secretary, Richardson is said to have in mind his own reorganization of that office. Realistically, the options are either to decisively strengthen or to decisively weaken the office. Reportedly, Richardson's aim is to make the constituent health agencies more responsive to the Secretary's office. The word is that what he wants in the assistant secretary's office is essentially an administrator. The months ahead will show whether DuVal is in Washington to help effect such a change.

Richardson, after a year at HEW, retains his reputation as a formidable administrator, and HEW looks as intractable an administrative problem as ever. As Egeberg told a group of reporters at an informal meeting early this spring, "If anybody can reorganize HEW, it is Secretary Richardson. The main question is, Can he reorganize it so anybody who succeeds him can keep it organized?"—JOHN WALSH

Energy: President Asks $3 Billion for Breeder Reactor, Fuel Studies

For several months, advisers to President Nixon have reportedly been hunting for a new "technological initiative" to revitalize the nation's languishing science and engineering communities. Now it appears that the President may have found his "new Apollo" in the form of a program costing far less, yet promising a more immediate social payoff, than the landing of men on the moon. As Nixon described it in a major message to Congress last week, his new program seeks to invest some $3 billion in federal funds over the next decade to develop new sources of "clean energy" from fossil and nuclear fuels.

In a 5000-word statement released on 4 June, the President outlined a broad array of fuel policy changes, research and development efforts, and attempts to foster consumer conservation of energy. All of this, he said, was aimed at achieving what have traditionally been two incompatible goals—feeding the nation's expanding appetite for electric power and petroleum, while reducing the air and water pollution, and the degradation of the land from mining and drilling, that inexorably result.

The energy message was, as he told a White House news conference, "the first comprehensive energy statement by a president." Accordingly, it contained something for nearly everyone.

There were sops to the environmentalists who have called for measures to conserve electricity and to minimize the release of heat and radioactive pollutants from nuclear power plants. There were promises to the fossil fuel industry of new efforts to overcome the hurdle of sulfur contamination that currently restricts the use of domestic oil and coal supplies, and there were rich promises to expand offshore oil leasing and to consider opening the vast shale oil lands of Wyoming, Colorado, and Utah to test-site leasing. But clearly the core of the President's message, and a plum for the nuclear industry, was a plea to Congress for a $2-billion commitment to develop a commercial, fast breeder nuclear reactor by 1980.

"Our best hope today for meeting the nation's growing demand for clean energy lies with the fast breeder reactor," the President said. "We have very high hopes that the breeder reactor will soon become a key element in the national fight against air and water pollution. . . . I believe it important to the nation that the commercial demonstration of a breeder reactor be completed by 1980."

Nixon Outlines His Energy Plan,

The President's package of new fuel policies and research for "clean energy" derives from a series of recommendations made to him—but not released to the public—by the energy subcommittee of the Domestic Council. The following is an outline of the President's program, adapted from a White House summary:

R & D for Clean Energy

Sulfur Oxide Control Technology

An increase of $15 million for FY 72 making a total of $26 million available to develop and demonstrate, in partnership with industry, the technology for removing sulfur from the stack gases of power plants and industrial plants burning coal and oil.

Nuclear Breeder Reactor

A commitment to complete the successful demonstration of the liquid metal fast breeder reactor by 1980. To accomplish this, a supplemental request for $27 million in operating funds for the base program will be made for FY 72. An additional $50 million will be requested for the federal cash contribution to the jointly funded demonstration plant.

Coal Gasification

An expanded cooperative pilot plant program totalling $30 million per year aimed at making coal gasification a commercial reality. The Office of Coal Research program would be expanded to $20 million, almost doubling its existing program, while industry has agreed to provide $10 million.

Ongoing Research and Development

The federal government is funding other energy R & D such as coal mine health and safety, fusion power, magnetohydrodynamics, underground electric transmission, and use of solar energy.

Three experimental breeders have already been built in the United States. Fueled by plutonium, they convert the most plentiful isotope of uranium, U-238, into still more plutonium, while producing steam for generating electricity. Glenn T. Seaborg, the chairman of the Atomic Energy Commission (AEC), has predicted that breeders would consume uranium about 30 times more efficiently than conventional nuclear reactors, thus stretching the world's supply of uranium from "one lasting decades to one lasting centuries."

Since 1949, the federal government has spent some $600 million on breeder development. But AEC officials estimate that the ultimate cost of developing the first two or three commercial, practical, and reliable breeders will run to $8 billion—$6 billion of which must come from the industry. Seaborg told the news conference that the AEC's initial goal will be the construction of a single demonstration breeder producing 300 to 500 megawatts of electricity. The project will cost between $400 million and $500 million, about half of which will come from utilities and reactor manufacturers.

As for the prospects of generating electricity from thermonuclear fusion, Seaborg noted that the Nixon message asks Congress for $2 million in addition to the $30 million already budgeted for controlled fusion research. "I'm optimistic," Seaborg said, "that we'll be able to demonstrate its scientific feasibility by the end of the decade." That achievement, he observed, would be roughly equivalent to Enrico Fermi's demonstration of a fission chain reaction 29 years ago.

The President's "clean energy" program neatly divided itself among relatively short-term measures and those affecting the availability of fuels and the production of power in the distant future. Besides the breeder project, Administration officials placed in the short-term category an ambitious new R & D effort to make the conversion of coal into sulfur-free gas commercially attractive during the 1970's.

Also in this category is an expanded demonstration program for removing sulfur oxides from the stack emissions of fossil-fueled industrial plants—particularly the utilities. Hollis M. Dole, the assistant Interior secretary for mineral resources, said that new money proposed for coal gasification would be used to increase the number of operating pilot plants from the present three to as many as seven. By 1976, a larger demonstration plant would begin producing sulfur-free gas for a power plant. Success of this effort—and of the program to scrub sulfur from industrial exhausts—would presumably reduce the nation's dependence on low-sulfur petroleum from Latin America and the Middle East. And success would almost certainly buoy the competitive position of coal in what is currently a losing race with nuclear fuel and natural gas.

Under the heading of long-term measures to develop energy resources, the President announced a series of moves to expand offshore drilling, to consider the initiation of leasing of more than a million acres of federal lands underlain by geothermal steam, and to explore the possibility of leasing shale oil lands next year for testing of oil extraction schemes. Each of these moves—in addition to the plan for a demonstration breeder reactor—will be preceded by a statement, as required by law, describing their likely impact on the environment. If the current battle over the trans-Alaskan pipeline is any indication, the adequacy of these statements will become grounds for court challenges by conservationists.

Mindful of this possibility, the President said in his message: "I believe the time has come to begin the orderly formulation of a shale oil policy—not by any head-long rush toward development but rather by a well-considered program in which both environmental protection and the recovery of a fair return to the Government are the cardinal principles under which any leasing takes place."

The Nixon message skirted the touchiest energy issues—such as oil import quotas, depletion allowances, control of strip mine damage, the development of Alaskan oil, and the expansion of oil companies into such diverse interests as coal mining and nuclear fuels. But the President did take the opportunity to chide Congress for its inaction on Administration proposals for

Proposes Opening Oil Shale Reserves

Leasing Energy Resources on Federal Lands

Accelerated Oil and Gas Leasing on the Outer Continental Shelf

Directs the Secretary of the Interior to increase oil and gas lease offerings on the Outer Continental Shelf both in the Gulf of Mexico and in other areas which appear promising, and to publish a 5-year schedule starting with a general lease sale and a drainage sale this year.

Oil Shale Leasing and Development

Requests the Secretary of the Interior to expedite development of an orderly oil shale leasing program. Environmental protection and recovery of a fair return to the government are fundamental concerns. If they can be satisfied, the first test lease would be scheduled next year.

Geothermal Energy

Requests the Secretary of the Interior to expedite the scheduling of a competitive lease sale this fall under recently enacted legislation, providing again that environmental concerns can be satisfied.

Other Federal Action

Indicates that the United States is willing to "remove quantitative restrictions" on Canadian oil imports, provided that an agreement on the security of this supply can be negotiated with Canada.

Announces that $16 million appropriated for this year will be released to modernize and expand the government's gaseous diffusion plants which produce enriched uranium for conventional nuclear power reactors.

Orders development of a new standard to increase the amount of insulation required in federally insured homes. Standard will reduce heat loss by one-third or more.

a law governing power plant siting, a tax on sulfur oxide emissions, and the creation of a Department of Natural Resources.

As for the question of who will bear the costs of "clean energy," the message made it plain that the major burden ultimately would be the consumer's. At present, Nixon said, the costs to society of producing energy—such as those for pollution control and improved mine safety—"are not all included in the price of the product." In the future, he said, consumers "will have a key role to play as they learn to conserve energy and as they come to understand that the cost of environmental protection must, to a major extent, be reflected in consumer prices."

—ROBERT GILLETTE

Route 128: Jobless in a Dilemma about Politics, Their Professions

Scratch an unemployed scientist or engineer from Boston's high-technology ring road, Route 128, these days and you are likely to find a very confused individual who is wondering whether he is a national resource or a political write-off.

Hardest hit are older professionals who, once fired, appear to have the most difficulty finding new jobs. And the spectacular—sometimes traumatic—upheaval in their lives seems to be changing their political and professional ideas.

In an effort to sample their views, *Science* talked to about 30 people directly concerned with the Route 128 scene. About half of those interviewed were the scientists and engineers themselves; the others were state and company officials. There appears to be a fundamental split over the nature of the problem. Some believe that the problem is temporary, that aerospace will revive and give them back their old jobs. Others are equally convinced that aerospace is finished, and that those out of work will stay so permanently unless they are willing to change fields.

For the last decade, Route 128 has been an enclave of healthy, wealthy activity on the rather bleak industrial scene in Massachusetts. Now it holds an estimated 10,000 unemployed scientists, engineers, and technicians—a conspicuous group, but only 6 percent of the state's 178,000 total unemployed. Massachusetts' textile, shoe, apparel, and electrical manufacturing industries have been ailing for many years, and the economic downturn has only worsened their problems.

Although somewhat more diverse, the Route 128 belt resembles other high-technology neighborhoods that are suffering acutely: Seattle, Washington, the San Francisco peninsula and Orange County in California. The big-name electronics firms in the Route 128 area—Sylvania, Raytheon, Itek, EG&G, Inc., General Electric Corp.—and hundreds of small spinoff firms are now merging, "diversifying," or reducing operations to get through this harsh period.

The principal grim fact emerging for the Route 128 jobless is simply that no jobs are open. A year ago, the big NASA Electronics Research Center in Cambridge closed, and that, symbolically more than numerically, meant to many that things had gotten worse. At that time, many men believed that they could find comparable jobs if they just looked hard enough.

Trying to help them do this has been the Route 128 Professional Service Center, which opened 1 February and is filled with the whir of computers processing resumés and job descriptions, including some out-of-state descriptions. The center is run by a colorful local political figure with an apparently limitless appetite for publicity, Herman LaMark. But according to the U.S. Department of Labor, which oversees the center at a cost of some $90,000, the center has to date interviewed over 4000 professionals, but can confirm that only 200 of them have in fact found jobs. Of these, only 78 are jobs that are "comparable" to their previous positions. The effort to match men with jobs is failing, simply because jobs have not materialized.

The general mood of the men interviewed by *Science* was grim, and expressed in statements such as, "If I had it to do over again I wouldn't be an engineer," and "Yes, I'd urge my children to go to college, but I'd tell them to learn plumbing first," and "Don't talk to me about how I'll put my kids through college—that's 4 years away, and 4 years is infinity."

These unemployed professionals express resentment against the companies that have fired them instead of bothering to retrain them, and against their colleagues who still have jobs. Several told *Science* that their companies have a de facto policy of age discrimination, that they throw out veterans when contracts dry up and hire fresh graduates for new projects in other areas. This system promotes economy in the company payroll, they say, but it wrecks the careers of the older engineers or scientists.

Senior men feel that they have little hope of moving upstairs into top management jobs. The Itek Corporation's *1970 Annual Report to Stockholders* says, "Almost one-half of the managers at the corporate level of 'middle managers' are under 40, and half of those are under 35. Companywide, 130 managers are under 40, with more than one-half of them under 35."

Corporate Outcasts

"The companies used to look for a well-rounded person. Now they want a man with very specialized ability," said one engineer who is working to help the unemployed. "I even inquired in another branch of my company about switching into a totally different area—medical electronics—where I'd never worked before. And I was told by the manager there, 'why should I hire you? I'd have to train you. Instead I can get someone fresh from school more cheaply.' "

Itek Corporation, which has been diversifying, made a follow-up study of its ex-employees. Of the replies, 65 percent of the men under 34 replied that they had found jobs equal to or better than their jobs at Itek, and 34 percent of those aged 35 to 44 said they had found equal or better jobs. But of the men over 44, only 6 percent said they had found equal or better jobs.

The Institute of Electrical and Electronics Engineers and the American Institute of Aeronautics and Astronautics have sponsored workshop seminars to guide the unemployed on how to