FOR IMMEDIATE RELEASE March 16, 1972

Office of the White House Press Secretary

THE WHITE HOUSE

TO THE CONGRESS OF THE UNITED STATES:

The ability of the American people to harness the discoveries of science in the service of man has always been an important element in our national progress. As I noted in my most recent message on the State of the Union, Americans have long been known all over the world for their technological ingenuity -- for being able to "build a better mousetrap" -- and this capacity has undergirded both our domestic prosperity and our international strength.

We owe a great deal to the researchers and engineers, the managers and entrepreneurs who have made this record possible. Again and again they have met what seemed like impossible challenges. Again and again they have achieved success. They have found a way of preventing polio, placed men on the moon, and sent television pictures across the oceans. They have contributed much to our standard of living and our military strength.

But the accomplishments of the past are not something we can rest on. They are something we must build on. I am therefore calling today for a strong new effort to marshal science and technology in the work of strengthening our economy and improving the quality of our life. And I am outlining ways in which the Federal Government can work as a more effective partner in this great task.

The importance of technological innovation has become dramatically evident in the past few years. For one thing, we have come to recognize that such innovation is essential to improving our economic productivity -- to producing more and better goods and services at lower costs. And improved productivity, in turn, is essential if we are to achieve a full and durable prosperity -- without inflation and without war. By fostering greater productivity, technological innovation can help us to expand our markets at home and abroad, strengthening old industries, creating new ones, and generally providing more jobs for the millions who will soon be entering the labor market.

This work is particularly important at a time when other countries are rapidly moving upward on the scientific and technological ladder, challenging us both in intellectual and in economic terms. Our international position in fields such as electronics, aircraft, steel, automobiles and shipbuilding is not as strong as it once was. A better performance is essential to both the health of our domestic economy and our leadership position abroad.

At the same time, the impact of new technology can do much to enrich the quality of our lives. The forces which threaten that quality will be growing at a dramatic pace in the years ahead. One of the great questions of our time is whether our capacity to deal with these forces will grow at a similar rate. The answer to that question lies in our scientific and technological progress.

more

As we face the new challenges of the 1970's, we can draw upon a great reservoir of scientific and technological information and skill -- the result of the enormous investments which both the Federal Government and private enterprise made in research and development in recent years. In addition, this Nation's historic commitment to scientific excellence, its determination to take the lead in exploring the unknown, have given us a great tradition, a rich legacy on which to draw. Now it is for us to extend that tradition by applying that legacy in new situations.

In pursuing this goal, it is important to remember several things. In the first place, we must always be aware that the mere act of scientific discovery alone is not enough. Even the most important breakthrough will have little impact on our lives unless it is put to use -- and putting an idea to use is a far more complex process than has often been appreciated. To accomplish this transformation, we must combine the genius of invention with the skills of entrepreneurship, management, marketing and finance.

Secondly, we must see that the environment for technological innovation is a favorable one. In some cases, excessive regulation, inadequate incentives and other barriers to innovation have worked to discourage and even to impede the entrepreneurial spirit. We need to do a better job of determining the extent to which such conditions exist, their underlying causes, and the best ways of dealing with them.

Thirdly, we must realize that the mere development of a new idea does not necessarily mean that it can or should be put into immediate use. In some cases, laws or regulations may inhibit its implementation. In other cases, the costs of the process may not be worth the benefits it produces. The introduction of some new technologies may produce undesirable side effects. Patterns of living and human behavior must also be taken into account. By realistically appreciating the limits of technological innovation, we will be in a better position fully to marshal its amazing strengths.

A fourth consideration concerns the need for scientific and technological manpower. Creative, inventive, dedicated scientists and engineers will surely be in demand in the years ahead; young people who believe they would find satisfaction in such careers should not hesitate to undertake them. I am convinced they will find ample opportunity to serve their communities and their country in important and exciting ways.

The fifth basic point I would make concerning our overall approach to science and technology in the 1970's concerns the importance of maintaining that spirit of curiosity and adventure which has always driven us to explore the unknown. This means that we must continue to give an important place to basic research and to exploratory experiments which provide the new ideas on which our edifice of technological accomplishment rests. Basic research in both the public and private sectors today is essential to our continuing progress tomorrow. All departments and agencies of the Federal Government will continue to support basic research which can help provide a broader range of future development options.

Finally, we must appreciate that the progress we seek requires a new partnership in science and technology -- one which brings together the Federal Government, private enterprise, State and local governments, and our universities and research centers in a coordinated, cooperative effort to serve the national interest. Each member of that partnership must play

the role it can play best; each must respect and reinforce the unique capacities of the other members. Only if this happens, only if our new partnership thrives, can we be sure that our scientific and technological resources will be used as effectively as possible in meeting our priority national needs.

With a new sense of purpose and a new sense of partnership, we can make the 1970's a great new era for American science and technology. Let us look now at some of the specific elements in this process.

STRENGTHENING THE FEDERAL ROLE

The role of the Federal Government in shaping American science and technology is pivotal. Of all our Nation's expenditures on research and development, 55 percent are presently funded by the Federal Government. Directly or indirectly, the Federal Government supports the employment of nearly half of all research and development personnel in the United States.

A good part of our Federal effort in this field has been directed in the past toward our national security needs. Because a strong national defense is essential to the maintenance of world peace, our research and development in support of national security must always be sufficient to our needs. We must ensure our strategic deterrent capability, continue the modernization of our Armed Forces, and strengthen the overall technological base that underlies future military systems. For these reasons, I have proposed a substantial increase for defense research and development for fiscal year 1973.

In this message, however, I would like to focus on how we can better apply our scientific resources in meeting civilian needs. Since the beginning of this Administration, I have felt that we should be doing more to focus our scientific and technological resources on the problems of the environment, health, energy, transportation and other pressing domestic concerns. If my new budget proposals are accepted, Federal funds for research and development concerning domestic problems will be 65 percent greater in the coming fiscal year than they were in 1969.

But increased funding is not the only prerequisite for progress in this field. We also need to spend our scarce resources more effectively. Accordingly, I have moved to develop an overall strategic approach in the allocation of Federal scientific and technological resources. As a part of this effort, I directed the Domestic Council last year to examine new technology opportunities in relation to domestic problems. In all of our planning, we have been concentrating not only on <u>how</u> <u>much</u> we spend but also on <u>how</u> we spend it.

My recommendations for strengthening the Federal role in science and technology have been presented to the Congress in my State of the Union message, in my budget for fiscal year 1973, and in individual agency presentations. I urge the Congress to support the various elements of this new Federal strategy.

1) We are reorienting our space program to focus on domestic needs -- such as communications, weather forecasting and natural resource exploration. One important way of doing this is by designing and developing a reusable space

shuttle, a step which would allow us to seize new opportunities in space with higher reliability at lower costs.

2) We are moving to set and meet certain civilian research and development targets. In my State of the Union Message, my Budget Message and in other communications with the Congress, I have identified a number of areas where new efforts are most likely to produce significant progress and help us meet pressing domestic needs. They include:

-- Providing new sources of energy without pollution. My proposed budget for fiscal year 1973 would increase energy-related research and development expenditures by 22 percent.

-- Developing fast, safe, pollution-free transportation. I have proposed spending 46 percent more in the coming fiscal year on a variety of transportation projects.

-- Working to reduce the loss of life and property from natural disasters. I have asked, for example, that our earthquake research program be doubled and that our hurricane research efforts be increased.

-- Improving drug abuse rehabilitation programs and efforts to curb drug trafficking. Our budget requests in this critical area are four times the level of 1971.

-- Increasing biomedical research efforts, especially those concerning cancer and heart disease, and generally providing more efficient and effective health care, including better emergency health care systems.

3) We will also draw more directly on the capabilities of our high technology agencies -- the Atomic Energy Commission, the National Aeronautics and Space Administration and the National Bureau of Standards in the Department of Commerce -- in applying research and development to domestic problems.

4) We are making strong efforts to improve the scientific and technological basis for setting Federal standards and regulations. For example, by learning to measure more precisely the level of air pollution and its effects on our health, we can do a more effective job of setting pollution standards and of enforcing those standards once they are established.

5) I am also providing in my 1973 budget for a 12 percent increase for research and development conducted at universities and colleges. This increase reflects the effort of the past 2 years to encourage educational institutions to undertake research related to important national problems.

6) Finally, I believe that the National Science Foundation should draw on all sectors of the scientific and technological community in working to meet significant domestic challenges. To this end, I am taking action to permit the Foundation to support applied research in industry when the use of industrial capabilities would be advantageous in accomplishing the Foundation's objectives.

SUPPORTING RESEARCH AND DEVELOPMENT IN THE PRIVATE SECTOR

The direction of private scientific and technological activities is determined in large measure by thousands of private decisions -- and this should always be the case. But

we cannot ignore the fact that Federal policy also has a great impact on what happens in the private sector. This influence is exerted in many ways -- including direct Federal support for such research and development.

In general, I believe it is appropriate for the Federal Government to encourage private research and development to the extent that the market mechanism is not effective in bringing needed innovations into use. This can happen in a number of circumstances. For example, the sheer size of some developmental projects is beyond the reach of private firms particularly in industries which are fragmented into many small companies. In other cases, the benefits of projects cannot be captured by private institutions, even though they may be very significant for the whole of society. In still other cases, the risks of certain projects, while acceptable to society as a whole, are excessive for individual companies.

In all these cases, Federal support of private research and development is necessary and desirable. We must see that such support is made available -- through cost-sharing agreements, procurement policies or other arrangements.

One example of the benefits of such a partnership between the Federal Government and private enterprise is the program I presented last June to meet our growing need for clean energy. As I outlined the Federal role in this effort, I also indicated that industry's response to these initiatives would be crucial. That response has been most encouraging to date. For example, the electric utilities have already pledged some $25 million a year for a period of 10 years for developing a liquid metal fast breeder reactor demonstration plant. These pledges have come through the Edison Electric Institute, the American Public Power Association, and the National Rural Electric Cooperative Association. This effort is one part of a larger effort by the electrical utilities to raise $150 million annually for research and development to meet the growing demand for clean electric power.

At the same time, the gas companies, through the American Gas Association, have raised $10 million to accelerate the effort to convert coal into gas. This sum represents industry's first year share in a pilot plant program which will be financed one-third by industry and two-thirds by the Federal Government. When it proves feasible to proceed to the demonstration stage, industrial contributions to this project will be expected to increase.

APPLYING GOVERNMENT-SPONSORED TECHNOLOGIES

An asset unused is an asset wasted. Federal research and development activities generate a great deal of new technology which could be applied in ways which go well beyond the immediate mission of the supporting agency. In such cases, I believe the Government has a responsibility to transfer the results of its research and development activities to wider use in the private sector.

It was to further this objective that we created in 1970 the new National Technical Information Service in the Department of Commerce. In addition, the new incentives programs of the National Science Foundation and the National Bureau of Standards will seek effective means of improving and accelerating the transfer of research and development results from Federal programs to a wider range of potential users.

One important barrier to the private development and commercial application of Government-sponsored technologies is the lack of incentive which results from the fact that such technologies are generally available to all competitors. To help remedy this situation, I approved last August a change in the Government patent policy which liberalized the private use of Government-owned patents. I directed that such patents may be made available to private firms through exclusive licenses where needed to encourage commercial application.

As a further step in this same direction, I am today directing my Science Adviser and the Secretary of Commerce to develop plans for a new, systematic effort to promote actively the licensing of Government-owned patents and to obtain domestic and foreign patent protection for technology owned by the United States Government in order to promote its transfer into the civilian economy.

IMPROVING THE CLIMATE FOR INNOVATION

There are many ways in which the Federal Government influences the level and the quality of private research and development. Its direct supportive efforts are important, but other policies -- such as tax, patent, procurement, regulation and antitrust policies -- also can have a significant effect on the climate for innovation.

We know, for instance, that a strong and reliable patent system is important to technological progress and industrial strength. The process of applying technology to achieve our national goals calls for a tremendous investment of money, energy and talent by our private enterprise system. If we expect industry to support this investment, we must make the most effective possible use of the incentives which are provided by our patent system.

The way we apply our antitrust laws can also do much to shape research and development. Uncertain reward and high risks can be significant barriers to progress when a firm is small in relation to the scale of effort required for successful projects. In such cases, formal or informal combinations of firms provide one means for hurdling these barriers, especially in highly fragmented industries. On the other hand, joint efforts among leading firms in highly concentrated industries would normally be considered undesirable. In general, combinations which lead to an improved allocation of the resources of the nation are normally permissible, but actions which lead to excessive market power for any single group are not. Any joint program for research and development must be approached in a way that does not detract from the normal competitive incentives of our free enterprise economy.

I believe we need to be better informed about the full consequences of all such policies for scientific and technological progress. For this reason, I have included in my budget for the coming fiscal year a program whereby the National Science Foundation would support assessments and studies focused specifically on barriers to technological innovation and on the consequences of adopting alternative Federal policies which would reduce or eliminate these barriers. These studies would be undertaken in close consultation with the Executive Office of the President, the Department of Commerce and other concerned departments and agencies, so that the results can be most expeditiously considered as further Government decisions are made.

There are a number of additional steps which can also do much to enhance the climate for innovation.

1) I shall submit legislation to encourage the development of the small, high technology firms which have had such a distinguished pioneering record. Because the combination of high technology and small size makes such firms exceptionally risky from an investment standpoint, my proposal would provide additional means for the Small Business Investment Companies (SBICs) to improve the availability of venture capital to such firms.

a. I propose that the ratio of Government support to SBICs be increased. This increased assistance would be channeled to small business concerns which are principally engaged in the development or exploitation of inventions or of technological improvements and new products.

b. I propose that the current limit on Small Business Administration loans to each SBIC be increased to $20 million to allow for growth in SBIC funds devoted to technology investments.

c. I propose that federally regulated commercial banks again be permitted to achieve up to 100 percent ownership of an SBIC, rather than the limited 50 percent ownership which is allowed at present.

d. To enhance risk-taking and entrepreneurial ventures, I again urge passage of the small business tax bill, which would provide for extending the eligibility period for the exercise of qualified stock options from 5 to 8 or 10 years, reducing the holding period for non-registered stock from 3 years to 1 year, and extending the tax-loss carry-forward from 5 to 10 years. These provisions would apply to small firms, as defined in the proposed legislation.

2) I have requested in my proposed budget for fiscal year 1973 that new programs be set up by the National Science Foundation and the National Bureau of Standards to determine effective ways of stimulating non-Federal investment in research and development and of improving the application of research and development results. The experiments to be set up under this program are designed to test a variety of partnership arrangements among the various levels of government, private firms and universities. They would include the exploration of new arrangements for cost-sharing, patent licensing, and research support, as well as the testing of incentives for industrial research associations.

3) To provide a focal point within the executive branch for policies concerning industrial research and development, the Department of Commerce will appraise, on a continuing basis, the technological strengths and weaknesses of American industry. It will propose measures to assure a vigorous state of industrial progress. The Department will work with other agencies in identifying barriers to such progress and will draw on the studies and assessments prepared through the National Science Foundation and the National Bureau of Standards.

4) To foster useful innovation, I also plan to establish a new program of research and development prizes. These prizes will be awarded by the President for outstanding achievements by individuals and institutions and will be used especially to encourage needed innovation in key areas of public concern. I believe these prizes will be an important symbol of the Nation's concern for our scientific and technological challenges.

5) An important step which could be of great significance in fostering technological innovations and enhancing our position in world trade is that of changing to the metric system of measurement. The Secretary of Commerce has submitted to the Congress legislation which would allow us to begin to develop a carefully coordinated national plan to bring about this change. The proposed legislation would bring together a broadly representative board of private citizens who would work with all sectors of our society in planning for such a transition. Should such a change be decided on, it would be implemented on a cooperative, voluntary basis.

STRONGER FEDERAL, STATE AND LOCAL PARTNERSHIPS

A consistent theme which runs throughout my program for making government more responsive to public needs is the idea that each level of government should do what it can do best. This same theme characterizes my approach to the challenges of research and development. The Federal Government, for example, can usually do a good job of massing research and development resources. But State and local governments usually have a much better "feel" for the specific public challenges to which those resources can be applied. If we are to use science and technology effectively in meeting these challenges, then State and local governments should have a central role in the application process. That process is a difficult one at best; it will be even more complex and frustrating if the States and localities are not adequately involved.

To help build a greater sense of partnership among the three levels of the Federal system, I am directing my Science Adviser, in cooperation with the Office of Intergovernmental Relations, to serve as a focal point for discussions among various Federal agencies and the representatives of State and local governments. These discussions should lay the basis for developing a better means for collaboration and consultation on scientific and technological questions in the future. They should focus on the following specific subjects:

1) Systematic ways for communicating to the appropriate Federal agencies the priority needs of State and local governments, along with information concerning locally-generated solutions to such problems. In this way, such information can be incorporated into the Federal research and development planning process.

2) Ways of assuring State and local governments adequate access to the technical resources of major Federal research and development centers, such as those which are concerned with transportation, the environment, and the development of new sources of energy.

3) Methods whereby the Federal Government can encourage the aggregation of State and local markets for certain products so that industries can give government purchasers the benefits of innovation and economies of scale.

The discussions which take place between Federal, State and local representatives can also help to guide the experimental programs I have proposed for the National Science Foundation and the National Bureau of Standards. These programs, in turn, can explore the possibilities for creating better ties between State and local governments on the one hand and local industries and universities on the other, thus stimulating the use of research and development in improving the

efficiency and effectiveness of public services at the State and local level.

WORLD PARTNERSHIP IN SCIENCE AND TECHNOLOGY

The laws of nature transcend national boundaries. Increasingly, the peoples of the world are irrevocably linked in a complex web of global interdependence -- and increasingly the strands of that web are woven by science and technology.

The cause of scientific and technological progress has always been advanced when men have been able to reach across international boundaries in common pursuits. Toward this end, we must now work to facilitate the flow of people and the exchange of ideas, and to recognize that the basic problems faced in each nation are shared by every nation.

I believe this country can benefit substantially from the experience of other countries, even as we help other countries by sharing our information and facilities and specialists with them. To promote this goal, I am directing the Federal agencies, under the leadership of the Department of State, to identify new opportunities for international cooperation in research and development. At the same time, I am inviting other countries to join in research efforts in the United States, including:

-- the effort to conquer cancer at the unique research facilities of our National Institutes of Health and at Fort Detrick, Maryland; and

-- the effort to understand the adverse health effects of chemicals, drugs and pollutants at the new National Center for Toxicological Research at Pine Bluff, Arkansas.

These two projects concern priority problems which now challenge the whole world's research community. But they are only a part of the larger fabric of cooperative international efforts in which we are now engaged.

Science and technology can also provide important links with countries which have different political systems from ours. For example, we have recently concluded an agreement with the Soviet Union in the field of health, an agreement which provides for joint research on cancer, heart disease and environmental health problems. We are also cooperating with the Soviet Union in the space field; we will continue to exchange lunar samples and we are exploring prospects for closer cooperation in satellite meteorology, in remote sensing of the environment, and in space medicine. Beyond this, joint working groups have verified the technical feasibility of a docking mission between a SALYUT Station and an Apollo spacecraft.

One result of my recent visit to the People's Republic of China was an agreement to facilitate the development of contacts and exchanges in many fields, including science and technology. I expect to see further progress in this area.

The United Nations and a number of its specialized agencies are also involved in a wide range of scientific and technological activities. The importance of these tasks -- and the clear need for an international approach to technical problems with global implications -- argues for the most effective possible organization and coordination of various international agencies concerned. As a step in this direction, I proposed in a recent message to the Congress the creation of

a United Nations Fund for the Environment to foster an international attack on environmental problems. Also, I believe the American scientific community should participate more fully in the science activities of international agencies.

To further these objectives, I am taking steps to initiate a broad review of United States involvement in the scientific and technological programs of international organizations and of steps that might be taken to make United States participation in these activities more effective, with even stronger ties to our domestic programs.

Finally, I would emphasize that United States science and technology can and must play an important role in the progress of developing nations. We are committed to bring the best of our science and technology to bear on the critical problems of development through our reorganized foreign assistance programs.

A NEW SENSE OF PURPOSE AND A NEW SENSE OF PARTNERSHIP

The years ahead will require a new sense of purpose and a new sense of partnership in science and technology. We must define our goals clearly, so that we know where we are going. And then we must develop careful strategies for pursuing those goals, strategies which bring together the Federal Government, the private sector, the universities, and the States and local communities in a cooperative pursuit of progress. Only then can we be confident that our public and private resources for science and technology will be spent as effectively as possible.

In all these efforts, it will be essential that the American people be better equipped to make wise judgments concerning public issues which involve science and technology. As our national life is increasingly permeated by science and technology, it is important that public understanding grow apace.

The investment we make today in science and technology and in the development of our future scientific and technical talent is an investment in tomorrow -- an investment which can have a tremendous impact on the basic quality of our lives. We must be sure that we invest wisely and well.

RICHARD NIXON

THE WHITE HOUSE,

March 16, 1972.

# # #

FOR IMMEDIATE RELEASE March 16, 1972

Office of the White House Press Secretary

THE WHITE HOUSE

FACT SHEET

MESSAGE ON SCIENCE AND TECHNOLOGY

BACKGROUND

The Message being sent to Congress today is the first Presidential Message on Science and Technology in the nation's history.

Scientific research and development account for some $27 billion worth of goods and services in this country. Approximately $17.8 billion worth will be paid for by the Federal government.

As the President pointed out in the State of the Union Message, the nation has a special bent for science and technology and our ability to harness it for the purposes of man. He is presently evolving a long term strategy "outlining ways in which the Federal Government can work as a more effective partner in this great task."

That strategy's key elements are:

o The maintenance of strong, sensible research and development programs in space and defense;

o The application of our scientific and technological genius to domestic opportunities;

o The stimulation -- in an area in which we lack full understanding -- of the processes of research and development through both public and private sources;

o The employment of our technologically-oriented agencies in support of agencies with social missions;

o The focussing of our resources on clear targets where breakthroughs are most likely.

Accordingly, the President has asked for $17.8 billion in the FY '73 budget for Research and Development, an increase of $1.4 billion (more than 8 percent) over FY '72. He has also asked for more than $700 million in new money for civilian R&D programs, a growth of 65 percent -- from $3.3 billion to $5.4 billion -- in civilian sector R&D since 1969.

Today's Message to the Congress resulted from continuing studies by the Office of Science and Technology, the White House R&D arm; special studies by the Domestic Council to identify new areas amenable to technological opportunities; recent consultations with industry, academic, business, scientific and other professional groups; thorough soundings of major Federal agencies and departments; and ongoing reviews of R&D related issues by White House task groups.

THE MESSAGE IN BRIEF

The President calls for new actions, relationships and legislation designed to enhance research and development in all sectors -- government, universities and private industry -- with the Federal government playing a catalytic role wherever possible.

more

The President today proposes actions aimed at enhancing the application of the nation's R&D capacity to civilian needs. "We must appreciate that the progress we seek requires a new partnership in science and technology -- one which brings together the Federal government, private enterprise, state and local governments and our universities and research centers in a coordinated, cooperative effort to serve the national interests," he told the Congress.

As part of a multi-faceted approach to such efforts, he pointed out that:

"Even the most important breakthrough will have little impact on our lives unless it is put to use -- and putting an idea to use is a far more complex process than has often been appreciated.

"We must see that the environment for technological innovation is a favorable one," one without "impediments of excessive regulation, inadequate incentives or other barriers...

"...We must realize that the mere development of a new idea does not necessarily mean that it can or should be put into immediate use...By realistically appreciating the limits of technological innovation we will be in a better position fully to marshal its amazing strengths.

"Creative, inventive dedicated scientists and engineers will surely be in demand in the years ahead...I am convinced that they will find ample opportunity to serve...

"...We must continue to give an important place to basic research and to exploratory experiments...Basic research in both the public and private sectors is essential to our continuing progress tomorrow. All departments and agencies...should support basic research so as to provide a broader range of future options."

The President recognizes that the Federal government is in a position to exert substantial leverage on the entire R&D enterprise since it employs 45-50 percent of the R&D personnel and finances 55 percent or more of all R&D.

ACTIONS ANNOUNCED IN THE MESSAGE

Actions to stimulate support for R&D and innovation in the private sector:

- The development of plans for a more active patent filing and licensing program for government-owned inventions both at home and abroad.

- The support, through the National Science Foundation, of applied research in industry when its use would be advantageous to accomplish NSF objectives. (Under section 3(c) of the National Science Foundation Act of 1950, as amended.)

- Studies by the NSF of the effects of Federal tax, patent, procurement, regulatory and antitrust policies on technological innovation.

- Submission of legislation soon to increase the ratio of government support to Small Business Investment Companies; to increase the limit on Small Business Administration Loans to SBIC's; to permit Federally regulated commercial banks to achieve 100% ownership of an SBIC.

more

- o New programs in the NSF and the National Bureau of Standards to determine effective ways to stimulate private investment in R&D and its application.

- o A program of research and development prizes awarded by the President for achievements in key areas of public concern.

- o Designation of the Department of Commerce as the Executive Branch focal point for policy development concerning industrial R&D.

Actions to strengthen collaboration between the Federal agencies and State and local governments:

- o Designation of the President's Science Adviser and the White House Office of Intergovernmental Relations as the focal point for Federal agency discussions with representatives of State and local governments in order to examine ways:

  -- To communicate the priority needs of State and local governments to guide Federal R&D planning.

  -- To assure State and local government access to the technical resources of major Federal R&D centers concerned with domestic problems.

  -- To encourage aggregation of State and local markets to stimulate innovation and economies of scale.

- o Experimental programs in the NSF and NBS to stimulate the use of R&D by State and local governments and to strengthen their ties to local industry and the universities.

Actions to strengthen cooperation between the United States and other nations in science and technology:

- o Direction to Federal agencies to identify new opportunities for international cooperation in R&D;

- o Invitation to other countries to join research efforts in the U.S. (in cancer research at NIH and Fort Detrick, Maryland, and in research on the health effects of chemicals and pollutants at the National Center for Toxicological Research at Pine Bluff, Arkansas.

- o Initiation of a broad review of U.S. involvement in international scientific and technological organization programs.

BACKGROUND ON FEDERAL R&D

In his State of the Union Message and in his budget, the President initiated the key elements of his strategy. Here are the highlights as taken from those documents:

DEFENSE AND SPACE PROGRAMS

The Department of Defense will increase its research and development funding by $767 million in FY 1973. This includes an increase of $123 million for research. The Navy R&D budget is up 14%, the Army 11% and the Air Force 9%.

Oceanography, biomedical research, atmospheric sciences, electronics and materials are important areas of research interest. Significant development thrusts are stronger sea-based strategic deterrents and new capabilities and increased effectiveness for general purpose forces.

He also proposed a new National Aeronautics and Space Administration budget for space sciences research -- an all-time high -- up 25% to $554 million. The space agency's applications research program increased $17 million to $201 million. Funds are requested for a new generation Orbiting Solar Observatory, and National Aeronautics and Space Administration will launch missions to Mars in 1975 and to Jupiter and Saturn in the 1977-78 period.

Manned Apollo missions 16 and 17 are to take place as scheduled this year. In 1973, Skylab, a three-man reusable space station, will be visited by three separate teams of astronauts for periods of up to 56 days. The Space Shuttle program for the late '70's was approved by the President on January 5. The overall cost of developing the reusable, two-part launch vehicle/orbiter is estimated at $5.5 billion over the next six years. Alternative advanced propulsion technologies will also be examined, including a small nuclear engine, for possible unmanned outer planets missions and other applications in the 1980's.

UTILIZING THE CAPABILITIES OF HIGH TECHNOLOGY AGENCIES

The President in the State of the Union message announced the decision to draw more on the capabilities of the high technology agencies such as the National Aeronautics and Space Administration, the Atomic Energy Commission and the National Bureau of Standards to deal with domestic problems and meet long-range national goals, but without diverting them from their primary missions. For example, our outstanding capabilities in space technology should be used to help the Department of Transportation develop better mass transportation systems.

TARGETS FOR RESEARCH AND DEVELOPMENT

Of the total civilian R&D increase of more than $700 million, almost $400 million of the increase is focused in five technology opportunity areas identified by the President in the State of the Union Message. As the President stated, these are areas where an extra effort in R&D is "most likely to produce a breakthrough and where the breakthrough is most likely to make a difference in our lives," but they do not represent our total civilian R&D effort.

(1) Abundant and Clean Energy Sources

An additional $88 million is being obligated for work on clean, abundant energy sources, a total of $480 million and some $392 million more than last year. This is an increase of more than 22 percent.

A broad research and development program is crucial to balance environmental and energy needs. Further effort will be devoted to the development of pollution control technologies in order to provide additional options for meeting air quality standards at lower costs. Research and development programs identified in the Energy Message of June 1971 will be expanded, including the fast breeder reactor for nuclear power, coal gasification, magneto-hydrodynamics controlled thermonuclear fusion power, solar energy and mapping and basic assessment of the resources of the Outer Continental Shelf.

The 1973 budget also provides for research by the Atomic Energy Commission on advanced dry cooling towers and large scale energy storage batteries, cryogenic power generation and transmission in the AEC and National Bureau of Standards, greater use of laser technology in fusion power research under the AEC, and research by the Department of the Interior on the uses of low-BTU gas produced -- with less pollution -- from coal.

(2) Safe, Fast Pollution-free Transportation

Obligations for R&D in transportation are being increased 46%, from $456 million in FY '72 to $666 million in FY '73.

New and expanded research and development programs will explore systems which are not only safer and more efficient but which reduce adverse environmental impacts. Programs will be initiated or expanded to attack the problem of truck and aircraft noise, develop more attractive and economical mass transit vehicles, and provide for safer automobiles.

Work will be accelerated on personal rapid transit, which provides individualized, nonstop service for commuters; and new work will be undertaken on dual-mode systems for metropolitan areas which might combine the convenience of the automobile with the efficiency of a rapid transit system and on new tunneling technologies to reduce the cost of underground excavation for mass transit. Work on advanced air traffic control concepts, a short takeoff and landing (STOL) aircraft, and quiet aircraft engines will continue at higher levels to provide more efficient, safer air transportation with reduced environmental impact. In these more advanced fields of both ground and air transportation, the capabilities of NASA will assist in meeting R&D program objectives. Similarly, the technical talent of AEC will be utilized in advanced work on tunneling.

(3) Reducing Losses from Natural Disasters

Funding in this area is being increased from $93 million in FY '72 to $136 million in FY '73, or 46%.

Natural disasters take an unwarranted toll on human life and property. In 1969, 12,000 people died from fires alone and $2.4 billion in property was destroyed. While increased warning time has significantly reduced deaths from hurricanes, property damage has increased dramatically to some $2.4 billion during 1965 through 1969.

Research efforts will be accelerated to diminish losses of lives and property from these and other hazards and natural disasters. Particular attention will be focused on research in hurricane modification to reduce damage from surface winds; on the prediction -- and ultimately control -- of earthquakes and on engineering to design safer structures; and on fire research -- including forest fires.

(4) Effective Emergency Health Care

An 88% expansion in funding, from $8 million to $15 million, is proposed for new demonstration projects.

One health need that has yet to be properly addressed is the provision of adequate emergency medical service. New technologies are available which can help in this field. The problem is to pull together these technologies into a system which effectively links communication, transportation of victims, ambulance equipment and services, trained manpower, and emergency room hospital service.

Full-scale demonstration of such integrated emergency treatment systems -- as planned in the 1973 budget -- can be undertaken with relatively small amounts of added Federal funds to act as a catalyst.

(5) Curbing Drug Traffic and Rehabilitating Users

Funds amounting to $60 million have been requested for FY '73, an increase of 20% over the 1972 amount of $50 million. This year's budget provides for an overall fourfold increase in research budgets of a number of agencies over the two-year period since 1971.

The June 1971 message to the Congress on drug abuse prevention and control recognized the need for a major effort to curb a problem that is assuming the dimensions of a national emergency. This message called for the creation of a Special Action Office for drug abuse prevention. The search for new ways to curb drug trafficking and to rehabilitate drug users has been stepped up in both 1972 and 1973.

As the President said of these R&D programs in his State of the Union Message: "And these are only the beginning."

# # # # #

FOR IMMEDIATE RELEASE March 16, 1972

Office of the White House Press Secretary

THE WHITE HOUSE

FACT SHEET

MESSAGE ON SCIENCE AND TECHNOLOGY

BACKGROUND

The Message being sent to Congress today is the first Presidential Message on Science and Technology in the nation's history.

Scientific research and development account for some $27 billion worth of goods and services in this country. Approximately $17.8 billion worth will be paid for by the Federal government.

As the President pointed out in the State of the Union Message, the nation has a special bent for science and technology and our ability to harness it for the purposes of man. He is presently evolving a long term strategy "outlining ways in which the Federal Government can work as a more effective partner in this great task."

That strategy's key elements are:

o The maintenance of strong, sensible research and development programs in space and defense;

o The application of our scientific and technological genius to domestic opportunities;

o The stimulation -- in an area in which we lack full understanding -- of the processes of research and development through both public and private sources;

o The employment of our technologically-oriented agencies in support of agencies with social missions;

o The focussing of our resources on clear targets where breakthroughs are most likely.

Accordingly, the President has asked for $17.8 billion in the FY '73 budget for Research and Development, an increase of $1.4 billion (more than 8 percent) over FY '72. He has also asked for more than $700 million in new money for civilian R&D programs, a growth of 65 percent -- from $3.3 billion to $5.4 billion -- in civilian sector R&D since 1969.

Today's Message to the Congress resulted from continuing studies by the Office of Science and Technology, the White House R&D arm; special studies by the Domestic Council to identify new areas amenable to technological opportunities; recent consultations with industry, academic, business, scientific and other professional groups; thorough soundings of major Federal agencies and departments; and ongoing reviews of R&D related issues by White House task groups.

THE MESSAGE IN BRIEF

The President calls for new actions, relationships and legislation designed to enhance research and development in all sectors -- government, universities and private industry -- with the Federal government playing a catalytic role wherever possible.

more

The President today proposes actions aimed at enhancing the application of the nation's R&D capacity to civilian needs. "We must appreciate that the progress we seek requires a new partnership in science and technology -- one which brings together the Federal government, private enterprise, state and local governments and our universities and research centers in a coordinated, cooperative effort to serve the national interests," he told the Congress.

As part of a multi-faceted approach to such efforts, he pointed out that:

"Even the most important breakthrough will have little impact on our lives unless it is put to use -- and putting an idea to use is a far more complex process than has often been appreciated.

"We must see that the environment for technological innovation is a favorable one," one without "impediments of excessive regulation, inadequate incentives or other barriers...

"...We must realize that the mere development of a new idea does not necessarily mean that it can or should be put into immediate use...By realistically appreciating the limits of technological innovation we will be in a better position fully to marshal its amazing strengths.

"Creative, inventive dedicated scientists and engineers will surely be in demand in the years ahead...I am convinced that they will find ample opportunity to serve...

"...We must continue to give an important place to basic research and to exploratory experiments...Basic research in both the public and private sectors is essential to our continuing progress tomorrow. All departments and agencies...should support basic research so as to provide a broader range of future options."

The President recognizes that the Federal government is in a position to exert substantial leverage on the entire R&D enterprise since it employs 45-50 percent of the R&D personnel and finances 55 percent or more of all R&D.

ACTIONS ANNOUNCED IN THE MESSAGE

Actions to stimulate support for R&D and innovation in the private sector:

- The development of plans for a more active patent filing and licensing program for government-owned inventions both at home and abroad.

- The support, through the National Science Foundation, of applied research in industry when its use would be advantageous to accomplish NSF objectives. (Under section 3(c) of the National Science Foundation Act of 1950, as amended.)

- Studies by the NSF of the effects of Federal tax, patent, procurement, regulatory and antitrust policies on technological innovation.

- Submission of legislation soon to increase the ratio of government support to Small Business Investment Companies; to increase the limit on Small Business Administration Loans to SBIC's; to permit Federally regulated commercial banks to achieve 100% ownership of an SBIC.

- o New programs in the NSF and the National Bureau of Standards to determine effective ways to stimulate private investment in R&D and its application.

- o A program of research and development prizes awarded by the President for achievements in key areas of public concern.

- o Designation of the Department of Commerce as the Executive Branch focal point for policy development concerning industrial R&D.

Actions to strengthen collaboration between the Federal agencies and State and local governments:

- o Designation of the President's Science Adviser and the White House Office of Intergovernmental Relations as the focal point for Federal agency discussions with representatives of State and local governments in order to examine ways:

  -- To communicate the priority needs of State and local governments to guide Federal R&D planning.

  -- To assure State and local government access to the technical resources of major Federal R&D centers concerned with domestic problems.

  -- To encourage aggregation of State and local markets to stimulate innovation and economies of scale.

- o Experimental programs in the NSF and NBS to stimulate the use of R&D by State and local governments and to strengthen their ties to local industry and the universities.

Actions to strengthen cooperation between the United States and other nations in science and technology:

- o Direction to Federal agencies to identify new opportunities for international cooperation in R&D;

- o Invitation to other countries to join research efforts in the U.S. (in cancer research at NIH and Fort Detrick, Maryland, and in research on the health effects of chemicals and pollutants at the National Center for Toxicological Research at Pine Bluff, Arkansas.

- o Initiation of a broad review of U.S. involvement in international scientific and technological organization programs.

BACKGROUND ON FEDERAL R&D

In his State of the Union Message and in his budget, the President initiated the key elements of his strategy. Here are the highlights as taken from those documents:

DEFENSE AND SPACE PROGRAMS

The Department of Defense will increase its research and development funding by $767 million in FY 1973. This includes an increase of $123 million for research. The Navy R&D budget is up 14%, the Army 11% and the Air Force 9%.

Oceanography, biomedical research, atmospheric sciences, electronics and materials are important areas of research interest. Significant development thrusts are stronger sea-based strategic deterrents and new capabilities and increased effectiveness for general purpose forces.

He also proposed a new National Aeronautics and Space Administration budget for space sciences research -- an all-time high -- up 25% to $554 million. The space agency's applications research program increased $17 million to $201 million. Funds are requested for a new generation Orbiting Solar Observatory, and National Aeronautics and Space Administration will launch missions to Mars in 1975 and to Jupiter and Saturn in the 1977-78 period.

Manned Apollo missions 16 and 17 are to take place as scheduled this year. In 1973, Skylab, a three-man reusable space station, will be visited by three separate teams of astronauts for periods of up to 56 days. The Space Shuttle program for the late '70's was approved by the President on January 5. The overall cost of developing the reusable, two-part launch vehicle/orbiter is estimated at $5.5 billion over the next six years. Alternative advanced propulsion technologies will also be examined, including a small nuclear engine, for possible unmanned outer planets missions and other applications in the 1980's.

UTILIZING THE CAPABILITIES OF HIGH TECHNOLOGY AGENCIES

The President in the State of the Union message announced the decision to draw more on the capabilities of the high technology agencies such as the National Aeronautics and Space Administration, the Atomic Energy Commission and the National Bureau of Standards to deal with domestic problems and meet long-range national goals, but without diverting them from their primary missions. For example, our outstanding capabilities in space technology should be used to help the Department of Transportation develop better mass transportation systems.

TARGETS FOR RESEARCH AND DEVELOPMENT

Of the total civilian R&D increase of more than $700 million, almost $400 million of the increase is focused in five technology opportunity areas identified by the President in the State of the Union Message. As the President stated, these are areas where an extra effort in R&D is "most likely to produce a breakthrough and where the breakthrough is most likely to make a difference in our lives," but they do not represent our total civilian R&D effort.

(1) Abundant and Clean Energy Sources

An additional $88 million is being obligated for work on clean, abundant energy sources, a total of $480 million and some $392 million more than last year. This is an increase of more than 22 percent.

A broad research and development program is crucial to balance environmental and energy needs. Further effort will be devoted to the development of pollution control technologies in order to provide additional options for meeting air quality standards at lower costs. Research and development programs identified in the Energy Message of June 1971 will be expanded, including the fast breeder reactor for nuclear power, coal gasification, magneto-hydrodynamics controlled thermonuclear fusion power, solar energy and mapping and basic assessment of the resources of the Outer Continental Shelf.

The 1973 budget also provides for research by the Atomic Energy Commission on advanced dry cooling towers and large scale energy storage batteries, cryogenic power generation and transmission in the AEC and National Bureau of Standards, greater use of laser technology in fusion power research under the AEC, and research by the Department of the Interior on the uses of low-BTU gas produced -- with less pollution -- from coal.

(2) Safe, Fast Pollution-free Transportation

Obligations for R&D in transportation are being increased 46%, from $456 million in FY '72 to $666 million in FY '73.

New and expanded research and development programs will explore systems which are not only safer and more efficient but which reduce adverse environmental impacts. Programs will be initiated or expanded to attack the problem of truck and aircraft noise, develop more attractive and economical mass transit vehicles, and provide for safer automobiles.

Work will be accelerated on personal rapid transit, which provides individualized, nonstop service for commuters; and new work will be undertaken on dual-mode systems for metropolitan areas which might combine the convenience of the automobile with the efficiency of a rapid transit system and on new tunneling technologies to reduce the cost of underground excavation for mass transit. Work on advanced air traffic control concepts, a short takeoff and landing (STOL) aircraft, and quiet aircraft engines will continue at higher levels to provide more efficient, safer air transportation with reduced environmental impact. In these more advanced fields of both ground and air transportation, the capabilities of NASA will assist in meeting R&D program objectives. Similarly, the technical talent of AEC will be utilized in advanced work on tunneling.

(3) Reducing Losses from Natural Disasters

Funding in this area is being increased from $93 million in FY '72 to $136 million in FY '73, or 46%.

Natural disasters take an unwarranted toll on human life and property. In 1969, 12,000 people died from fires alone and $2.4 billion in property was destroyed. While increased warning time has significantly reduced deaths from hurricanes, property damage has increased dramatically to some $2.4 billion during 1965 through 1969.

Research efforts will be accelerated to diminish losses of lives and property from these and other hazards and natural disasters. Particular attention will be focused on research in hurricane modification to reduce damage from surface winds; on the prediction -- and ultimately control -- of earthquakes and on engineering to design safer structures; and on fire research -- including forest fires.

(4) Effective Emergency Health Care

An 88% expansion in funding, from $8 million to $15 million, is proposed for new demonstration projects.

One health need that has yet to be properly addressed is the provision of adequate emergency medical service. New technologies are available which can help in this field. The problem is to pull together these technologies into a system which effectively links communication, transportation of victims, ambulance equipment and services, trained manpower, and emergency room hospital service.

Full-scale demonstration of such integrated emergency treatment systems -- as planned in the 1973 budget -- can be undertaken with relatively small amounts of added Federal funds to act as a catalyst.

(5) Curbing Drug Traffic and Rehabilitating Users

Funds amounting to $60 million have been requested for FY '73, an increase of 20% over the 1972 amount of $50 million. This year's budget provides for an overall fourfold increase in research budgets of a number of agencies over the two-year period since 1971.

The June 1971 message to the Congress on drug abuse prevention and control recognized the need for a major effort to curb a problem that is assuming the dimensions of a national emergency. This message called for the creation of a Special Action Office for drug abuse prevention. The search for new ways to curb drug trafficking and to rehabilitate drug users has been stepped up in both 1972 and 1973.

As the President said of these R&D programs in his State of the Union Message: "And these are only the beginning."

# # # # #

(363 6352)

For Release MARCH 20, 1972, AM's

STATEMENT BY RALPH NADER ON THE WHITE HOUSE RECAT REPORT

On behalf of the White House, the Office of Science and Technology has prepared and released the RECAT report as another effort to intimidate the federal regulatory agencies responsible for regulating motor vehicle air pollution and safety. Never in the history of the Office of Science and Technology has it been so manipulated or, the in the current parlance of the White House scene, so Flaniganized. This report was the inspiration of Peter Flanigan who pursued it all the way to its predetermined destination. It is a mockery of scientific integrity and competence and a penny-ante caricature of think tank studies.

RECAT uses a mass of erratic statistics to prove that air pollution and safety regulation are not worth the cost to the consumer, but disregards the excessive industry profit margins and outrageous costs of unneeded and unwanted "standard" equipment. In contrast, the report is uncritical of the way the government is handling the drinking driver and highway programs which industry generally finds it advantageous to support.

Specific deficiencies include:

--RECAT tells the government to use cost-effectiveness computations before proposing safety and pollution standards, but it blithely ignores the industry's refusal to supply cost figures. RECAT uses the industry's retail price figures which it fails to mention include an unknown profit margin. For example, it quotes the industry's retail price figure of $152 per car for safety equipment through 1971. The Bureau of Labor Statistics retail figure is $81.50, but this figure is buried in the middle of the report and is not included in the summary tables where RECAT's estimate of $118 is given without explanation.

81.50 — 118 — 152 miles — dollars

-- RECAT grossly underestimates the value of human life as $140,000. By contrast, the Brookings Institution recently gave "a conservative estimate" of $275,000. Ignored by RECAT are the radiating costs of family disruption, personal suffering, reduction in standard of living, by-passed educational opportunities, economic dislocations, and other less quantifiable factors.

-- The utter sellout to the special interests of the automotive industry is conclusively evidenced by the RECAT proposal that safety and air pollution regulation be tailored to the manufacturer's vanishing style change cycle. Needless style changes currently cost the consuming public hundreds of millions of dollars per year. Such useless expenditures (except to the automobile industry in creating artificial demand) should be clearly subservient to the public health and welfare.

-- On the air bag, the report blithely and uncritically uses industry estimates on air bag costs but ignores the elasticity in vehicle cost tradeoffs between style and safety. The air bag could add nothing to the price of a car if the auto companies substituted it for some of the existing chrome and style gimmicks. In contrast, RECAT decreases industry figures for seatbelt costs, and ignores the cost of inertial reels required in 1973. Worse it does not even mention the demonstrated superiority of the air bag in high speed crashes; in protecting children, pregnant women, and out-sized people; and the greatly increased convenience and usage rates.

In its comparisons, RECAT also forgets the horrid design of many present shoulder harnesses, and the large number of owners who will disconnect their seatbelt warnings and interlocks. The committee bases its cost-benefit estimates on 80% seat belt use, but does not have the courage to recommend that seat belt usage be required by law. The committee's "expert" on air bags is Mr. P.J. Brown, an outspoken opponent of the air bag who only recently joined the NHTSA in a government reorganization move.

--Instead of specific legislative emission standards and public rule making, RECAT proposes flexible administrative action and closed door negotiations with industry which would then present the public with faits accomplis. The public would be informed of proposed rule making "only after the costs, benefits, and side-effects of the intended regulations are understood to the extent possible by the parties concerned." Obviously, the public which breathes the noxious emissions of motor vehicles are not "parties concerned" and not privy to those secret negotiations because they are not notified until "publication". Is this any way to treat an industry that was conspiring, according to the Justice Department's January 1969 complaint, to restrain air pollution control technology behind closed doors from as early as 1953?

--RECAT commends the industry for its "intensive development effort" in developing 1976 NOx controls. The National Academy of Sciences, after reviewing the same data, criticized the auto industry in January 1972 saying, "The level of current research and development on reduction catalysts for NOx control is not commensurate with the importance of this problem."

-- The suggested RECAT two-car strategy (a "high-emission"car and a "low-emission" car) is not soundly based as the report does not consider that the vehicle population is sold or resold every 3 years and 20 percent of the population moves every year. Combining these two factors with motoring trips from one region to another precludes any cost-effective administration of such a two-car system. And, there is not mention of the problem of vehicle travel by people who live in a high-emission car region, such as West Virginia, being completely surrounded by low-emission regions.

-- The cost-benefit analysis of air pollution control is naive if not completely erroneous. The cost of automotive air pollution is based on 1968 data when approximately 14% of the vehicle population had emission controls that reduced hydrocarbon and carbon monoxide emission levels by about 18% and 6% respectively. Benefits from those reductions were ignored, yet the costs of controls to reach these levels were considered. Last week, EPA released a more accurate report showing the 1976 pollution controls to be cost-effective.

The politicized incompetence of those who produced the RECAT report would have been even more evident if it had not had a last minute review by DOT staff who while disagreeing with the report managed to tone down some of the flagrant excursions into techno-economic idiocy. The Office of Science and Technology should not lend a veneer of prestige to the conscious deceptions and virtual professional malpractice of those directing the preparation of this pseudo-scientific report.

The public is entitled to disclosure by the RECAT group of all its meetings and other contacts with the auto industry and all reports and other written filings supplied by the auto companies and trade associations so that an objective evaluation of the basis for the RECAT opinions can be made.

For information contact Carl Nash or Clarence M. Ditlow at 833-9700

Bill Pochman

BURTON BERINSKY

East Flatbush, "a working-class community where neighbors still care about one another." The women pictured on these pages are not those in the article.

school, went to work for a year or two at poorly paid jobs, married by age 20 and quickly started having children. Only two of the 12 had any education beyond high school. Rose Danielli's background is typical; she worked as a telephone operator for a year before marrying Joe, a telephone installer, when they were both 19.

The husbands are blue-collar union men or white-collar workers employed by the city government; their general income range is between $9,000 and $14,000 a year. Most of the families have at least three children. Homemade soups and clothes are a necessary economy for them rather than an expression of the "traditional female role." Their houses represent the only important financial investment of their lives and are maintained with appropriate care—postage-stamp lawns raked free of leaves, living-room sofas glazed with plastic slipcovers and reserved for company, starched kitchen curtains, home freezers stocked with the specials the women unearth in numerous grocery stores on Saturday mornings. They worry in equal measure about the rising price of ground chuck, the fact that so many of their grown children are leaving the old neighborhood, and how to get along with the blacks who are moving into the area. A movie and dinner in a local Chinese or Italian restaurant is a once-a-month event. Manhattan is "the city," a place to be visited on wedding anniversaries for dinner and a hotel floor show.

Whatever their problems, the women love their husbands and are not about to leave them. They do not expect to liberate themselves by living alone, although they understand why some younger women find marriage an unsatisfactory state. They have neither the education nor the work experience to be tapped as token women for high-powered jobs in high-powered companies. One woman in the group says she is waiting breathlessly for the day when the local 6 o'clock news will feature a broadcaster who is not only black and female but over 40, thereby providing on-screen representation for three oppressed groups instead of two.

Nevertheless, the women are convinced that they can build a future different from the traditional path laid out by their mothers and grandmothers. The feminist movement is responsible in large measure for their belief that they can change the course of their middle-aged lives.

The movement was gaining strength and national publicity at a time when the women who make up the East Flatbush group began to face the void most full-time mothers experience after their children grow up and leave home. Their comments in the group sessions indicate that two main concerns spurred their interest in feminism: the feeling that society in general, and their husbands in particular, no longer viewed them as sexually interesting or even sexually functioning women, and the realization that they were "out of a job" in the same sense as a middle-aged man who is fired by his employer of 20 years.

The idea of a formal consciousness-raising group was suggested last fall by Lillian Schwartz, the only one of the women with any extensive contacts outside the neighborhood. She had been active for many years in citywide organizations concerned with the public schools, and she was hearing more and more about the feminist movement from the women she met in the course of her volunteer work. At the same time, her three closest friends in East Flatbush were constantly mulling over the question of what to do with the next 20 or 30 years of their lives. They agreed that an organized group might help them figure out what to do and quickly recruited enough interested women to make up a manageable dozen. Lillian hunted down a copy of Ms. with advice on how to form a consciousness-raising group.

The most important decision at the first meeting was that the sessions would be held regularly on Tuesday nights. Except in emergencies, they would not be subject to interference by children and husbands who had other activities in mind. At the second session, several women reported with glee that the announcement of a regular meeting had caused a storm in their homes. "In our house, my husband expects me home every evening," explained one woman. "That is, unless he decides to go bowling. Then I can go to the movies by myself or out to a neighbor's."

Some of the husbands resented the decision to regularize the meetings because they had chosen to view the group as just another *Kaffeeklatsch*. The reactions of the men included bitter oppo-

(Continued on Page 39)

By Daniel S. Greenberg

'I have read them, and I want you to know that I do not understand them. . . .'

Science and Richard Nixon

Brilliant scientific discoveries continue to pour out of the nation's laboratories, and the Nobel and other grand prizes continue to pour in, but probably not since Depression days, when a career in research usually involved a pact with poverty, has the American scientific community been so enveloped in despair or felt so ill-treated by its great patron, the Federal Government. In the reign of Richard M. Nixon, lawyer-President surrounded by the high achievers of conglometry, public relations, advertising, corporate law and burglary, the "scientific-technological élite" of President Eisenhower's farewell address has fallen from political grace as has no other group (except, curiously, the poor).

Today, for the first time since 1957, when Eisenhower summoned James R. Killian Jr., president of M.I.T., to serve as a full-time counselor on the mysteries of space and advanced weaponry, the post of Science Adviser to the President stands vacant, and come July it will be abolished. Federal funds for research and development—the lifeblood of university-based science and of a vast amount of science and technology elsewhere—have been virtually level for the past three years, which means that purchasing power is down substantially. The exact decline is difficult to figure since the ongoing revolution in scientific instrumentation makes it ever more costly simply to hold one's place in the competitive world of basic science. But Harvard's Paul Doty Jr., one of the nation's leading biochemists, believes that inflation has eroded away as much as 30 per cent of the constant dollar figure. And if Mr. Nixon's budgetary plans for the coming fiscal year are carried out, the drop will be even steeper, for the President has proposed to eliminate Federal traineeships for the support of graduate students.

Within the Federal budget for research and development, spending in some categories is reduced, but in others it is up—or appears to be. The Administration boasts about the increases—its celebrated War on Cancer, for example, and the newly conceived companion program for heart and lung disease. But even in these high-priority areas, the promises of fiscal growth have not been accompanied by any new outpouring of funds. The heart and lung program has not yet been organized, and the National Cancer Institute is operating on an annual budget that is practically identical to that of 1972. Meanwhile, the other research centers that make up the National Institutes of Health are slated for reduced spending in the forthcoming fiscal year.

The gloom in the amorphous network of institutions that make up the "scientific community" has also been deepened by more specific cutbacks: the termination of further manned exploration of the moon, the "stretchout" or cancellation of several major scientific space projects and a standstill spending plan for the academic science divisions of the National Science Foundation, the principal mainstay of university researchers outside the biomedical area. Even the one-time noblemen of the scientific hierarchy, the high-energy physicists, whose stadium-sized particle accelerators once commanded blank checks in Washington, are hard-pressed by their principal source of finance, the Atomic Energy Commission. Five of the nation's major accelerators will have their already tight budgets reduced next year. The sixth—the $250-million National Accelerator Laboratory now nearing completion at Weston, Ill.—will get more than last year, but considerably less than originally expected for its research debut.

To outsiders, the inhabitants of this disaster area are the "technocracy," the Strangeloves, beneficiaries of a fabled grant economy, generators and masters of esoteric knowledge that osmotically permeates our cultural and political processes, regardless of the *pro forma* rules. Don K. Price Jr. of Harvard dubbed American science "The Fourth Estate," and observed that "it has become the major Establishment in the American political system: the only set of institutions for which tax funds are appropriated almost on faith, and under concordats which protect the autonomy, if not the cloistered calm, of the laboratory." Science and technology's extraordinary postwar ascent to prominence and affluence gave rise in the nineteen-sixties to such works as "The New Brahmins," by Spencer Klaw, and "The New Priesthood," by Ralph Lapp, both muckracking jobs, but not without awe for their freewheeling subjects. But today in the leather-upholstered, muraled and chandeliered Cosmos Club, the mannerly gathering place for Washington's resident and commuting men of learning, you will find the "scientific-technological élite" radiating the mood of a *déclassé* set awaiting the next disaster.

When Mr. Nixon first took office, the Office of Science and Technology (O.S.T.), considered the research community's embassy in Washington, was a well-established part of his Executive Office family. Now the President has simply wiped out that operation. His similar designs on the Office of Economic Opportunity were predictable, given the President's belief in self-reliance, but his abolition of the O.S.T. has puzzled the scientists and technologists, who, after all, play a significant part in a high-technology society afflicted by foreign competition and a tide of domestic operations that seem to invite scientific and technical remedies.

Consider the circumstances of O.S.T.'s demise. Leaping before his office was scuttled, Presidential Science Adviser and O.S.T. Director Edward E. David Jr. suddenly announced his resignation on Jan. 2 and immediately departed for a job in industry, thus eliminating the research community's highest ranking member at court. One month later, Mr. Nixon informed Congress of his intention to abolish the 50-member O.S.T.—the decision that had precipitated Dr. David's departure—and, by extension, an assortment of science advisory groups that had grown up around it since Eisenhower's Sputnik-induced summons for expert help. By way of ex-

Daniel S. Greenberg, author of "The Politics of Pure Science," publishes an independent Washington-based newsletter, Science & Government Report.

ARNOLD ROTH

planation, Mr. Nixon stated that since scientific expertise was now sufficiently available throughout Government agencies, a full-time scientific presence at the Presidential elbow was no longer necessary. He failed to note, though, that his post-election wave of forced resignations has decimated the upper ranks of research virtually throughout the Federal bureaucracy. (Among the casualties, for example, was the director of the multibillion dollar National Institutes of Health, Robert Q. Marston, whose post had heretofore been immune to political tides. Marston's resignation was ordered and accepted without explanation, and without a successor in the wings to take his place.)

In connection with the abolition of O.S.T., Mr. Nixon explained, he and his entourage, when the need arose, would solicit scientific advice from the director of the National Science Foundation, an agency that is, at best, one of the larger midgets in Federal research affairs. (N.S.F. is budgeted next year for $446-million for the "conduct of research and development," compared with $8.3-billion for the Department of Defense, $3-billion for the National Aeronautics and Space Administration, $1.8-billion for the Department of Health, Education and Welfare and $1.4-billion for the

(Continued on Page 15)

New girl . . . new scene
Face up to Fall in WINTUK® sweaters. Vest $10, cardigan $15, polyester shirt $13, sizes S-M-L. Polyester skirt $13, sizes 8-18.

devon

1411 Broadway, New York, N.Y. 10018. Tel. 563-0917

® DuPont Certification Mark

(Continued from Page 13)

Atomic Energy Commission.) To perform this job, the N.S.F. Director, H. Guyford Stever, would take on the additional title of Science Adviser—though not to anyone in particular. He's just the Science Adviser, and furthermore, he is not permitted to provide advice on military research, an area into which the liberal, academic O.S.T. frequently sought to poke, to the outrage of the military services and their allies.

Unlike his predecessor, the newly created Science Adviser will not have direct access to the President; rather, his channel leads to Treasury Secretary George P. Shultz, Mr. Nixon's newly designated White House adviser for economic affairs. But then, it turns out, he will not even have access directly to Mr. Shultz, but only to his chief aide in the White House, Kenneth Dam, a lawyer-economist-budgeteer alumnus of the Office of Management and Budget—a rare triple personification of the professions that are least impressed by science's plea for faith in research. All of which deepened the despair of the elders of science, who had had easy access to the White House in earlier times and recognized that attempting to run science from the pint-sized National Science Foundation is akin to directing a major symphony orchestra from the seat of second oboist, with no authority over the brass.

In view of all this, what, then, is going on between Mr. Nixon and American science, and, in particular, what does it portend for the quality, viability and utilization of the nation's scientific resources? Do we face "the virtual dismantling of the foremost health sciences research program in the world," as Paul Berg, chairman of Stanford's department of biochemistry, proclaimed — and as specialists in other disciplines similarly prophesied for their own fields — when the new budget was announced? Or does the weeping simply reflect the ups and downs of bureaucratic skirmishing, infighting of vital concern to the participants and their friends, but of no particular consequence to the rest of us?

An essential part, but only a part, of the answer is that Mr. Nixon, who is demonstrably not above grudgery, does not like the academic world, including its substantial scientific component, probably for the well established reason that the academic world long ago decided that it did not like Mr. Nixon. It was academe, home base of the "campus bums" whom Mr. Nixon once angrily decried, that ignited and sustained the antiwar movement. Many of its eminent professors, scientists well represented among them, served in one brain trust or another for Kennedy when he beat Nixon by a whisker in 1960. In the following Presidential election, the scientific community came out in force against Goldwater with a nationwide Scientists and Engineers for Johnson-Humphrey. Matters were less clear-cut in 1968, and fewer came out in support of Humphrey's candidacy, but the dominant trend was anti-Nixon. After Nixon was installed in the Presidency, it soon became clear to his closest henchmen that a piranha was on the premises in the form of one of the proudest descendants of Eisenhower's quest for scientific advice—the 18-member President's Science Advisory Committee (P.S.A.C.), composed of distinguished scientists, engineers and other specialists who would normally meet monthly in Washington to dispense independent thought on whatever matters of science and technology engaged their interest. Chaired by the President's Science Adviser, P.S.A.C. was originally created to help the Science Adviser and the President squelch the military services' conflicting claims for independent missile forces of their own. Arms control, disarmament and the nuclear test ban tended to dominate its thinking—especially during the period when Mr. Nixon was behaving like a cold warrior. In its spare time, P.S.A.C. trumpeted the importance of heavy Government support for academic science, whence most of its members commuted, and the message was heeded. Around election season, many of its members semicovertly deployed their nationwide connections and influence in behalf of the Democratic candidate, as is noted in an M.I.T. doctoral thesis by Anne H. Cahn entitled "Eggheads and Warheads: Scientists and the ABM." She states: ". . . the October, 1968, meeting of the P.S.A.C. Military Strategic Panel was converted into a working session of Scientists and Engineers for Humphrey-Muskie, to the chagrin of at least one panel member who was a Nixon supporter. He

Our elegant Lancaster Rose Wine Cooler in Silverplate is a reproduction of an early English design. Eleven inches high. We thoughtfully include an aluminum liner so that you may also use it as a vase or planter. For our complete catalog write to Poole Silver Co., Taunton, Mass. 02780.

POOLE

Our silver has been shining since 1893.

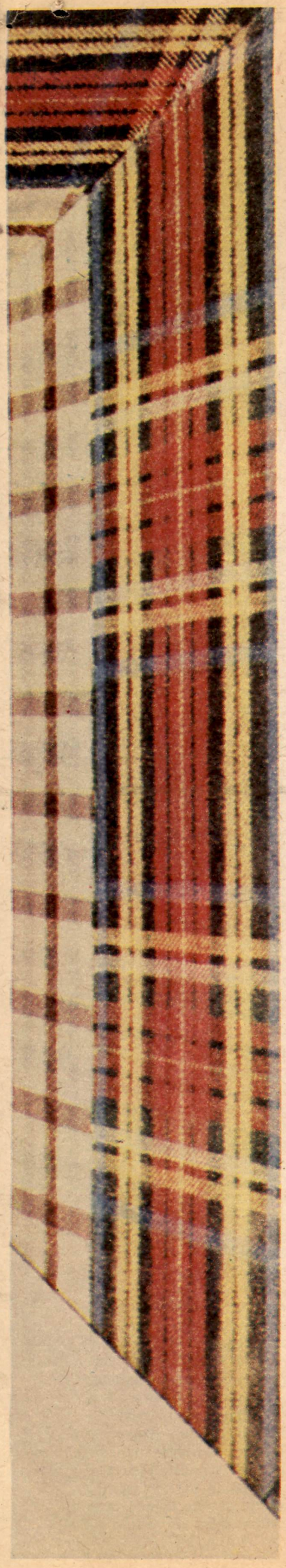
A subsidiary of Towle Silversmiths

viewed with distaste the sight of his colleagues arranging calling and canvassing activities at the expense of the legitimate responsibilities of P.S.A.C." The account is disputed by Richard Garwin, a top I.B.M. researcher, who says he was there. Be that as it may, Garwin himself was the cause of an outburst of White House rage several years later when, after having studied the supersonic transport at the request of O.S.T., he concluded that it was a poor bargain — and publicly said so when Congress was engaged in its eventually fatal deliberations on the project. The Federation of American Scientists subsequently bestowed its first annual Public Service Award on Garwin "for courageous and effective testimony on the SST." The White House was livid on many grounds.

Viewed against this brief sketch of some of Mr. Nixon's formative encounters with statesmen of science, it is not unusual that, in contrast to our last half-dozen Presidents, he has rarely made a ceremonial gesture toward science. Of his few utterances on science, the most puzzling occurred in May, 1971, when he awarded the Medal of Science — highest award of its kind — to a group at the White House. Noting that he had read the citations accompanying the awards, Mr. Nixon then went on to say in part (according to the official White House transcript): "I have read them, and I want you to know that I do not understand them, but I want you to know, too, that because I do not understand them, I realize how enormously important their contributions are to this nation. That to me is the nature of science to the unsophisticated people."

Whatever the nature of science to the unsophisticated people, Mr. Nixon and his aides have apparently concluded that, for example, the Medal of Science can be dispensed with or delayed. Normally awarded annually, the medal dropped off the White House agenda after that 1971 presentation and has not been heard of since. And in May, 1972, the White House announced that Mr. Nixon had established a separate set of Presidential Awards for Technological Innovation—to be accompanied by prizes of $50,000 each—with the first presentation scheduled for Sept. 15, 1972. An expert panel forwarded a list of nominees to the White House in comfortable time for that date, but the awards have never been made nor has any explanation been forthcoming. When Science Adviser David resigned at the beginning of this year, his office safe contained 10 $50,000 checks made out to the winners. They have been there for months awaiting the

(Continued on Page 20)



DAN RIVER RUNS DEEP

Your clothes are going Hollywood.

It's because of the fabrics.

With rajah-rich cashmere looks.

With four-star flannel looks.

With natty, nifty, newsy plaids.

In Gable glens, Chevalier checks, Bogart tartans, Wallace Beery Whonkees.

In neon-lighted darks and low-lighted brights. In tycoon tones, in mogul monochromatics.

Co-starring in pants and vests, jackets and jeans, safaris and slacks.

And solids! Gabardines, Mirro Sheens, buckskins, homespuns.

In Fortrel polyester and cotton.

Let your clothes go Hollywood. Because Dan River has the fabric stars.

Dan River Inc., Danville Division, Marketing, 111 West 40th St., N.Y., N.Y. 10018. Tel. 212/554-5633.
Fortrel® is a registered trademark of Fiber Industries Inc.

Dan River®
Men's Wear Fabrics

Item of the week

(Continued from Page 17)

White House's word on when to schedule the awards ceremony.

Mr. Nixon's cool feelings toward the men of science does not, however, explain it all. He is no devotee of the arts and humanities, but the Government foundation responsible for subsidizing them has flourished even in these most difficult of budgetary times—its funding has risen from $72-million this year to $120-million scheduled for next year. What else is involved?

Closely related to the absence of favorable Presidential interest is the fact that, after nearly a decade of exuberant, often aimless growth, research and development in the U.S. was due for a collision with economic reality and social utility. From the late nineteen-fifties through the mid-nineteen-sixties, a growth mania, mysteriously set at an annual minimum of 15 per cent—though it often exceeded that—underlay research-and-development demands on the U.S. Treasury. If that figure were not met, if more bright youngsters were not subsidized into scientific careers, if more laboratories were not built and splendidly equipped—well, the statesmen of science assured Government and public, the Russians would get ahead, or the health of the American people would suffer, the culture would decline, or still other misfortunes might occur. As Federal expenditures for research and development rose from under $7-billion in 1959 to $16.5-billion in 1966, the academic scientists who dominated the top Government advisory councils argued that defense, space and atomic-energy activities took the lion's share, leaving academic science with a minor share of the money—between 10 per cent and 15 per cent—but most of the blame for the boundless fiscal appetite of "science." Well, there is justice to that plaint, but in the public mind, it's all "science," whether it's a space shot sent aloft by engineers to test a missile nose cone or true science, such as basic biochemistry questing for a better understanding of cell processes. The politicians began to balk, and soon relatively hard times set in for a generation that, from graduate school onwards, had become accustomed to more every year. At first the wails did not protest an actual regression of funds, but a deceleration in growth, often speciously referred to as "cuts" when science lamented aloud. But then came real cuts and accompanying them were basic inquiries from the budget makers: What, after all, is the true value of science, in terms of cost-effectiveness, for improving health, industrial productivity and social well-being? Mainly through special studies convened by the National Academy of Sciences, the high temple of science, the research community responded with many-paged, vaporous replies, generally to the effect that investment in research inevitably works out to the good, but there is no way of knowing how beforehand. Typical was the 1967 assertion of Philip Handler, then chairman of biochemistry at Duke, chairman of the National Science Board, member of P.S.A.C. and currently president of the Academy. "The edifice which is being created by science," he said, " . . . is fully comparable to the cathedrals of the Middle Ages or to the art of the Renaissance. . . ." More prophetic in terms of political sentiment, however, was the observation of Harry G. Johnson, professor of economics at the University of Chicago, who, when asked by his scientific brethren to join in a defense of science, observed that "insistence on the obligation of society to support the pursuit of scientific knowledge for its own sake differs little from the historically earlier insistence on the obligation of society to support the pursuit of religious truth, an obligation recompensed by a similarly unspecified and problematic payoff in the distant future."

In the fertile soil provided by Mr. Nixon's own particular attitude toward research and its practitioners, the difficulties that had sprouted during the preceding years began to flourish. Rising unemployment among scientists and engineers, never very high, but startling for being there at all in the face of the research community's repeated warnings of trained-manpower shortages, caused the Nixon Administration to query why the Federal Government should continue heavy subsidies for graduate training. No persuasive answer was forthcoming, and gradually the budgetmakers began to prune and then virtually eliminate this support, their reasoning being that if aspiring lawyers, architects and business managers are able to get

educated without direct Federal assistance, there is no reason why aspiring chemists, physicists and mathematicians cannot do the same. And then, as attention increasingly focused on the nation's assorted ills, particularly the international competition that had begun to develop in the previously golden field of high-technology exports, questions began to arise about the return that was being realized from the Federal Government's investment in research and development. A key clue to Mr. Nixon's thinking on this matter appeared in September, 1970, when he appointed Dr. David, an engineer and psychologist, to be his Science Adviser. Traditionally, the Advisers had come from academe, but Dr. David's 20-year career had been in communications research and management at Bell Labs. Introducing him at a brief ceremony in the White House Rose Garden, Mr. Nixon several times said of Dr. David, "He is a very practical man."

Practical he may have been, but influential he was not, for the apparatus that Dr. David presided over was still tainted by its independent, liberal and academic reputation. The White House simply could not tolerate it. And though the elders of science had long since forsaken the "cathedral" and "Renaissance art" metaphor to justify requests for Government patronage, questions persisted as to what we were getting from these massive expenditures.

A further clue to Mr. Nixon's sentiments came in the fall of 1971, when the White House announced it had ordered a massive examination of "technological opportunities" related to industrial productivity and domestic social problems — and had assigned directorship of the study to William Magruder, chief of the very SST project that one of O.S.T.'s consultants, Dr. Garwin of I.B.M., had helped shoot down in Congress. If any doubt about O.S.T.'s place in White House esteem still existed, it was dissolved by that bureaucratic affront. Magruder energetically went about his task, and eventually produced a multi-billion-dollar list of promising research possibilities that the Federal Government might help pursue. The list was dutifully examined by the economists and lawyers of the Office of Management and Budget, who concluded that little or no firm evidence had been adduced to establish that the proposed expenditures would produce any reasonable payoff. When last year's budget was published, Administration officials contended that some $700-million of proposed expenditures reflected Magruder's proposals in such fields as energy research, pollution abatement, crime control and transportation. But the only clearly identifiable newcomer was a $40-million item, to be jointly administered by the National Science Foundation and the National Bureau of Standards, to conduct "experiments" on collaboration in innovation among Government, industry and academic research organizations. Explained an official of O.M.B.: "Frankly, we don't think anyone really understands how ideas get translated into marketable and socially useful products. We want to study it before we start paying for it heavily."

At Dr. David's prompting, Nixon subsequently issued the first Presidential Message on Science and Technology; its thrust was that, while basic research must remain an important Federal responsibility, the time had come to reorient the national research enterprise toward the solution of domestic problems. The rhetoric is, of course, commendable, but, in fact, the carve-up of Federal research and development expenditures still remains heavily weighted toward national security affairs, with the Department of Defense receiving not only approximately half of all Federal r. & d. funds—$8.3-billion out of a total of $16.7-billion budgeted for next year—but also receiving $460-million of the $904-million growth incorporated into the new budget.

All of this leaves two questions: First, is this a proper time to dispense with full-time science advice at the White House level? Second, will the budgetary jolts now being experienced by research produce serious harm or cause valuable opportunities to be missed?

In answer to the first, it is clear that advice cannot be provided to he who does not wish to be advised. The formal dismantling of O.S.T. simply reflects the nearly complete erosion of its influence during Mr. Nixon's first term. And yet that erosion could well prove unwise for the Administration as well as for science. If the Administration is sincere in its stated desire to reorient federally supported research activities

We bet you can't resist the enchanting fragrance of Clairol® herbal essence shampoo.

You're invited to smell it.
Go to your favorite store. Look for our display. Experience the fragrance of Clairol herbal essence shampoo. Close your eyes and imagine you're in a Garden of Earthly Delights.™ Almost immediately the beautiful scents of herbs and wild flowers surround you. Camomile. Juniper. Birch leaves. Melissa. Fragrances you won't be able to resist.

We make it easy for you to love it.
Take the coupon below to the checkout counter and get 10¢ off your purchase of Clairol herbal essence shampoo. When you use it, it's like washing your hair in a cool green mountain rain forest. Your hair becomes crystal clean and shiny with a new kind of earthly excitement so it moves with the grace of a wood nymph.

It's a bet you can't lose.
If by any chance you don't agree that it's the most exciting shampoo on earth, we'll send you a 15¢ coupon good on any shampoo. Just send the front label of Clairol herbal essence shampoo to Clairol, Box 630, Yonkers, N.Y. 10701. We'll even send you an 8¢ refund to cover your mailing cost.*

*Offer expires December 31, 1973. Only 1 request per envelope. Good only in continental U.S.A., Hawaii, and Alaska. Void where prohibited, taxed or restricted by law. ©1973 Clairol, Inc., 1 Blachley Rd., Stamford, Conn. 06904.

STORE COUPON

10¢ 10¢

10¢ off* Clairol® herbal essence shampoo.

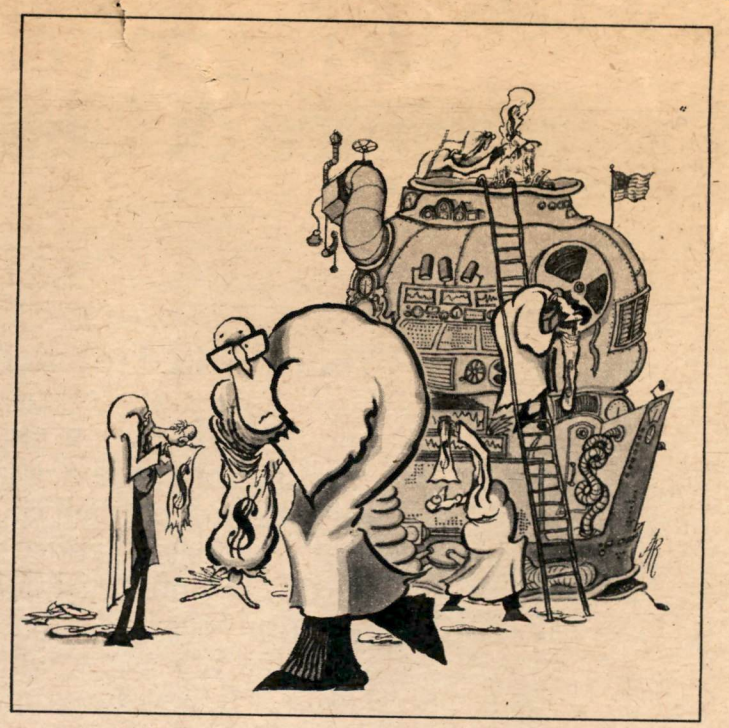
It's a Garden of Earthly Delights™!

Mr. Retailer: For each coupon you accept from a consumer at time of purchase of Clairol herbal essence shampoo, Clairol, Inc. will pay the face value plus 3¢ handling allowance, provided you and your customer have complied with the terms of the offer; any other application constitutes fraud. Invoices showing your purchase of sufficient stock to cover all coupons redeemed must be shown upon request; failure to comply may at Clairol Inc's option void all coupons submitted for redemption for which no proof of products purchased is shown. Coupon not assignable or transferable; void if prohibited, taxed; or restricted by law. Your customer must pay sales tax. Cash value 1/20th of 1 cent. Offer good only in continental U.S.A., Alaska, and Hawaii. Redeem only by mailing to: EVANSVILLE COUPON REDEMPTION CENTER, P.O. Box 3637, Evansville, Indiana 47701. Offer limited to one coupon per product.

*EXPIRES DECEMBER 31, 1973

10¢ 10¢

STORE COUPON



toward domestic problems, then it is all the more important to attach Presidential authority and prestige to the task of coordinating the sprawling Federal research enterprise, selecting from among the far-too-many technological opportunities those that merit priority, and, in general, looking after the care and feeding of that delicate entity known as the "research community."

As for the future of research, it is true that cutbacks will have no immediate devastating impact. The Nobel Prizes continue to flock to American research workers, and this is often cited as a measure of sustained American quality. But complacency is dangerous. The prizes are often awarded for work performed a decade back, and it is over the past five years or so that American science has suffered its most serious financial and administrative shocks. It is undoubtedly still the most productive research community in the world, and research workers in many industrialized nations tend to regard with amusement the austerity complaints of their American colleagues. But as funds shrink and bright youngsters increasingly shy away from careers in science, the situation that is developing is not unlike that of a baseball team with a superb lineup of starters, a sparsely filled bench and a decaying farm system. The Einsteins and the Fermis are going to get started in research and win renown no matter what the Federal Government does or does not do about supporting the training of graduate students. But according to the most recently available figures, Ph.D. output in the sciences declined virtually across the board last spring for the first time since the post-World War II "hump" of G.I. students distorted the curves. Chemistry was down 8.8 per cent; physics and astronomy 6 per cent and agricultural sciences 5 per cent. And further declines are on the way, for in response to a mixture of factors, among them the shrinkage of Federal support for graduate students, enrollments at virtually all of the nation's top graduate centers are dropping sharply. Next fall, Harvard will admit 550 graduate students, compared with 900 just a few years ago; at the University of Wisconsin, graduate enrollment has dropped by nearly 1,000 over the past four years, while at the University of Illinois, similarly sharp cuts have occurred. And the declines in the sciences may be even more severe than these figures suggest, since enrollments in other fields have been increasing.

With the Ph.D. "pipeline" extending from three to six years, the effects on the quality of scientific output are difficult to ascertain. But according to a senior member of Harvard's élite chemistry department, "it's gradually becoming more and more difficult to find promising young faculty members. And whereas we used to be worrying about the 'brain drain' to the U.S., we now find that some outstanding foreign researchers are reluctant to come here because they fear difficulties in obtaining research funds. Maybe it's socially desirable that people are being diverted to other fields, medicine among them, but I think we should take notice of what's happening to science." ■