In an effort to deny U.S. advances to our adversaries, restrictions have been imposed on scientific communication that threaten the very system that has given us our lead. What actions would your Administration take to ensure a proper balance between the need for secrecy and the openness essential to the health of science?*

We should be clear in our distinction between the transfer of technology to our adversaries and the transfer of scientific information. In the case of technology, we continue to face a serious and well-documented problem. The Soviet Union and its satellites try hard to acquire Western technology to improve their military systems, and unfortunately they're quite successful at it. Just as corporations must protect their trade secrets, the Western nations must slow this illegal transfer of military technology. We will continue to use such means as export controls to protect ourselves.

But the flow or exchange of scientific information, which is a primary concern of the university community, remains essentially unimpeded, in spite of some alarms that suggest otherwise.

I agree that open scientific communication has been a key in remarkable advances in technology worldwide, and we are working with the academic community to preserve and strengthen that system. Our universities have, and will continue to have, an environment of academic freedom unsurpassed anywhere.

■ *More than a year ago the National Commission on Excellence in Education issued its sober report, "A Nation at Risk: The Imperative for Educational Reform." The report places particular stress on the urgent need for reform in math and science education. What should be the role of the Federal government in ensuring that the vital needs of the nation for scientific and technical manpower are met?*

The tremendously encouraging public reaction to the report by the National Commission makes it clear that the strongest force for improving educational quality comes not from government but from the determination of an aroused citizenry. The most important reforms, the ones with the most impact, are a direct result of increased expectations of excellence by families and schools.

But there are also effective steps the Federal government, which has always played a very limited role in elementary and secondary education, can take to respond to those public priorities. Certainly there is evidence that our schools can do a better job teaching such subjects as science and math. By taking advantage of improving technologies such as computers and important new findings about the way children learn, we can give teachers new tools and new abilities to help their students progress faster.

Federally supported research along these lines promises to provide broad benefits throughout the nation's schools. I recently signed legislation that provides for grants to improve mathematics and science instruction, in part through additional training for teachers in these critical fields.

An important goal is to increase the number of students who are encouraged to pursue higher education in technical fields. That means we have to be prepared, at the college level, to provide the technical training that increasing numbers of students are demanding today.

Fortunately, we are now starting to see the payoffs of our strong support for university science and engineering programs. For example, the Presidential Young Investigator Awards are attracting young, extremely well-qualified new faculty in those university fields suffering from shortage of teachers.

And, beginning in just a few months, we'll be seeing the first of the new university Engineering Research Centers being established to reflect the rapid changes taking place in the practice of engineering these days. The emphasis we have placed on developing new technical talent may prove to be one of the wisest investments of Federal funds ever made in this field.

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We should consider creation of new centers of research excellence similar in scope and mission to the National Institutes of Health.

To foster the translation of basic research into technology and programs which can help our industries and our nation, several steps must be taken. I favor a crash program to enhance the attractiveness of teaching in engineering institutions, to ensure an adequate supply of industrial engineers in the coming decade. I endorse the establishment of an Economic Competitiveness Council, as proposed by House Demo-

crats, empowered to among other things help coordinate US research activities with those of other countries. I propose that we establish Technology Extension Centers, similar to those used for many years by agriculture, to help with the wide dissemination and effective use of the new technology we develop. They would channel Federally supported R&D monies to the private sector and provide technical assistance to new and smaller businesses.

I believe, in addition, that we should make the 25% R&D tax credit permanent, eliminate the capital gains tax for long-term investment in smaller businesses, and broaden the Investment Tax Credit to cover new investment in education and training of industrial R&D personnel. We should also reexamine our patent and copyright laws to ensure that new kinds of "intellectual property" such as computer software are appropriately treated, and clarify antitrust laws to encourage joint R&D ventures by creating legal zones in which companies can engage in legitimate cooperative activities without risk of adverse antitrust action.

Lastly, I support broadened cooperation with our allies on large projects requiring the combined skills and resources of more than one country. The cooperative projects undertaken by NASA are a good example of this type of work. However, we should take care to preserve America's competitiveness in basic and applied research in those areas where we and our allies are vying for shares in the international marketplace.

■ *Each year many worthy scientific projects are abandoned or deferred for lack of funds. Each such instance represents a technological risk for the United States. Yet some projects continue to be funded by direct congressional action, avoiding the process of peer review. How can the Federal government ensure that the advice of our leading experts is considered in establishing priorities for the most essential and promising scientific projects?*

The Economic Competitiveness Council should be empowered to engage in ongoing technology assessment, soliciting the advice and recommendations of experts in and out of the government to set priorities in funding, and aiding coordination and cooperation between business, labor, education and private research centers, and the Federal government. It should work closely with the Congressional Office of Technology Assessment to assist Congress and the Executive Branch in arriving at unified priorities for the nation. We also need to ensure that our university personnel have adequate time for research and rapid access to information, without which they cannot contribute effectively to this effort.

■ *The economic and military security of the United States is dependent on our continued technological superiority. In an effort to deny US advances to our adversaries, restrictions have been imposed on scientific communication that threaten the very system that has given us our lead. What actions would your administration take to ensure a proper balance between the need for secrecy and the openness essential to the health of science?*

As mentioned in my answer to the first question, I believe that the restrictions on scientific discussions should be reduced to only that level absolutely necessary to safeguard national security. I realize that this distinction is often unclear, but I feel we must foster the openness all scientists need to work effectively. I strongly oppose the type of wide-sweeping gag rule which the Reagan Administration recently tried to establish.

■ *More than a year ago the National Commission on Excellence in Education issued its sober report, "A Nation at Risk: The Imperative for Educational Reform." The report places particular stress on the urgent need for reform in math and science education. What should be the role of the Federal government in ensuring that the vital needs of the nation for scientific and technical manpower are met?*

Excellence in science begins with a trained mind. To be effective, that training must begin in the early years of education, and it must continue to the most advanced level. For that reason, I have offered a comprehensive program to upgrade instruction in science, mathematics and technology. This program includes:

Establishing a new Fund for Excellence, which would make $4.5 billion in added resources available each year to local school districts to use to address their most pressing primary and secondary education needs. These funds could be used for such purposes as upgrading instructional materials, developing new computer literacy courses, raising teacher salaries to attract first rate personnel, and training teachers to use new technology in the classroom. I have proposed investing an additional $1 billion each year to enhance the quality and attractiveness of elementary and secondary education as a career, especially in critical areas such as mathematics and the sciences.

At the college level, we need to ensure access for all capable students, and we must provide special opportunities for talented students in science and math. We should increase Pell grants for low and moderate-income students, expand the Guaranteed Loan Program, enlarge summer research opportunities through internships and funding for summer research projects and enhance campus-based aid programs. We must also help colleges and universities obtain the best possible equipment on which to train students.

At the graduate level, we should create new national Advanced Study Awards for outstanding students in science, mathematics and other areas, provide funds for institutions hosting Advanced Study Award winners to support their research, and institute competitively awarded block training grants, modelled after the current US Public Health Service grants, to pay for student stipends and the costs of equipment and laboratory materials.

Few but telling changes in science budget

The government's new year began 1 October with funds for science research relatively unmarred by the budget bashing that Congress sometimes inflicts. Before departing Washington for his party's convention in August, President Reagan signed all three science spending bills for fiscal 1985. He also signed the Education and Economic Security Act that had been in a state of high entropy for more than a year after the House passed a similar version, but without the perverse "equal access" provision that the Senate added to allow student religious groups to meet in public schools before and after classes. Of all the appropriations bills involving science, only the Defense Department's remained bogged down, largely in election-year political and philosophical differences.

Few significant changes were made in the administration's budget presented last February to advance basic science and military research, amounting to an overall 14% increase, to a grand total of $53.1 billion (PHYSICS TODAY, April, page 55). Congress approved one of the President's own pet projects, NASA's proposed space station. While it acknowledged support for the project by the aerospace industry and the prospect of an "on-orbit facility for undertaking biological, commercial, science, applications and payload operations on a routine basis," Congress also admitted in its final compromise bill that the space station