

International Cooperation in Science and Technology

Symposium on Science and Society

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November 2, 2003

What a pleasure it is to be included in this distinguished assembly. I am pleased that anyone is still interested in what I might have to say.

Thanks, Rosina, for inviting me. I must say I really liked the first part of the email you sent to the panel members—the part that said “you really don’t have to prepare anything for this meeting,” until I read the next line, which said “because Norm Neureiter is going to give the plenary talk and all you have to do is make a few comments.” When I saw her last week in Washington and noted that I was really busy adjusting to retirement and didn’t have a lot of time, she said, “Oh, don’t worry. Yours is the last panel on the program and it’s possible that nobody will stay that long anyway. A lot of them have early planes.” I am grateful to those of you that did stay--even if you just overslept from the previous session.

Let me start though with a few words of sincere appreciation and thanks to two special people here today. First is Neal Lane. Neal, I know that your recommendation and support had a lot to do with my being selected by Secretary of State Albright as her S & T Adviser—the first such position in the history of that Department. It has been a great job and has certainly kept me off the streets and out of my wife’s garden—though not out of airplanes--on a more or less 24/7 schedule for the last three years. It’s always exciting to be the first at anything—there is no benchmark to measure you against—and that means a lot in a world where metrics seem required for everything. But, it was also a job where every day, literally

every day, there was some new issue, new contact, new challenge or new opportunity to deal with. It was sometimes frustrating, sometimes vexing—the caprice of Government decision-making (also known in my office as the one-issue weenie effect) does that to you, but never was it boring. I just loved the job.

On my final interview for it, just two months before the 2000 election—after a brief chat with Secretary Albright—and where it was apparent I had the job—her Chief of Staff finished up the interview by saying, “By the way, don’t sell your house in Dallas.” I looked at her – put my hand on her arm and said “Lady, I don’t need this job and my wife does not want me to take it, but if you offer it to me I cannot resist. I’ve been in training for this for 40 years.”

Jack Gibbons, you are the other one I especially want to thank. From your experience as a part-time adviser at State after leaving the White House, you knew, I think even before I did, that I had the job. You warned me that I was about to enter what you once called the most technophobic culture that you had ever seen. But you also did something else for me. Even before I was appointed, you invited me to give a speech to an NAE Symposium on Earth Systems Engineering. It turned out to be on my 35th day on the job, and I titled the speech “It’s the World, Stupid.”

I stole that title from William Safire, and was trying to make the point that in a world of inordinate disorder, America remained the only credible bearer of the mantle of global leadership; and yet, how sad it was that the election campaign was essentially devoid of any mention of foreign policy, despite Jim Lehrer’s valiant efforts during one of the debates to

raise such issues. I still think my comments in that talk were right on target. And when I opened the Washington Post last Sunday to an article with the headline: “This Election Has Foreign Affairs Written All Over It,” I realized how much things have changed in the last three years. Foreign policy is very much at the top of America’s agenda today.

But Jack, what you did for me with that invitation, in addition to forcing me to write the first speech to go up on our Science Adviser’s website at State, was to give me an introduction to a key audience of supporters in the world of the National Academies. And the support for our work at State from those institutions--under Bruce Alberts, Bill Wulf, Ken Shine and Harvey Fineberg has remained steadfast and rock solid to this day. And that attitude was contagious—with tremendous interest and support from AAAS, many professional societies, the university science and engineering communities, and from the technical agencies of the USG.

I also have to thank Jack Marburger and his staff at OSTP for the great cooperation that we have had with that office. Clearly, with its overall role in S&T policy and with its Director in effect serving as the “S&T Minister” for the U.S., OSTP’s sustained support must be an essential part of whatever we try to do at State in the area of S&T.

Our basic mission, which derived from the NRC’s Seminal study in 1999 of S&T and foreign policy, was to strengthen State’s capacity to fully integrate science and technology considerations into the formation of U.S. foreign policy. I would like to be able to say that you can do this by whispering in the Secretary’s ear, but nothing could be further from the truth.

So, I decided, if we were going to penetrate to the heart of Jack Gibbon's "land of technophobia," we needed more scientists in the system than our three-person office could ever have. So, after assuring that our outreach to the external S&T communities was in order, we focussed on getting more scientists into the system through expansion of fellowship programs. The greatest increase is in the AAAS program, but AIP and IEEE are also providing science fellows to State and ACS and IRI have now also agreed to start similar programs. This fall we have 40 Ph.D. scientists or graduate engineers working in State under these programs—distributed among 16 different bureaus, including five of the six geographic or regional bureaus—the heart of the Department. And my successor George Atkinson is putting the final touches on a new Jefferson science fellows program that he has worked out with funding from private foundations and universities, and which will add more fellows by next fall. We have also put a new focus on getting science students into our summer intern program, we have gotten more scientist detailees into State from other agencies and a special program, in which NSF was the first participant, is placing over 30 scientists a year from technical agencies into tailored, 1-3 month assignments at U.S. embassies throughout the world.

The reason that fellows are so important is that they represent distributed wisdom around the building. State is a complex institution of 26 bureaus, six of them geographic bureaus covering all the regions and some 191 countries of the world. These bureaus oversee about 270 embassies and consulates staffed by the foreign service officers that Secretary Powell calls the front line of national security. The other bureaus are known as functional bureaus, serving specific missions such as arms control; non-

proliferation; oceans, environment and science; consular affairs, educational and cultural exchanges, administration, political/military affairs, etc. Rarely do purely scientific issues go to the Secretary of State; big political issues go there--North Korea, the global HIV/AIDS epidemic, the Iranian nuclear issue, Iraq reconstruction, etc. And often, different bureaus have very different views on the policy issue at hand. Also, quite often S&T is an element in those big issues, but if the S&T considerations are not made at the bureau or office level as the policy documents move up through the system, the chances of affecting the policy at the end are not very good. For the first time this fall we have a senior physics professor working on ITAR export control issues in the Political/Military Affairs bureau. The staff calls him "Doc." This area has been a huge source of difficulty for universities carrying on space research programs with foreign students or foreign cooperators. Hopefully this AIP Fellow can help make a difference.

The third element in our program was the selection of specific science initiatives, which in my judgement could demonstrate the direct value of S&T to achievement of political objectives with other countries. It was a direct attempt at consciousness raising among the foreign service to the potential value of S&T initiatives as part of an active foreign policy. I am going to give you several examples of those initiatives. Then I think the Panel members can comment on activities in their areas of interest, and perhaps in the discussion we can draw some conclusions about how S&T does fit into foreign policy and how to make that process more effective.

With the ability to interact with programs of all the USG technical agencies and to interface with any of the 191 countries in the world, there was a very rich smorgasbord of opportunities to draw on to demonstrate

the value of science. We tried to be selective in picking our targets of opportunity.

As you know, I spent nearly 30 years in two large corporations—in the fields of petroleum and electronics. The big corporate world has heartily embraced globalization. Mergers and alliances, especially in high-tech industries are de riguer. Exxon and Mobil were not big enough alone to address the global marketplace so now my \$83 per month Exxon retirement check comes from the Exxon Mobil Corporation. HP and Compaq were either too big to have to compete with each other or not big enough to compete in the global market and they merged, not without some fuss, but they did it.

But the political world has not bought into this. There centrifugal forces prevail. Ethnic tensions, nationalist ambitions, and religious extremism continue to divide the world's peoples at a remarkable rate. The instruments of division or separation can be democratic, but increasingly they are violent—fueled by passionate convictions that emerge as terrorism or suicidal attacks. The point is the political world is very different and business solutions or market solutions are not the complete answer. We are all struggling to find the right answers to these questions and, in doing so , to protect our own country and citizens in the process.

So what were the scientific projects that struck me as having political value for the regional bureaus or country desks? One example was the formation and implementation of the Indo-US S&T Forum. It had grown out of two high-level dialogs with the Indian science community that Neal Lane had begun. It became a major objective of Ambassador Celeste in India, but although a modest rupee endowment had been

provided and an agreed framework set up, nothing had happened, the U.S. Administration changed and the money was about to be lost. With strong support from the South Asia Bureau and the Embassy, I stepped in and set up a U.S. board and arranged a first meeting with the Indian counterparts. For three years now I have served as co-chairman of the Forum, with strong secretarial support from the National Academy, and in this way have sustained a formal mechanism for bilateral S&T cooperation with India. This happens to fit very well with present U.S. policy toward India, which stresses cooperation, encourages the economic and scientific development of India and has relaxed some of the sanctions placed on India after their nuclear tests. The Indians particularly want more cooperation in nuclear power, civil space activity and easing of export controls on high technology items—the so-called trinity of issues. Some relaxation continues, but proliferation concerns and to a lesser extent intellectual property concerns still limit these interactions. On the other hand, the Forum is working, and is considered a meaningful part of the new and much warmer relationship of the U.S. with India.

When President Bush met with President Musharraf in Washington almost two years ago, in addition to arrangements to fight terrorism and to provide assistance in education and economic development, they also noted a desire to develop cooperation in S&T. This was of considerable interest to the Embassy and to the Pakistan desk, and when no one else in the USG picked this up, our office did. Working with Pakistan's very impressive Minister of Science and Technology Atta-ur-Rahman, we laid out a framework for a cooperative program. After a year's effort of badgering USAID, they agreed to give \$2 million to put meat on the bones of the program. The Pakistanis agreed to put \$500K and then, during a visit I made to Pakistan, raised it to \$1 million.

On that same visit the U.S. Ambassador and I were received by President Musharraf and spent some 40 minutes with him discussing the importance of this S&T cooperation to Pakistan's economic development and the U.S. effort to improve overall relations with that country. However, all of this happened more than four months ago and still nothing has happened to move this relationship forward. Even though an S&T Agreement was signed during President Musharraf's most recent visit to the U.S. and our program was already to go, spending of this AID money by State has been blocked by a staff member in the Congress. The reason given is that State should not spend "assistance funds." There is nothing wrong with the program, but State should find Economic Support Funds (ESF) for this project. Unfortunately, all the 2003 ESF money is gone. So the net result is no money, no program, high embarrassment on the U.S. side, and negative political impact. There may be a chance to find some ESF money when there is a 2004 appropriation. So, of course, we haven't given up, but it is a bit depressing—or more graciously put—it reflects the caprice of government decision-making. Nothing is for sure. Just as a footnote, the day I first asked for \$2 million, the U.S. had just given \$312 million to the Pakistan military. Can't we use some of that I later asked the Pakistani Minister. "Oh no," he said, "that's already spent." I am sure you all have noticed, wars are very expensive.

The next project was with Vietnam. During President Clinton's visit to Vietnam, an S&T agreement had been signed between our two countries. But it had not gone been ratified in Vietnam and nothing was going on. The Vietnam desk was eager to see that go forward and so our office took up the cause of working on relations with this most populous and energetic countries of the region. I stopped in Hanoi on a trip to India and tried to jog the ratification process, and then put together a U.S

interagency group to serve as the U.S. half of the Joint Committee called for in the Agreement. I have now co-chaired this relationship for two years. We do have some programs underway, we have considerable non-governmental interest in Vietnam in the universities and among veterans concerned with the Agent Orange. A promising agenda is being prepared for the third Joint Committee meeting to be held this month in Vietnam (this time without me). Furthermore since we began, Congress has established the Vietnam education Fund, which will provide \$5 million per year for 17 years to support exchanges of students and professors in science, technology and mathematics. The money actually comes from payment of debts of South Vietnam to the U.S. that were assumed by the North at the end of the Vietnam War. This program will over time provide a cadre of scientists, trained in the U.S., who will maintain links with their U.S. professors and build the cooperative programs of the future.

Thanks to the support of Jack Marburger and especially Rita Colwell, I also played a role in the rejuvenation and restructuring of U.S. involvement in IIASA in Vienna. It now has a new director, new members (China, Germany and India), and an evolving focus in their work. The U.S. is appointing a new U.S. member committee under the management of the National Academy. This reaffirmation of U.S. involvement was a positive element in our diplomatic relations with Austria and perhaps more importantly politically, kept us from actively withdrawing from an international body, which was very closely identified with climate change research, at a time when the U.S. was under particularly sharp international criticism for our revised stance on the Kyoto Agreement, after being very active for several years in actions leading to that Agreement.

In another project, our office rode the coattails of Jack Marburger and Ray Orbach in the successful effort to get the U.S. to rejoin the ITER consortium to build an experimental thermonuclear reactor—a key way station on the road to fusion energy. China and South Korea have also joined with Japan, the EU and Russia, though Canada is now uncertain, but the consortium is presently at a very critical stage in the decision process on siting and cost sharing. To me this is an extremely important test case for the viability of the big multinational science or technology project. Can five nations and one region come together and work for ten years to build the reactor and then continue to cooperate in operations for an additional 10-20 years? Can and will each entity compromise its own domestic fusion program, its domestic industry involvement and agree to sustain funding for work at a site thousands of miles from home? Can the export control issues and the IPR issues all be resolved in time to move ahead in the coming year? ITER has been in process for 18 years. We are approaching a time when firm decisions must be made or ITER could founder for good. To me, this would be a great disappointment. It would imply a dim future for big science and big technology cooperation. It would also have unfortunate implications for the next generation of particle accelerator, which because of cost will have to be built with multinational inputs, but can only be located in one country. If it were only something we could bomb, there would be unlimited money available.

I have to confess something: I am an inveterate engager. We are all prisoners of our own experience, and my experience is in Poland and Eastern Europe, where we actively sought to keep channels open to the scientific community, where we knew many people agreed with us and

opposed their own regimes. We did the same thing in the Soviet Union – via the Pugwash conferences and an S&T agreement that we negotiated on my dining room table in Bethesda with the Russians in 1972 prior to the Nixon-Brezhnev summit. These engagements of our science communities in the 1960's and '70's led to the Test Ban Treaty and the ABM Treaty – in my view all part of the process of finding ways to engage to keep us from killing each other.

It was always interesting to me that it was the Soviets that didn't want contacts with our scientists; it was the Eastern European governments – especially the Czechs and Hungarians that kept us away from their scientific communities.

This coming week I am speaking at a major meeting on US-China relations at Texas A&M. It is perhaps not well-known, but when Henry Kissinger went to Beijing to arrange President Nixon's trip, he carried with him a collection of 40 cooperative projects in Science and Technology that was eventually laid before the Chinese as evidence beyond the change in political relationships that was being proposed, there were some tangible cooperative programs which could result.

Those 40 projects were cobbled together by me in 3 days and 3 nights (I was a lot younger then) with the help of a great group from OST and from the Committee on Scholarly Communication with the PRC at the NAS. Those proposals ultimately turned into actual exchanges and projects administered by the Academy until the signing of an intergovernmental S&T agreement that was put together by Frank Press during the Carter Administration. That has evolved into the quite incredible range of

cooperative programs that we have today with China, including 60-plus thousand students – at least two-thirds of them in S&T fields.

This, by the way, is not a welcome development to some, based on the argument that we are helping China to become stronger and that their S&T smarts can be applied to their military capabilities and begin to challenge the US around the globe.

To me, these are very fundamental issues and they go to the heart of another matter in which I have been very involved for the last year or so and which I consider one of the most serious barriers to our international cooperation in Science and Technology. That is, our visa policies which come directly from the Patriot Act. Let me cast it in an even broader context. The military strength of the US is our hard power. Today, no one in the world can challenge that hard power on the battlefield. But there is another side to America – our soft power. Sometimes called the co-opting power as Joseph Nye at Harvard has written about it. It is the siren song of human rights, of an open society, of freedom of inquiry, of speech, of religion, -- all the elements of democracy. Our science and technology and our universities and the relationships we build around the world are the instruments of that soft power. But what message do our visa policies send? They are saying thank you for sending 50% or more of our physical science graduate students, 200,000 high tech workers a year during our e-boom, your post-docs to do research at NIH on diseases that afflict Americans, and to staff the physics and chemistry labs at our universities. But by the way, no if you are from China, or Russia, or Eastern Europe, or from a Muslim country and you are a scientist and want to study or work in the US, the chances of your getting here are not what they used to be. I'm sure you all have some horror stories of missed

meetings, of fellowships not accepted, of some of the best and brightest going elsewhere. How about those invited guests who didn't make it to a key meeting –and not the Ambassador to the country in question, not Secretary Powell, no one can approve a visa for a scientist from many countries except a Washington interagency committee. So we tell everyone to be sure to apply two to three months ahead of time and there will probably be no problem. But many people don't or can't or won't apply three months ahead of time. And France and Australia and the UK ,Germany and Japan are happy to take the best and the brightest of those that only wanted to come to the US. Yes, the visa processing has improved, but I truly believe we are depriving ourselves of one of our greatest foreign policy instruments. We are muting our soft power message of these great United States – a nation whose very essence rests on the principle of openness. Remember that cold war movie, “The Russians are Coming”? The current Russian Ambassador to the US, Ushakov, had a short op-ed piece in the Washington Post this year which was titled, “The Russians Are Not Coming.” It was about the visa problem.

Because I am an engager, I hail the efforts of the NAS, with little or no support from the USG, to bravely carry on its program of interaction with the Iranian Academy of Sciences, although the meetings have to be held outside the United States. I also just read we are planning to further tighten our restrictions on interactions with Cuba. I once tried to work with the Cuba desk at State to explain how a U.S. company could benefit if they were permitted to buy some biotechnology development from a Cuban laboratory. The woman simply could not hear me; she just kept saying that the invention may not be worth anything and we would be helping Cuba by giving them US dollars.

I can't help but believe that the engagements we carried on with Russia and Eastern Europe were important elements in the final collapse of those regimes – their walls could not withstand the winds of *solidarnosc* and *glasnost*. I once said this to an acquaintance who had worked for the CIA; his forceful response was: “Are you kidding? I brought down the Soviet Union. Every piece of military equipment that went to the mujaheddin in Afghanistan went over my desk. That's what brought the Soviet Union to its knees.” I haven't seen him now for about 10 years; he's long since retired. Stinger missiles aren't as attractive in Taliban hands today as maybe they were in the 1980's.

So I see our international science cooperation in a political context. In addition to the above, it is also clearly one of our most powerful instruments for helping the developing world to begin to build an indigenous technical capacity for linking to the global economy which is ultimately driven by technology.

That is why the new study on the role of S&T in AID that the NAS/NRC is about to begin with AID's approval and partial funding, is so important. Despite a series of fits and starts over the years to make S&T an identifiable and pervasive element in AID's activities, it still is not: even if many of their projects are fundamentally technical in nature.

On the commercial side, five of my last seven years at Texas Instruments were spent in Japan. When I went there in 1989, the US and Japan were engaged in a kind of semiconductor war, in which Japan had agreed to “open its markets” to more US microchips, even accepting a semi-secret protocol in the agreement that the US--both industry and government--

chose to interpret as guaranteeing an increase of foreign market share in Japan from around 8% to 20 % or more. We actually made the 20% target on my watch as head of the US Semiconductor Industry Association chapter in Japan, but more importantly, I participated in effecting a change of attitude in Japan from fighting with the US to a growing number of real partnerships in development, in production, in marketing, and in high-tech joint ventures.

In fact, as Texas Instruments and Hitachi drew on their combined technical and financial capacities to invest in a memory chip venture in Dallas, I began to make rather lyrical speeches about how the 21st century would be characterized by ever-closer ties between the high-tech industries of the two countries -- so well symbolized by these two fierce former competitors joining forces to compete in the global chip market. Unfortunately the plant during one of the chip industry slowdowns in the late 90's could not compete on costs with much bigger plants in Asia, especially with Taiwan and Korea and that joint venture failed, somewhat dimming my idyllic vision. But the reality is that there is not a US electronic company today that does not have a major activity in Asia, be it alliances, joint ventures, outsourced contract manufacturing or whatever.

Also while I was in Japan, TI built a research center there, not just for research purposes but also to attract though its high technology appeal some of the best and brightest graduating Japanese engineers and scientists who typically would have gone to one of the big Japanese companies.

Another issue which is having a significant impact on international S&T cooperation is IPR – intellectual property rights. The signing of bilateral agreements has been seriously impacted by USG policies on IPR protection. Driven most strongly by the Office of the US Trade Representative (USTR), the US has established IPR language to be inserted into any bilateral S&T agreement covering IPR. If it is judged that the other country has minimal or inadequate IPR protection the requirements are severe. Even where there is protection and the relative country markets are vastly different in size, it has been difficult to accept this language. Although most agreements have never encountered a problem, and it has been estimated that fewer than one % of these cooperative activities have ever involved intellectual property it still can be a problem. For instance, this issue has stopped for several years, despite a lot of negotiating, the signing of a bilateral S&T agreement with Australia, because of what the Australians perceive as unfair treatment of a joint invention with respect to market rights. I think this issue may get worse in the future as other countries increasingly emphasize more university-industry cooperation in S&T.

Furthermore biotechnology companies in the US are finding much of the fundamental work that they want to capitalize on in university laboratories. Universities in turn have set up patenting and licensing office to take advantage of their professors inventions, or in some cases to share the ownership of the patent with the professor in order to keep him/her at the university.

In general on our S&T agreements I have always felt that IPR issues should be worked on a case by case basis, and that we do not need

draconian default boilerplate in our S & T agreements. Rather it should be adequate simply to say that IPR issues as they may arise will be worked out between the parties. And indeed, when political interests are at stake, for example, an S&T agreement is desired as a deliverable on a presidential visit, higher authorities have simply overruled the defenders of the IPR boilerplate. In the corporate world, extensive international activities are continually dealing with IPR issues and they either work them out and make a deal or they don't. It seems like a very rational way to do business, even for governments.

Another problem has been linkage, where single issue functional issues in State seek to hold other programs hostage to unrelated objectives in the erroneous belief that doing so will "put pressure on" the other country to agree to a particular US demand. In the process, there is little or no consideration of the benefits to US or US science which may be lost; in other words there is no effective way of balancing the relative benefits and losses.

This policy, for example, has stopped DOE fuel cell cooperation with Russia for several years, has resulted in discontinuance of the peaceful uses of atomic energy program which has existed for many years, and has impeded our high energy physics cooperation with Russia. All of this has been to force Russia to give up its nuclear cooperation with Iran. Of course it did no good, but it did kill or seriously impede good relations with a number of Russian institutes of interest and benefit to the US scientific and technical community.

So what are my conclusions.

1) I believe that S&T cooperation is good and we should use our strength in these areas as instruments for building better relations around the world:

- a) to address common problems of the modern world such as energy, environment, infectious diseases, etc.
- b) to draw on the best and brightest from around the world for the benefit of science and increasing the store of human knowledge.
- c) to measure our own science against the best in the world.
- d) to apply our S&T skills to the challenge of sustainable development.
- e) to use our science as a carrier of American values of freedom of inquiry and entrepreneurship and to build strands of stability into the fabric of our relations with other countries – in short, as an instrument of soft power.
- f) to engage with and maintain ties with the scientific and intellectual communities of the world, even in countries where we may have severe political disagreements.

2) What are the barriers?

- a) the visa problem for visiting scientists, even to attend scientific meetings in the US.
- b) Export control regulations – inhibiting space related research in universities, severely handicapping US satellite exports, and assuring protected markets in satellite technology for foreign competitors.
- c) Marginalization of these issues in the diplomatic community, which your support of my position at State has sought to change. But I assure you that this is a long- term process and eternal vigilance remains the price of survival of these efforts.

d) finally, a major problem lies in the funding for international cooperation. There are no dedicated funds for this area in the Federal Government. Furthermore, legislation governing S&T funding generally requires them either to justify their international work either in terms of their benefits to US science or to their domestic missions. Ironically, the most liberal rules are in the department that in general is most opposed to these interactions – the Defense Dept. DOD can spend money abroad for almost anything in the name of national security.

Does one need new legislation appropriating money for S&T cooperation, for example, giving money to the Dept of State? That is one possibility and to some extent it has already happened when the Wall came down and the Soviet Empire imploded and funds were made available by the Congress through the SEED Act and the Freedom Support Act to aid the transition in those countries. Some of that money did go for cooperative science programs.

But it could also be done with changes in the nature of spending authority for each of the technological agencies. It would take a resounding policy authorization that international S&T cooperation is an active element of US foreign policy and each agency is charged with defining that policy in terms of its mission and with the political guidance of the State Dept to ensure overall compatibility with US foreign policy goals.

I recently learned that there was an effort back in the Carter Administration to create a new government agency for the direct support of international cooperation in science. The proposal had

actually made it through three of the four Congressional hurdles – two authorization bills and one appropriations bill in the House, but it was killed in the Senate by one member who felt it would tread on the toes of AID. What a shame!

In truth I am not sure another agency is the best answer to the problem. Our S&T cooperation needs to be broad and to encompass the full range of mission- oriented research of our federal technical agencies. But it would require an indication from the Congress that international S&T cooperation is, in fact, encouraged and fundable. I was pleased to see in the OSTP/OMB budget guidance this year to the agencies that one of the seven criteria that would be seen favorably would be having an international cooperative element in the program.

US universities have long played a key role abroad, taking some five to six hundred thousand students a year, including pre-doctoral and post-doctoral researchers. They have also played an important role in implementing AID programs abroad, especially in agriculture. A consortium of US universities helped establish the IIT system in India which now produces the highly trained scientists and engineers that have remade the image of India as a vital part of the information era.

Administration of such monies is not simple and will always be subject to complaints, especially as it is spent overseas. But I strongly believe it is worth a try, for as one looks at the challenges of sustainable development such linkages to the Western world's S&T communities will be absolutely vital in building indigenous technical capacity in the developing world.

By the way, we did sell our house in Dallas and bought one in Washington. I successfully survived the transition to a new Administration and have with great enthusiasm worked for Secretary Colin Powell since January 2001. He has been a strong supporter of what we are trying to do, spoke eloquently about science at State at an annual meeting of the National Academy and recently reaffirmed his commitment to S&T by approving George Atkinson as my successor as S&T Adviser. Still, for all of that, and while we have, I believe, made considerable progress these past three years, S&T is still shallow-rooted in State as an institution, and there is much more to do. For all of you, who believe as I do, that S&T is an essential element of foreign policy, eternal vigilance remains the watchword to assure that these roots continue to grow.