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TO THE CONGRESS OF THE UNITED STATES:

This report responds to the requirement, embodied in Title V of the Foreign Relations Authorization Act, Fiscal Year 1979 (Public Law 95-426), that I report annually on the United States Government's international activities in the field of science and technology. As a supplement to this report, the Department of State, in collaboration with interested departments and agencies, has prepared the attached study which contains a more detailed description and analysis of the Government's international non-military scientific and technological activities.

Since this is my first report under the Statute, I would like to discuss the general approach of my Administration to our bilateral and multilateral activities in science and technology.

International Cooperation in Science and Technology to Serve National Needs

The United States remains the world's leader in science and technology. We invest more in research and development than any other country. Our total national investment in research and development (R&D) exceeds those of Japan, West Germany, and France combined. We employ more scientists and engineers than any other free world country, and they contribute almost 40% of the world's scientific literature. Over the past decade, American scientists have garnered 57 Nobel prizes compared to 28 from all other countries combined. The magnitude, quality, and diversity of our R&D resources will continue to make cooperation with the United States in science and technology at individual, institutional, and governmental levels highly attractive to other nations.

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Yet, we also recognize that, while the United States retains international preeminence in many areas of science and technology, we are no longer in a position to dominate each and every field. Nor do we hold a monopoly on the world's supply of scientific talent. The industrialized democracies of Western Europe, Canada, and Japan have established strong national programs in science and technology. Several other countries, such as Mexico, Brazil, South Korea, the People's Republic of China, and Israel have built their own capabilities for carrying out scientific and technological activities in selected areas of special concern to them. Thus, just as the United States can profit from and be stimulated by vigorous international competition in science and technology, we can also profit through international cooperation, which extends and complements our own efforts and helps us achieve our national objectives.

International cooperation is not simply synonymous with Federally-sponsored cooperation. American scientists and engineers engage in a great many cooperative international ventures. Often, they work through the universities or the industrial firms which employ them, with the Federal Government acting, at most, as a catalyst. An important aspect of this Administration's science policy is to encourage such private sector cooperation. American universities have made tremendous contributions to the development of science abroad. International collaboration among industrial firms in areas such as transportation, industrial utilization of space, communications, and energy production can serve important national interests as well as the interests of the firms involved.

Almost every technical agency in the United States Government carries out programs with important international components. Many of the problems with which these agencies deal -- such as health, environmental protection, and agricultural

production -- do not recognize international boundaries. They are world-wide in scope and impact. Governments everywhere invest precious resources in basic and applied research to tackle these problems. Our agencies constantly seek out and are sought out by the best foreign scientists and institutions for collaborative work in areas of common interest. In doing so we build stronger relationships with our partners abroad and help develop common approaches to common problems.

I will illustrate these points by briefly focusing on the National Aeronautics and Space Administration's (NASA) programs. Last year the spectacular voyages of the Space Shuttle Columbia were among our Nation's proudest achievements. But let us remember that many of our friends abroad made substantial contributions to the Shuttle program. Canada provided the remote manipulator system, the "Canadarm," first used on Columbia's second flight, at the cost of $100 million. In December our European Space Agency (ESA) partners presented the first Spacelab module to the United States. This billion dollar facility is scheduled to fly aboard the Shuttle in 1983. It will enable American and European scientists to carry out astronomical investigations of the sun and distant parts of the universe, and to perform the most ambitious experiments ever attempted in space's zero-gravity environment.

Thus, the scope and significance of international cooperation in space science are clear and visible. Since NASA's inception, this country's civilian space programs have been open to foreign participation. Almost all of NASA's programs have an international element, and many of them, like Shuttle, have a very large foreign component. The Federal Republic of Germany's contribution to the Galileo

mission to Jupiter will total approximately $100 million, and ESA's contribution to development of the Space Telescope will total almost $130 million. Both we and our foreign partners clearly benefit from such collaboration on large-scale, high-cost programs. What each of us may find difficult to do alone, we can accomplish together.

The same is true in many other fields. It is especially true today when fiscal restraint in our agencies' programs is required if we are to restore our Nation's economic health. Since many other nations face similar economic difficulties, it is becoming increasingly important that we all reach beyond our borders to form partnerships in research enterprises. There are areas of science, such as high energy physics and fusion research, where the cost of the next generation of facilities will be so high that international collaboration among the western industrialized nations may become a necessity. We welcome opportunities to explore with other nations the sharing of the high costs of modern scientific facilities.

We must also work with our partners for less duplication of scientific facilities. Our scientists will travel abroad to make use of unique facilities there just as foreign scientists will come to the U.S. to work in our laboratories.

I have focused thus far on collaboration with the industrialized democracies of Western Europe, Canada, and Japan. It is to these countries that our government agencies most frequently turn for partners for the simple reason that their capabilities are generally closest to our own. But several other countries, such as Mexico, China, South Korea, Brazil, and Israel, have made impressive strides in developing their own capabilities in science and technology, and they have in selected areas become attractive partners for our government agencies.

In this past year, special emphasis has been placed on the development of our scientific and technological relations with Mexico and the People's Republic of China. Our programs with both of these countries are models of the positive contribution which mutually beneficial scientific cooperation can make to our overall relations with other countries. Both Mexico and China have recognized the importance of building their own scientific institutions. These countries deal with us as equals in areas such as arid lands management and earthquake prediction. I look for cooperation between the United States and these and other rapidly developing countries to expand as their capabilities grow.

The Soviet Union

There is one possible partner for scientific collaboration with whom I have not yet dealt: the Soviet Union. Potentially, American scientific collaboration with the Soviet Union could be highly beneficial to the entire world. It is easy to imagine the problems which might be solved by the cooperative efforts of the two largest scientific establishments in the world, and indeed, it was that vision which prompted President Nixon to launch the cooperative scientific and technological program with the Soviet Union a decade ago.

But that vision never materialized. Unfortunately, both our government agencies and the American scientific community were quickly faced with the stark realities of the Soviet system:

-- Many of the best Soviet scientists and institutions are off-limits to foreigners; they work in the vast Soviet military sector, where the Soviet Union has chosen to expend a disproportionate and growing share of its national resources.

-- Free exchange of ideas in non-sensitive areas, the norm in the West, is impeded because Soviet scientists face imprisonment for disclosure of unpublished research results.

-- Similarly, Soviet scientists are not allowed to travel freely to scientific conferences abroad, and many of the Soviet Union's national scientific conferences are closed to Westerners.

-- Jewish scientists, even when they can obtain an education in the Soviet Union, face limited careers.

-- The Soviet government has chosen to imprison, exile, or deny work to some of its most distinguished scientists for the "crimes" of thinking independently or wishing to emigrate. Others are sent to psychiatric hospitals in a flagrant misuse of science in service to the Soviet state.

As a result of all this, many American scientists began independently and personally to boycott the bilateral exchanges with the Soviet Union, and the potential for scientific cooperation with the Soviet Union was diminished even before the Soviet invasion of Afghanistan. That event led to an official curtailment of the level of cooperative activity under the eleven bilateral technical agreements to a small fraction of the pre-invasion level. Following the Soviet involvement in the tragic repression in Poland, I announced on December 29, 1981, that three of our bilateral scientific and technical agreements which come up for renewal in the next six months would not be renewed. Furthermore, I requested a complete review of all other exchanges with the Soviet Union. That review is currently under way. Future cooperation with the Soviet Union depends on the steps they take to comply with recognized norms of peaceful intercourse among nations.

Science and Technology for Development

I have dealt so far with those international scientific and technological activities which we undertake as a means of extending our own resources for solving the problems we share with others. We also recognize that science and technology should play a central role in our assistance to developing nations.

Last October I brought to the Cancun summit a program for action inspired by an old proverb: "Give a hungry man a fish and he'll be hungry tomorrow; teach him how to fish, and he'll never be hungry again." I stressed at Cancun the need for the developing countries to strengthen their own productive capacities and the vital role of the private sector -- industry, universities and volunteer organizations -- in international development.

This Administration intends to emphasize the role of science and technology in our bilateral development assistance programs, particularly in the areas of food and energy. Increasing food production in developing countries is critically important. We have always made food and agriculture an important emphasis of our aid programs. In addition to direct food aid we have underwritten successful agricultural research abroad, welcomed thousands of foreign students to our finest institutions, and helped make available throughout the world discoveries of the high-yielding seed varieties of the Green Revolution.

At Cancun I proposed that task forces be sent to developing countries to assist them in finding new agricultural techniques and transmitting to farmers techniques now in existence. It is expected that such task forces, whose expertise has been tailored to address the specific areas identified by the host governments, will visit several countries in 1982. Peru has already been selected as the first country to receive a task force.

The United States will also emphasize energy-related development activities in the years ahead. Our energy bilateral aid program will stress technical assistance rather than resource transfers. We will support intensified energy training programs for technicians from developing countries, and efforts to help developing countries more efficiently utilize their resources.

It is clear that America's greatest resources for assisting developing countries lie in our private sector. Our contributions to development through trade dwarf our direct assistance contributions. The United States absorbs about one-half of all manufactured goods exported by the non-OPEC developing countries to the industrialized world. Our companies have been at the forefront in establishing manufacturing capabilities in the developing countries. Thus, we will work with developing countries to improve the climate for private investment and for the transfer of technology that comes with such investment.

We are also looking to build a stronger, long-term relationship between our universities and the developing countries. The Agency for International Development (AID) is experimenting with several new mechanisms for assuring greater continuity in the involvement of American universities and their scientific talent in development assistance programs. Additionally, more than 150,000 foreign students are enrolled at present in science, mathematics, and engineering programs in American universities. When these foreign students return to their native lands they maintain ties with American institutions, and this becomes a continuing channel for the development of the indigenous scientific and technological capacities of the developing countries.

Funding and Personnel

My fiscal year 1983 budget has been sent to the Congress. In it I have requested funds adequate to meet our priority research and development and foreign policy needs.

The Department of State plays a central role in ensuring that international scientific activities are consistent with our foreign policy objectives. Over the past year, the Department of State has continued its efforts to upgrade the scientific and technical skills of its officers.

To carry out the commitment to greater emphasis on science and technology in our development assistance program, AID has, over the past year, reorganized and strengthened its science and technology capabilities, and placed a high priority on the effective use of these in planning and implementing its programs. AID established a new Bureau for Science and Technology charged with providing leadership in this area. A new Science Advisor to the Administrator of AID was appointed and a competitive research grants program was started by his office.

The Future

I believe that the health of the American science and technology enterprise is essential to meeting our principal objectives: sustained economic recovery, enhanced national security, and improved quality of life for our people. The same is true for our friends abroad. International scientific and technical cooperation can help both us and our friends to reach our respective national goals. We intend to continue our participation in international research and development programs on the basis of mutual benefit and mutual interest,

and to identify the most fruitful areas for cooperation. And through trade, investment and development assistance we will share the harvest of our scientific enterprise with our friends in need.

Ronald Reagan

THE WHITE HOUSE,

March 22, 1982.