

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



BROWN

MCCORMACK

MARTIN

EMERY

SCHMITT

STEERS

BURCHAM

1950–70 as a research chemist at the AEC's Hanford Project in Richland, Wash., before he entered public life. He is an enthusiastic advocate not only of controlled-fusion R&D, but of other approaches as well; he has written all House-passed authorizations for solar and geothermal-energy research. During his current term he proposed an electric-vehicle bill now near passage and co-sponsored several on energy conservation. McCormack is a member of the American Nuclear Society and the American Chemical Society, and he won election last year to the national board of directors of the American Association for the Advancement of Science.

Emery, who first won his House seat in 1974, serves on three subcommittees of the science and technology committee—Energy Research (Fossil Fuels), Space Science and Applications, and Environment and the Atmosphere—and holds membership on the Committee on Merchant Marine and Fisheries as well. He graduated from Worcester Polytechnic Institute in 1970 with a bachelor's degree in electrical engineering, and he served two years in Maine's state legislature prior to his election to Congress. Emery, we were told, believes the US should move rapidly to develop alternative sources of energy that would be long-term and renewable: solar-electric, geothermal, wind and ocean energy, for example. He supports breeder and fusion-power development as a middle-term solution, according to a staff spokesman, but he wants such approaches to be strictly monitored, for safety reasons. He has strongly favored multi-billion-dollar loan guarantees for research on synthetic fuels, such as the production of methanol from wood chips. (Maine is a heavily forested state.) Emery serves on the House Republican Conference Committee's special task force on energy and the environment.

Martin was appointed to two largely science-oriented committees during his first term in Congress, Interior and Insular Affairs and Science and Astronautics; now he serves on the Committee on Ways and Means instead, with membership in its subcommittees on health, taxation and oversight. His claim to the "scientist" appellation appears best of all the candidates this year—he earned a PhD in chemistry from Princeton University in 1960, then taught at Davidson College,

where he became an associate professor on the chemistry faculty in 1964. His committee-related activities include co-sponsorship of a health-insurance bill for catastrophic illness, while on his own time he has been studying the fluorocarbon-ozone question.

Brown holds a BS in physics and worked as an engineer before he won election to the House in 1962. He recently added membership on the Joint Committee on Atomic Energy to his Congressional credits (see the Brown interview in *PHYSICS TODAY*, July 1976, page 61).

The challengers. Schmitt graduated from Cal Tech with a bachelor's degree in science in 1957, then studied geology at the University of Oslo, Norway. In 1964 he received his PhD in that discipline from Harvard University. He joined NASA as a scientist-astronaut in 1965 and rode the Lunar Rover on the Moon as lunar-module pilot for the last manned Moon mission, Apollo 17, in December 1972. Schmitt assumed additional duties as chief of the scientist-astronauts in February 1974, and he was named assistant administrator of NASA's energy program in May of that year.

As a former astronaut, Schmitt points out that many of the last decade's technological advances originated in the space program: he mentions as examples the worldwide communications-satellite network, computerized control centers, Skylab studies of the Sun and the development of solar-energy devices. With respect to the energy problem, he has said we must continue nuclear R&D, develop coal as an alternative to petroleum, accelerate the work on solar and geothermal power and push harder on fusion. Schmitt answered our question about breeders thus: "Breeder-reactor technology is an area of nuclear R&D that the nation cannot afford to neglect. Although it is not yet clear that a long-term commitment should be made to breeder reactors as a major source of electric power, we must continue to examine that option . . . If nothing else, we must understand the breeder so we can anticipate problems that may develop with its use elsewhere in the world."

On national energy policy, Schmitt claims that "the essential factor is the balance between free enterprise and government action." He believes ade-

quate money to finance the development of major energy alternatives must come from private investors; for example, he argues against forced divestiture by the large oil companies because they "have been the major force in recent years behind the increase in coal and uranium production" in the US.

Burcham is bidding to unseat incumbent Democrat Gladys Spellman in his Maryland district. He graduated from the Naval Academy in 1954 and studied engineering administration at the George Washington University. As coordinating engineer for ACF Industries' nuclear products division (Washington, D.C.) during 1957–59, Burcham was responsible for the construction of test reactors in Holland and Sweden. From 1960 to 1966 he oversaw the planning and building of a \$15-million environmental test facility for the Goddard Space Flight Center at Greenbelt. Before running for Congress he served on the Prince Georges County Council.

Steers studied economics at Yale College, from which he graduated in 1939; he then attended the weather school at MIT and subsequently pursued an Air Force career in meteorology. He worked for the AEC in 1951–53 and later started a mutual fund for scientists. He told us R&D spending should be increased to improve weapons-systems reliability, and he is a strong believer in basic and applied research in general. Steers serves as a state senator at present, and he faces Democrat Lanny Davis and Independent Robin Ficker in his House seat bid. —FCB

in brief

The Acoustical Society of America's *Standards Index 1-1976* is available from the Standards Secretariat of the ASA, 335 East 45th Street, New York, N.Y. 10017 at a price of \$7.50 (prepaid). The International Center for Theoretical Physics will assist theoretical physicists who want to spend their sabbatical year in a developing-country university. The Center will circulate information on a physicist's credentials and availability among physics departments. Interested persons should contact Luciano Fonda at the Center, PO Box 586, Trieste, Italy. □