

state & society

Presidential candidates answer queries on science policy

Published here are the views of the two major Presidential candidates on three questions of science policy posed by the president of The American Physical Society, William A. Fowler, in a letter addressed to the two men. Responses were furnished by the campaign offices of Gerald Ford and Jimmy Carter on the following issues:

- ▶ The role of science advisers in the Executive Office of the President,
- ▶ National energy needs and the nuclear-power program, and
- ▶ Federal support for basic and applied science.

Ford:

Science advice. The Congress has approved my June 1975 proposal to create an Office of Science and Technology Policy in the White House. The Director of the OSTP will serve as my science and technology adviser.

The principal responsibility of this adviser will be to provide advice on the scientific, engineering and technical aspects of issues requiring attention at the highest levels of government. He will be one of my senior advisers and will also provide advice to other senior advisers.

In carrying out his responsibilities, I expect my science and technology adviser to:

- ▶ Participate in the formulation of my budget and legislative proposals, particularly where scientific and technical considerations are involved.
- ▶ Review existing policies and programs to identify opportunities for and constraints upon the use of our scientific and technical capabilities in achieving national objectives.
- ▶ Help identify new opportunities for using science and technology to improve our understanding of national problems and contribute to their solution.

The Director of OSTP will be a member of the Domestic Council and an adviser to the National Security Council. He will play a major role in the President's Committee on Science and Technology, which will consist of 14 experts from outside the Federal Government and will conduct a two-year review of Federal science and technology policies, activities and organization. He will also be Chairman of the Federal Coordinating Council, which will promote the coordination of R&D among Federal agencies. He will lead a panel focusing on State and local problems which can be mitigated through the application of science and technology.

Energy. In early 1975 I outlined a comprehensive energy policy and program with three major goals:

- ▶ To halt our growing dependence on imported oil during the next few critical years.
- ▶ End our vulnerability by 1985—by (1) reducing oil imports to between 3 and 5 million barrels per day, and (2) developing

continued on page 62

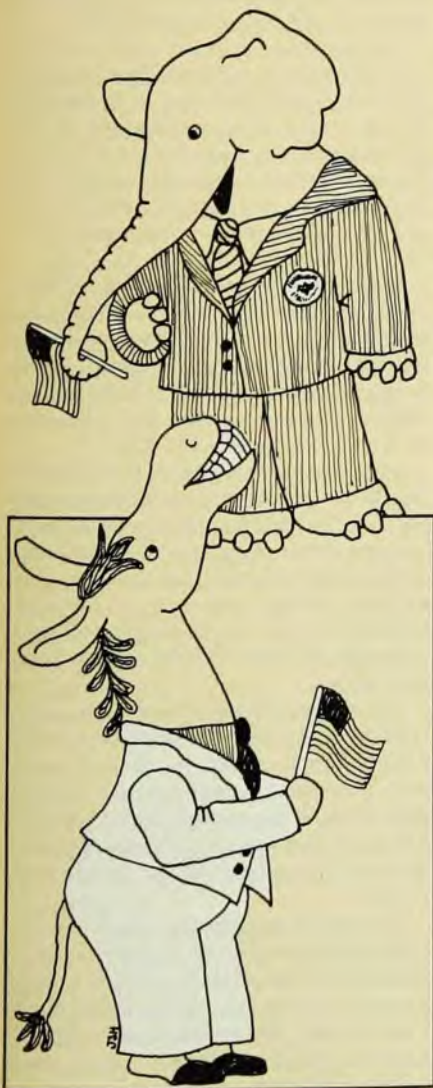
Carter:

Science advice. My career at the Naval Academy at Annapolis and my involvement with the nuclear-submarine program in the Navy has given me a broad scientific and technical background to understand the role of science and technology in our lives. It is crucial that the advice of the scientific and professional community of this nation be actively and permanently sought by elected officials in the evolution of national policy dealing with the complicated, unpredictable and rapidly changing technological problems of this modern world. The day when political leaders could make effective policy decisions independently and turn to the scientific community only for assistance in implementation has long passed. The office of science adviser to the President should be upgraded immediately to provide a permanent and high-level relationship between the White House decision-making process and the scientific community.

Energy. It is time for strong leadership and planning in energy, yet none exists in the Executive Branch. One of the greatest failures of national leadership is the failure to convince the American people of the urgency of our energy problems. In the White House it is business as usual. Our national policy for energy must include a combination of energy conservation and energy development, together with price protection for the consumer.

The importance of energy conservation cannot be overemphasized. The potential for dramatic energy conservation remains untapped. Our energy waste in transportation is 85%, in generating electricity it is 65%. Overall, 50% of our energy is wasted. The Federal Government itself must set an example for energy conservation and must ensure that its own regulations do not encourage energy waste.

We need to encourage mass transit as a means of energy conservation. Strict fuel-efficiency standards and ratings must be established for motor vehicles. Rigid enforcement of energy-saving speed limits is essential. Efficiency standards and better labeling for electric appliances are a prerequisite. Moreover, mandatory improvements in building insulation must





be established. To help conserve our dwindling energy supplies, unnecessary electrical power-plant construction should be stopped, and advertising at the consumers' expense to encourage increased electrical consumption should be restricted. Rate structures which discourage total consumption and peak power demand, which give greater protection to the average consumer, should be established.

As one who is intimately familiar with the problems and potentials of nuclear energy, I believe we must make every effort to minimize our dependence on nuclear energy. I would emphasize, however, that I do not support a moratorium on the use of nuclear energy, and I recognize that our increasing demand for electricity is likely to require dependence on this source for some time. I do feel though that we should shift our R&D priorities to conservation and non-nuclear options.

A major immediate need is to derive maximum energy from coal while preserving environmental quality. We have at least a 200-year supply of clean and accessible coal. Power companies and industries must shift to this source of energy, and we must invest in improved mining efficiency, cleaner combustion technology and a better transportation system for moving coal to its end users. Substantial increases in coal production and utilization will only come with a stable regulatory climate. The recent veto of the strip-mining bill merely prolonged the present climate of uncertainty. We must also exploit the potential of solar energy in the construction of new homes and offices.

During the past few years, two thirds of all Federal research and development funds went for atomic power, primarily for the Liquid Metal Fast Breeder Reactor. Since this potential source of energy will not be economically feasible until the price of natural uranium increases several times over, since England, France and the USSR have design experience with the LMFB, and because of the mounting cost in environmental problems, our excessive emphasis on this project should be severely reduced and converted to a long-term, possibly multinational, effort.

The private commercial production of enriched uranium fuel should be approached with extreme caution.

In addition to the physical damage and human suffering which would result from a nuclear disaster, the economic, psychological and political consequences to our energy supply system would be more devastating than a total Middle East oil embargo. It is imperative that such an accident be prevented. We must maintain the strictest possible safety standards for our atomic power plants and be completely honest with our people concerning any problems or dangers. For instance, nuclear reactors should be located below ground level, the power plants should be housed in sealed buildings within which permanent heavy vacuums are maintained, plants should be located in sparsely populated areas and only after consultation with state and local officials, design should be standardized, and a fulltime Federal employee with full authority to shut down the plant in case of any operational abnormality should always be present in control rooms.

An international conference on energy would benefit all nations. It is ridiculous for each of us to go our own separate ways and replicate research projects which are being completed in other nations. There is certainly enough challenge and responsibility to go around in energy fields involving thermonuclear-reaction containment, liquefaction and gasification of coal, use of solid waste, breeder reactors, electric propulsion and rail development, building insulation and design, heating, cooling and electric-power generation from solar energy, electric-power transmission, industrial plant efficiency, automobile-engine design, coal-mining techniques, efficiencies of petroleum extraction from the ground, materials recycling, long-range benefit-cost ratios for energy sources and nuclear waste disposal. Of course private industry will be expected to continue research in many of these areas and other fields of interest, often in cooperation with government.

Federal support for science. I believe the Federal Government has a crucial role to play in supporting development of new technologies which address national priorities such as energy conservation and production of new supplies, development

of new mass-transportation systems, improvement of our communications systems, delivery of high-quality health care, and advancement in methods of manufacturing which are environmentally sound. The Government must provide leadership and active support for basic research and application of the fruits of this research through agencies such as NASA, the National Science Foundation, the National Academy of Engineering and the National Institutes of Occupational Safety and Health.

Ensuring a growing and healthy economy which provides jobs for all of our citizens who can work is one of the greatest challenges to our society. Our scientific and technological excellence is a principal tool in achieving this goal and deserves priority support from the Federal Government.

Ford

continued from page 61

the ability to offset any future embargo with stored petroleum and emergency standby measures to conserve energy.

► Mobilize our technology and resources to supply a significant share of the free world's energy needs beyond 1985.

My program is based on the fundamental principles of providing energy at the lowest cost consistent with our need for adequate and secure supplies; relying on the private sector and market forces as the most efficient means to achieve the goals; and achieving a balance between our efforts to preserve the environment and our need for energy.

Briefly, the program involves reducing the rate of growth in energy consumption by cutting waste and improving energy efficiency; increasing domestic energy production; completing a strategic petroleum-storage program; and developing advanced energy technologies.

Over the past two years the Congress has passed eight of my major energy proposals. Fifteen other proposals still await passage, including measures dealing with energy conservation, natural gas, coal, nuclear energy and energy facilities. Meanwhile, we have proceeded with programs that are possible within existing authorities.

I have requested \$2.9 billion for energy R&D in 1977—an increase of 30% over the \$2.2 billion provided in 1976—to work with colleges and universities, industry and others in the private sector to develop advanced technology for using coal, synthetic fuels, nuclear, solar and geothermal energy.

You asked specifically about our nuclear-power programs. I believe we must increase the use of *both* coal and nuclear energy to meet our energy needs in the years ahead. Even with strong efforts to conserve energy, the nation's energy needs will be increasing. We should fulfill these

needs by using domestic coal and nuclear energy rather than through increased reliance on expensive imported oil which jeopardizes our nation's strength and welfare.

We now have 59 licensed commercial nuclear power plants providing about 9% of our electrical requirements. (If the electrical power supplied by these plants were supplied by oil-fired plants, an additional one million barrels of oil would be consumed each day.) One hundred seventy-seven additional plants are planned or committed.

The safety record for nuclear power plants is outstanding. Nevertheless, we must continue our efforts to assure that it will remain so in the years ahead. In January 1975, I activated the independent Nuclear Regulatory Commission (NRC), which has the responsibility for assuring the safety, reliability and environmental acceptability of commercial nuclear power.

Also, my 1977 budget provides greatly increased funding to accelerate R&D to:

- ▶ make the safety of commercial nuclear power plants even more certain;
- ▶ develop further technologies to guard against the theft and misuse of nuclear materials, and
- ▶ provide safe long-term storage of radioactive wastes.

The use of nuclear energy will increase around the world as the supplies of oil and natural gas diminish. Recognizing this, I believe that we must maintain our role as the major supplier of nuclear fuel and equipment for peaceful purposes—so that we can influence others to accept controls to minimize the threat of proliferation.

We are now in the midst of a concerted review of our nuclear policy objectives and options, particularly with respect to proliferation, exports, reprocessing and waste management. I will act promptly on any changes in our policies which are needed.

While on the subject of nuclear energy, I want to commend The American Physical Society for its April 1975 report on light-water reactor safety. The report was an important part of the information used in formulating my 1977 budget requests for the reactor-safety research program of the NRC. I am pleased that you were willing to complete that extensive evaluation and that you have undertaken a study of issues relating to nuclear-waste management. This expert advice is very important to us.

Federal support for science. I believe the future of America depends heavily on the vitality of its science and the strength of its technology.

In my view, the Federal Government has a key role in support of basic research because the private sector and individual companies cannot readily capture the benefits from investments in such research. The Federal Government provides support for basic research through



mission agencies and through the National Science Foundation (NSF) where the objective is to advance broadly our nation's scientific capability.

There is a stronger motivation for private industry to invest in applied research, and here the Federal Government is more selective in its funding—supporting research to meet specific governmental needs (such as defense) or to help achieve broad national goals of critical importance (such as energy).

My Administration has recognized that Federal investment in R&D had not kept pace with rising price levels. Funding for basic science, in particular, has been declining—in constant-dollar terms—for nearly ten years.

My 1977 Budget provided for Federal obligations of \$24.7 billion for R&D—an increase of 11% over 1976. Within this

total, funding for applied research was increased by 8%—from \$4.8 billion to \$5.2 billion, and funding for basic research was increased by 11%—from almost \$2.4 billion to more than \$2.6 billion. Because of its key role in the support of basic research in academic institutions, I requested a 20% increase in NSF's basic-research funding.

The Congress approved many of my budget proposals, but it provided less than my request for NSF. This suggests that the scientific community and the Administration will have to work harder to explain to the Congress the importance of basic research.

Industry and others in the private sector also play an important role in supporting basic and applied research. We should seek to preserve and expand incentives for such investments.

Scientist-candidates for Congress

Seven candidates with scientific or technological backgrounds are waging campaigns this year for seats in the House and Senate. Scientist-candidates running for Congress include four incumbents and two challengers in House races, while former-astronaut Harrison Schmitt of New Mexico seeks membership in the Senate. Most share a common concern over the energy future of the US, though their policy prescriptions to meet the nation's needs for energy differ.

Known to be seeking re-election to the House are the following: Mike McCormack (D-Wash.), George E. Brown Jr (D-Cal.), James G. Martin (R-N.C.) and David F. Emery (R-Me.). Two other House candidates with experience in science are John R. Burcham of Maryland's fifth Congressional District and Newton I. Steers Jr of the eighth, both Republicans. Schmitt, also a Republican, faces incumbent Senator Joseph M.

Montoya (D-N.M.) in this fall's election. This list of contenders is not necessarily comprehensive; some candidates may have been missed, and the certification of office seekers as scientists necessarily involves subjective decisions. Each of those named here has won the nomination of his party and has engaged in a science-related career—most have had academic training in one of the sciences.

The incumbents. McCormack seeks a fourth term in the House. He serves as chairman of the Committee on Science and Technology's Subcommittee on Energy Research, Development and Demonstration and of the Joint Committee on Atomic Energy's Subcommittee on ERDA, Environment and Safety. McCormack is also a member of the Public Works and Transportation Committee. He earned a master's degree in chemistry from Washington State University in 1949 and spent the period