Mr. HORN. Mr. Speaker, one of America’s great treasures is the National Academy of Sciences. Its distinguished members have rendered service to our government and the American people since the early years of the Civil War. President Lincoln saw the need for the availability of talented scientists to help their nation whether they are recommending various policies and to provide specific advice on complex scientific and technological problems both military and civilian.

At its 135th Annual Meeting earlier this week, Dr. Bruce Alberts, the President of the Academy reported on its work. I believe my colleagues and citizens generally will be interested in the work of the Academy to encourage a better scientific base by students throughout our land. Half of Dr. Alberts’ report expresses a major concern as to whether our country will be able to educate the two million new teachers which we will need in the next decade. Those new teachers must have a solid base in mathematics and science if the United States is to remain the leader in science and technology throughout the 21st Century.

The Academy has consistently built working relationships with other scientists and their academies throughout the world. That type of collaboration is essential if the countries—both large and small—are to meet the needs of their people and to provide the opportunities for a better life than is now possible in all too many places.

The report of Dr. Alberts should be reassuring. His remarks entitled “Moving from Analysis to Action” show that our brightest minds are devoted to dealing with the very real problems that confront all humankind. I submit these wise remarks for the RECORD.

MOVING FROM ANALYSIS TO ACTION

Welcome to this 135th annual meeting of the Academy. We had a very exciting year in Washington in 1997. When I spoke last April, our role as an independent adviser to the nation was threatened by a legal ruling that applied the Federal Advisory Committee Act to the operations of the Academy. Because of a great deal of very hard work by many people, the crises that started in January 1997 ended in November, when Congress passed a bill that rescues our committees are kept free from government control. The tremendous support we received from the federal administration and from so many members of Congress is deeply appreciated, and it is a great testimony to the value they place on the objective advice that we provide to the nation.

As is appropriate, much of the advice we provide focuses on the policies needed to support our vigorous scientific research enterprise. Especially influential are the reports of our Committee on Science, Engineering, and Public Policy, known as COSEPUP, under the leadership of Academy member Phil Griffiths. Their analysis of President Clinton’s budget last week was impressive.

This report focuses on the federal science and technology component of that budget, an important concept that was developed in the 1995 report of a COSEPUP committee chaired by Frank Press. COSEPUP will provide this analysis every year, making sure that this crucial part of the federal investment in science provides value to the American people.

COSEPUP also is deeply engaged in a very important study dealing with the implications that the Government Performance and Results Act has for basic research. This new law, known as GPRA, requires all agencies to set goals and to use performance measures for management and budgeting. It is intended to encourage greater efficiency and accountability in Federal programs. But if not implemented wisely, it could have a negative effect on the research enterprise—especially if we are working hard to avoid.

For the remainder of this talk, I want to focus on just two issues: education, and science in its international context. I start with the education imperative.

At this session last year, I discussed the eighth-grade results in the Third International Mathematics and Science Study (TIMSS), which U.S. students ranked about average in both science and math among 41 countries. This spring, the test results for our senior high school seniors showed that they had done even worse in this international comparison. Many Americans didn’t believe it. Column after column ran on the opinion pages of the nation’s major newspapers, challenging the research that the world’s undisputed leader in science and technology produce a population of young people with such poor science and mathematics skills? Recall that this was a test in which students at the end of secondary school from 21 countries participated, and U.S. students out-performed only two countries. Could these poor results reflect either a flaw in the exam, or an unusual bimodal distribution in the U.S. performance—with the top 20 percent of our students, perhaps? Unfortunately, the answer is no. TIMSS also included a comparison across countries of the very best students in both advanced mathematics and physics. The results are on the next slide. Here, there was not a single nation that we outperformed.

If we examine U.S. scores on our own national examinations, we find that the performance of our students has been improving at a gradual pace since 1970. What the TIMSS results mean in fact is that, while we have been improving our science and mathematics education slowly, many other nations of the world have been doing so at a faster rate.

Clearly, we can and must do better if we are to remain a scientific nation throughout the next century. This Academy has been trying to play a major role in science and math education for many years. I would like to share with you some of the ways in which we can be even more effective, given the history that is so much that needs to be done.

As you know, through the National Research Council, our Academy, for example, produces a great deal of useful information in the form of reports which are published in a book produced for teachers to help them teach evolution and the nature of science. Some 15,000 free copies of this book have been sent to science teachers across the country, but anyone can also get it free from the Web. Academy member Don Kennedy, who led this highly successful effort, is encouraging us to produce more high-quality materials along these lines. He asks us to take a close look at the evolution book, and then send us your ideas for future projects.

As I left California in 1993 to assume my job at the Academy, the state was completing its elaborate process of adopting new science textbooks. This event, which occurs every eight years, culminates with a small list of state-approved science teaching materials, determining what each school district can purchase with state funds. I watched this process closely in San Francisco and was appalled to see what happened at the middle school level. Despite all of the expensive and time-consuming effort involved, San Francisco’s middle school textbooks were an example, a sixth-grade human biology textbook—book with mindless chapters devoid of any context that could enable students to understand the material. What is tragic about this is that many of San Francisco’s elementary school students are benefiting from an excellent hands-on science curriculum, composed of modules similar to those produced by our National Science Resources Center, a partnership between the Academy and the San Francisco Institute. When these students leave the fifth grade, many say that science is their favorite subject. But in middle school, textbooks such as the one I have just described make them lose all interest in science.

Outstanding teachers have told us repeatedly that the Science Standards are not enough. In order to teach effectively, teachers need both curriculum materials that match the Standards and high-quality training in how to use them. The Academy has been attempting to help by examining all of the science curriculum commercially available and compiling analyses of the best available teaching materials, as well. The National Science Resources Center published a book titled, “Resources for Teaching Elementary School Science,” and this month they published a sequel, “Resources for Teaching Middle School Science.” Again, these two documents are available on our Web site, at no cost.

We also have begun a new project, organized by our Center for Science, Mathematics, and Engineering Education. Here a committee chaired by NAS member Maxine Singer is bringing scientists and science teachers together to produce an easy-to-use, effective guide for school districts on how to implement the state-mandated Science Standards. Through such devices, we hope to create a more sophisticated market which should in turn drive the production of higher-quality curricula.

Unfortunately, multiple forces have created within our education system a very stable equilibrium that resists change. The next slide shows a diagram of that system, based on a figure that was published in one of our education reports. The system is in gridlock, with most of the arrows pointed directly against the teachers. Over the next few...
minutes, I will explain what the Academy hopes to be able to do in specific areas.

I start with state and national examinations. As indicated by the next slide, at present, the tests are not the fault of the textbooks and the textbooks support the tests. Students are taught to memorize terms that are defined as if they were procedures without meaning in order to do well on the exams. Having them learn for meaning is not the main goal—and sometimes biology is not even on the tests. And I can state with confidence that it is totally unrealistic to try to teach anyone all of biology in one year. But such broad survey courses are taught in our best high schools, and this type of teaching is strongly reinforced by the national SAT II biology subject test offered by the College Board, which alone might have one-half million students taking it annually. I will cover all of biology, with little opportunity to develop concepts, or to give students any feeling for the nature of science.

Consider this quote from a popular 1997 study guide called “Cracking the SAT II: Biology Subject Test”: “We'll show you that you don't really have to understand anything. You just have to make a couple of the right simple associations, like these. Aerobic respiration with: presence of oxygen more ATP produced. . . . Anaerobic respiration with: absence of oxygen less ATP produced. When we get through, you may not really understand much about the difference between aerobic and anaerobic respiration. But you will understand the major types of respiration.” Whether or not you understand your answers, the scoring machines at the Educational Testing Service will think you did. Their test construction and scoring procedures are designed so that the test may be easily scored and interpreted by machines, without the need for human judgment. The AT&T program has worked. . . . Stick with us, and you'll make the transition.

The textbooks that teach to such tests, as well as the tests themselves, stand in powerful contrast to our view of education as a valuable experience. Is it any wonder that an extensive analysis of the attitudes toward schooling of 20,000 middle-class American adolescents shows that 40 percent of them are completely disengaged from what is going on in the classroom? These young Americans place no value on what is being taught, and they correspondingly pay no attention to it. Science is taught as if students are on the test, and the test has been placed on a decline of parental and community values. But when one looks at the science curriculum and the science tests that produce these kinds of results, one has to wonder whether a great deal of the blame does not instead belong the excruciatingly unbalanced, watered-down, unilluminating texts. . . . Stick with us, and you'll make the transition.

The Academy has been working to improve the science achievement tests used for college admissions for more than six years. We began by engaging the Carnegie Corporation, and the Educational Testing Service in discussions about their science exams. More recently, we have been working with the American Association for the Advancement of Science and the Association of American Universities to encourage them to define, differ, more meaningful measures of science achievement. We have not yet been able to change the tests that our students are forced to take, but we are now seeing some progress in all of these endeavors.

Let's turn now to the districts that govern our schools. What can be done about the fact that so many of our school systems are dysfunctional organizations that not only fail to support teachers with the incentives, resources, and training that they need, but also place burdens upon teachers that make it almost impossible for them to do their job well?

We will never have quality education for most of our children unless school systems can transform themselves into effective organizations that spread good instruction throughout all of their schools. Our Center on Science, Mathematics, and Engineering Education at Stanford University is developing procedures and systems that focus on school-district improvement. A small group—led by Ray Cortines, previously San Francisco's school superintendent, the New York City schools, and by Robert Waterman, an expert in corporate management who co-authored “In Search of Excellence”—is attempting to lead schools to improve. Our group has learned from studies of the 20 or so effective school districts in the United States and Canada that might serve as organizational models. My personal belief is that we have not shown ourselves to be able to make major progress in U.S. education until we can successfully attack this issue head-on.

I want to end this part of my discussion by focusing on the education and recruitment of teachers. We know that far too few of them have the understanding of science or math that they need to be able to teach these subjects effectively in schools today. We also know that the preparation for teaching provided in most teacher education programs is inadequate. Teachers are generally taught pedagogy, divorced from any subject matter, whereas to be a good math teacher, one needs to understand how to teach mathematics. And to be a good science teacher, one needs focused preparation on how to teach science. Moreover, we seem to be preparing too many teachers who will learn everything that he or she needs to know during their college years, but in reality, a teacher should be provided with an experienced, expert mentor, along with continuous professional development. Doctors don't graduate from medical school and practice medicine for 30 years with only their initial training. Similarly, with science evolving at an ever-increasing rate, the professional development of science teachers must become a non-ending process that is deeply embedded in each school district. An enormous turnover of teachers will occur during the next 10 years, when it is estimated that some 2 million new teachers will be needed. What might the Academy do to address the urgent national need for talented teachers in education, I believe that the Academy should begin by engaging both the College Board and the American Psychological Association in their colleges and universities, if they will share their best ideas with us. We propose to develop a national “summer camp” where they demonstrate for the nation's best teacher educators how to teach science. Moreover, we seem to be preparing too many teachers who will learn everything that he or she needs to know during their college years, but in reality, a teacher should be provided with an experienced, expert mentor, along with continuous professional development.

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In my opinion, we need many more pathways that allow people who know science and mathematics well to readily enter the teaching profession. We need to change topics completely, and move on to an equally important challenge: the need for a greatly expanded role of U.S. scientists in the development of policy. In the early 1990s, the Carnegie Commission on Science, Technology, and Government published a series of reports emphasizing the need for a greatly increased role for science and scientists in international affairs. Several of the members of the Academy were leaders in that effort. As the Commission pointed out, there are tremendous unexploited opportunities for the scientific community in the international arena. In a world filled with conflicting cultural values and competing needs, people everywhere share a powerful common culture that respects honesty, generosity, and ideas independent of their source and rewarding merit. A major aim of this Academy is to strengthen the ties between scientists and their institutions around the world. Our goal is to create a scientific community that becomes a central element in the interactions between nations—increasing the level of rationality in international discourse, while enhancing the influence of scientists everywhere in the decision-making processes of their own governments.

I am pleased to announce that we recently received a letter from the Department of State in which Secretary Madeleine Albright requests that we help the State Department determine the contributions that science, technology, and health can make to foreign policy, and how the Department might better carry out its responsibilities to that end. This effort has been encouraged by our Public Welfare Medal winner, William Golden, whose advice and help on this matter has been crucial.

What are the main principles that should underlie our response to the State Department? I would like to suggest consideration of the four ideas shown on the next slide, which I will briefly discuss.

Science Can Be A Powerful Force for Promoting Democracy. The vitality of a nation's science and technology enterprise is increasingly becoming the main driver of economic advancement around the world. Success requires a free exchange of ideas, as well as universal access to the world's great store of knowledge. Historically, the growth of science has helped to spread democracy, and this is even more true today. . . .
our society will actually be utterly stagnant, though it may seem tranquil."

New Scientific and Technical Advances Are Essential To Accommodate the World's Rapidly Expanding Population. The rapid rise in the human population in the second half of this century has led to a crowded world—one that will need more and more efficient use of resources from science and technology to maintain stability in the face of increasing demands on natural resources. Thus, for example, a potential catastrophe in Asia could be avoided if, in addition, farmers had enough land available to practice shifting cultivation, in which fields were left fallow for 10 or so years between cycles of planting. So, because of Africa's dramatically increasing population, there is not enough land to allow these practices. The result is a continuing process of overpopulation that produces yields, and will make it nearly impossible for Africa to feed itself. The best estimates for the year 2010 predict that fully one-third of the people in Sub-Saharan Africa will have great difficulty obtaining food, versus 12 percent of the people in South Asia and 5 percent in East Asia.

It has long been evident that the ethnic conflicts that led to the massacres in Rwanda were in large part triggered by conflicts over limited food resources, and we expect more such conflicts in the future, unless something dramatic is done now. How might the tremendous scientific resources of the developed world affect the problem of increasing the African food supply? At present, I see large numbers of talented, idealistic young people in our universities who would welcome the challenge of working on such urgent scientific problems. But the many opportunities to use modern science in behalf of the developing world remain invisible to most scientists.

University campuses and other educational institutions have the potential to eliminate this lack of information throughout the world, involving a short distance from this Academy: "The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have little."

Extensions of Remarks

The communications revolution also is driving a great transformation in education. Already, the Web is being used as a direct teaching tool, providing virtual classrooms and allowing electronic distance education. Our tool allows a course taught at one site to be taken by students anywhere in the world. Such technologies present an enormous opportunity to use scientific and technical knowledge everywhere—an ability that will be absolutely essential if we are to meet the more rational use of natural resources worldwide in the 21st century. Science Academies Can Be A Strong Force For Wide Policy-making. In preparing for the future scenario of what our world will become, there are two major questions: How can developing countries should not expect to follow the research model that led to the scientific enterprise of the United States and elsewhere. Moreover, we need to adapt and develop technologies appropriate to our local circumstances, help strengthen education, and expand our roles as advisers in both government and industry.

The Need to Learn From Action-Oriented Research and Experience. In his work for the Carnegie Commission, Jimmy Carter made this point: "What the leaders of the developing countries should not expect to follow the research model that led to the scientific enterprise of the United States and elsewhere. Moreover, we need to adapt and develop technologies appropriate to our local circumstances, help strengthen education, and expand our roles as advisers in both government and industry."

Developing countries have traditionally had very poor access to the world's store of scientific knowledge. With the electronic publication of scientific journals, we now have the potential to eliminate this lack of access. The Academy has decided to lead the way with a new flagship journal, the Proceedings of the National Academy of Sciences, making it free on the Web for developing nations. We also are hoping to spread this practice widely in the scientific and technical journals, since there is almost no cost involved in providing such free electronic access.

The next problem that scientists in developing countries will face is that of finding the information they need in the mass of published literature. In 1997, the U.S. government set an important precedent. We announced that the National Library of Medicine's indexing of the complete biomedical literature would be made electronically available for free, around the world, at their cleverly named Web site, "PubMed." A similar ability to search the complete agricultural and environmental literature should follow. The president of the PubMed Project, David Lipman, is presently investigating what can be done to produce such a site.
they are also major challenges for this Academy. Because of your stature and your achievements, the people in this room have the potential to change the world profoundly. I urge you to view this organization as a lever through which you can exert a beneficial, lasting influence on both the nation and the world.

IN HONOR OF FATHER C. DAVID WILLIAMS

HON. CHARLES E. SCHUMER
OF NEW YORK

IN THE HOUSE OF REPRESENTATIVES

Monday, May 4, 1998

Mr. SCHUMER. Mr. Speaker, I am honored to begin by speaking for a moment about two groups that aren't widely discussed here on the House floor. The first is Mother Jones and the second is USA*Engage. I want to focus a little bit on how the history and the track record of USA*Engage suggest that we, as stewards of government, must take care that we represent the American people and not narrowly focused special interests.

Mother Jones or “MoJo” is a national magazine of investigative journalism focusing on political reporting. It is named after and in the spirit of the legendary Mary Harris (Mother) Jones who was one of the most effective organizers of her time. Before passing on at the ripe old age of 100, this spirited mother of four was a natural leader, and I would like to congratulate all the people who have made the 30th Anniversary of the Port Huron Museum of Arts and Sciences a reality.

THE LOUDEST VOICE

HON. FRANK R. WOLF
OF VIRGINIA

IN THE HOUSE OF REPRESENTATIVES

Monday, May 4, 1998

Mr. WOLF. Mr. Speaker, I want to begin by talking for a moment about two groups that aren't widely discussed here on the House floor. The first is Mother Jones and the second is USA*Engage. Then I want to focus a little bit on how the history and the track record of USA*Engage suggest that we, as stewards of government, must take care that we represent the American people and not narrowly focused special interests.

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TRIBUTE TO THE PORT HURON MUSEUM OF ARTS AND SCIENCES

HON. DAVID E. BONIOR
OF MICHIGAN

IN THE HOUSE OF REPRESENTATIVES

Monday, May 4, 1998

Mr. BONIOR. Mr. Speaker, I am honored to have the opportunity to recognize the 30th anniversary of the Port Huron Museum of Arts and History. The Port Huron community will celebrate this historic event on May 3, 1998. In 1968, the Port Huron community organized a volunteer effort to open the doors of the Port Huron Museum of Arts and History. In the beginning, the Museum relied solely on volunteers to operate the institution. Even though the Museum now employs a small staff of full-time, part-time, and seasonal help; more than 24,000 volunteer hours were contributed in 1997. Throughout the past 30 years, many people have worked together to create this educational resource for the Port Huron area. Located inside the 1904 Carnegie Library, the Port Huron Museum of Arts and History is the home of many exhibits dedicated to local history, natural history, and art. The Museum is committed to bringing a variety of events to the public such as the Festival of International Cultures and the Blue Water Native American Pow Wow. In 1990, the Museum was proud to dedicate the Huron Lightship, a National Landmark, as its first offsite facility. Not only is Port Huron Museum a valuable resource to the Port Huron community, it is also recognized throughout the State of Michigan and the nation as center for research in folk arts, archaeology, and Great Lakes marine lore.

Throughout the past 30 years, the Museum of Arts and History has contributed greatly to the cultural diversity of Port Huron. The staff and volunteers of the Port Huron Museum have worked hard to encourage an appreciation and understanding for art and history in our community. I would like to congratulate all the people who have made the 30th Anniversary of the Port Huron Museum of Arts and Sciences a reality.

USA*Engage to deal with these countries having a History of repressing their own people. The list of these firms reads like a Who's Who of big business. I know these companies are run by good and decent people who are probably not aware of the range of activities in which the Wexler Group is intensely involved.

Anne Wexler has assembled a daunting army for her assault on Washington that includes a former U.S. Trade Representative, former Members of Congress, a former close staffer of the President, the former law firm of the State Department official who heads up the committee charged with reviewing proposed sanctions, and others. And look at what they have accomplished:

Instant access to Congress and the ear of State Department officials charged with assessing human rights violations.

“Pro-trade” studies from pricey and prestigious think tanks.

The matching-up and contact of religious groups and leaders interested in human rights around the world by business representatives thought to have special sway or influence.

“Spin control.” MoJo says USA*Engage boasts that of 242 newspaper editorials, 180 were favorable, 36 neutral and only 26 were hostile.

MoJo quotes human rights advocate Simon Billenness, talking about the important role economic sanctions played in ending South Africa’s apartheid regime, “If USA*Engage had succeeded with these tactics during the apartheid years, Nelson Mandela might still be in prison.” I recognize that these companies can hire whomever they choose, but there are consequences.

Look at what they are doing. Look at the real issue. We are talking about countries which are committing the very worst atrocities on their own people for simply believing in God. In Sudan, starvation is the weapon of choice, spiced with high altitude bombing, mass murder and selling their own people into slavery. In Burma, in Sudan, in this country, in this hemisphere, businesses are allowed to starve.

Tibet is in danger of losing its religion, its culture, its language and even its identity. It has already lost thousands of Buddhist monasteries and too many monks and nuns.

In Iraq, the Kurds have been used for target practice and guinea pigs for toxic killing. MoJo talks about the track record of Burma in Nigeria.

The victims of these outrages and more are Anne Wexler’s targets. When she and her other well connected friends are successful in changing a legislative clause here and writing a Dear Colleague there, when they urge another Member to sign on to a “gutting amendment,” do they think about the Catholic bishop starting his third decade in a brutal Chinese