

# Science Policy and Leadership

George E. Brown Jr.

*Following is an edited version of Congressman George E. Brown's remarks at a reception hosted by the MRS Office of Public Affairs on February 28, 1991 as part of the events surrounding the SSSC Forum (February 27) and the Washington Materials Forum (February 28 through March 1).*

I have had a lifetime concern and interest in the areas of science and their impact on society and the creation of a technological society, which permeates all our activities and which promises to continue to revolutionize our way of life, not only here in the United States but throughout the world. I have been concerned, of course, with the issues of science policy which will allow us to continue to exercise some world leadership.

It is my own honest and very strong opinion that unless we retain our scientific leadership, and our leadership of the processes by which we create new and advanced technologies, that we will become a second-rate power. This is a condition I wouldn't like to see and which I think threatens our security as much as if we were to unilaterally disarm in a military sense. The security in the world ahead of us is going to be based on knowledge, it's going to be based on economic capability, it's going to be based on a sensitivity to the way the world is changing. And it is in these areas that I get my greatest pleasure in having an opportunity to work.

I hope I'll be a good chairman for the Committee on Science, Space and Technology. I have no reason to assume that this will be based on my technical qualifications, which are slim but considerably better than those of most congressmen. What I think will help me become a good chairman is that I enjoy working in the science policy area and I have, I think, a feeling for the importance of it.

I want to say just a word about what I consider to be the importance of the Materials Research Society, and I probably said this five years ago\*.... You are a unique society in the sense that you include members from a number of other significant disciplines. You include those who are doing research in chemistry and physics and

in various other areas and are therefore cross-cutting in your approach. Your Society also includes representation from the private sector, the government sector, and the university sector—all of whom play roles in supporting this kind of research. You also include a wide variety of corporate interests in this country—startup research operations, more mature corporations involved in producing numerous technologies, and even the giants of the American corporate world. You are therefore in tune with an emerging culture [based on]...the importance of cross-disciplinary research, cooperation between the various sectors, the development of partnerships and other activities which will alter the style of the past.

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Cross-cutting, interdisciplinary, multi-sector cooperation is going to determine our success. I want you to recognize that this does indeed give you a unique role to play and that it should enable you to facilitate the development of this cooperative approach to meeting some of this country's future needs.

A new "term of art" being used as we look at the role of the federal government, vis-à-vis the private sector and universities, is "industry-led consortia." It is the mode by which we will make progress in

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**\*Editor's Note:** Brown gave the plenary address at the 1986 MRS Fall Meeting. His address, "U.S. Science and Technology Policy for the 1990s," was published in the *MRS Bulletin XII* (6) January 1/February 15, 1987, p. 72.

critical areas in the years ahead.

I have seen over the past few years—a relatively short period of time—a recognition that a responsible and important way for the federal government to interact is to support these industry-led consortia toward the development of so-called "enabling precompetitive, generic technologies," which are today becoming quite respectable and do not call up the specter of *industrial policy* that was the bugaboo of cooperation between the federal government and the private sector in the past.

A major stumbling block in the United States' regaining its lead as a great industrial nation and losing its leadership to competitors such as Japan and, in many cases, members of the European community, has been our unwillingness to face up to new modes of cooperation between the federal government, the private sector, and the universities. We are now beginning to overcome that. Dr. Bromley has played an extremely important role in doing that. [D. Allen Bromley is assistant to the president for science and technology, and director of the Office of Science and Technology Policy.]

I want you to recognize that you have a mission in helping us continue the momentum in this area. I said it earlier this week to a semiconductor group and I say it on every possible occasion. The world is changing and we're going to have to change our mode of thinking in order to keep up with it. You have, through your Society's composition, a unique role in enabling this kind of change, which is going to be so important to the future of this country. We are on the verge of doing some extremely interesting and important things.

There's a new attitude about technology in this country and probably in the world, which at least in part stems from the public education resulting from the war in the Middle East. That's the first war I've seen live on evening television...where you could see modern high-technology weapons operate. That they did operate, and operate successfully, has created a public attitude that this country may be able to regain its technological leadership. This has not been easy. We've had technological failures, and I've had to live through the Challenger accident, the Hubble telescope fiasco, and a number of things which lead many people to ask, "Have we wasted all that taxpayers' money?"

Now I see a different climate and a different attitude emerging. It bodes well for the future of this country as a scientific and technological leader. I am very happy that this is happening and happy to have the opportunity to play some small role in it. I

don't need to tell this group about the pervasiveness of materials research issues through all areas of modern society.

Tomorrow, other members of the Committee and I are going to Bell Labs.... It had probably been the greatest research institution in the entire world. It's not quite in the same position today, but it's still an important national resource. We'll be looking at advanced technology developments and a lot of them will be materials developments—fiber optics, photonics, and devices and mechanisms that relate to our sophisticated knowledge of materials and our ability to produce such materials. The same thing is true, of course, in a number of other areas—computers and so on.

We are making real strides in these areas, and members of the Materials Research Society are going to be, and are, in the forefront of these developments. I would like to convey to you, if you don't already have it, a sense of the critical, important nature of your work and the role that you can play as a Society.

I'm going to conclude with a few remarks about the Committee itself and speak to issues that seem to have aroused some concern in the scientific community because we have made some slight changes in our Committee organization.

One of those changes was to create a Subcommittee on Technology and Competitiveness. Assumed within that Subcommittee is the full jurisdiction for what was once labeled "transportation, aviation, and materials." People have asked me, "Are you renouncing the Committee's interest in each of these important fields?"....

Not one single thing has been changed in the jurisdiction of that Subcommittee. What we tried to do by a simple change in title is to focus on the role that all these technologies play in securing national leadership in technology and our ability to compete with other parts of the industrial world. It is our hope that in so doing we will increase the importance of these subsidiary fields and we will not confuse people with what appears as a rather complicated and not very clear title in terms of describing content....

In this fashion we hope to have a stronger influence on the other members of Congress. They all understand the importance of maintaining our international leadership. They're not quite sure how it relates to these various technologies but we're going to try to inculcate an understanding that unless we support the research and technology development necessary to an advanced industrial country, we're going to become second rate. We are trying to get Congress and the Execu-

tive Branch to understand (and that's becoming much easier with the role that Dr. Bromley is playing) that we have a coherent broad concern for the health of science and technology and that unless this country continues to support these fields at increasing levels, we are going to fall behind. The difference between the United States and Japan is that for 25 years Japan has shown a continuous, steady growth in support for science and technology, and the United States has shown no growth, measured in terms of percent of the gross national product devoted to research and development.

We have to progress. We can't remain static. We have to be competitive. And we're going to try to use the Committee to look at the whole investment of the federal government, as well as the private sector, in research and development, both as an index of our health as a society and as an index of our ability to provide careers for scientists and technologists. If we find that we're not achieving the results that we want, we'll change the [Subcommittee] title back again. That's not really very important.

But I think that we're going to see some results here, and I want to assure you that as far as I'm concerned, and I think I can speak for the other members of the Committee, we're not decreasing our interest in materials research, we are actually increasing it. We're going to do our best to create a base of understanding in the Congress, and we hope in the public, that this is vital to our future as a country and that we're going to have to continue to expand our support for all the areas involved in materials research activities.

### **Subcommittees of the House Science, Space and Technology Committee**

Subcommittee on Science, chaired by Rick Boucher (D-VA)

Subcommittee on Energy, chaired by Marilyn Lloyd (D-TN)

Subcommittee on Space, chaired by Ralph Hall (D-TX)

Subcommittee on Technology and Competitiveness, chaired by Tim Valentine (D-NC)

Subcommittee on Environment, chaired by James Scheuer (D-NY)

Subcommittee on Investigations and Oversight, chaired by Howard Wolpe (D-MI)

Now having said that, let me just thank you again for this opportunity to be with you. I have already gotten some reasonably good ideas as to how we can increase our focus on the importance of materials research and we will carry those back to the Committee and do our best to serve you well in that capacity. We look forward to additional opportunities to talk to you, and to have you come before the Committee and its subcommittees and give us some input.

While I'm here, I'd like to introduce the staff director of the Technology and Competitiveness Subcommittee, Jim Turner. In case you need to 'hit him over the head' with some ideas about what needs to be done, he's available to do that.

Thank you very much.

### **Brown's Answers to Audience Questions**

*Responding to a question from Dave Nagel (Naval Research Laboratory) on technology transfer from the federal laboratories:*

It's not working as well as it should be, and I've been trying to find out why it isn't working better. I think that we're on the verge of seeing some improvements because of what I see going on in some of the national labs and in other places. For example, next week I'll be speaking out at Lawrence Livermore...about how we can get greater utilization of the research and development going on in the lab through more effective technology transfer and help to shift the role of the labs (in this case focused largely on nuclear weapons development) gradually into areas which can utilize lab resources for the civilian sector. That is going to be difficult, and it can't be done overnight. But we see these great laboratories...as being one of our vital resources if we can develop a culture of closer relationships with private sector research and development activities, involve the universities, and have those laboratories play a role in educating the public as well (which Admiral Watkins is doing an excellent job encouraging). If we are able to do this, we will be able to solve a lot of problems. Of course, the key to all of this is how effectively we can transfer technology. Remember the magic words—this has to be precommercial, enabling, generic technology.

*Responding to a question from Bill R. Appleton (Oak Ridge National Laboratory) on MS&E as an administration initiative not unlike "high-performance computing":*

I agree completely with the need to have this kind of a program. Earlier this week I had the opportunity to talk to the chairman of the group from the Astronomy Commit-

tee who is looking at a 10-year program for astronomy, for example. You have a number of benefits from taking this long look at how the science discipline can develop and what its needs will be, and I have been encouraging this for as long as I've been in Congress. Sometimes this is called strategic policy planning. It has a number of different names, but in my opinion we cannot make intelligent policy unless we look at coherent areas like this and understand the importance of these areas and the relationships to other areas and begin to plan for the proper level of support over a long period of time. So I'm thoroughly in accord with this. You made a comparison with this and the high-performance computing activity. With Senator Gore, I have introduced legislation to implement this high-performance computing initiative which fortunately has the administration's support. I would be equally pleased to support and introduce legislation setting forth a similar framework for materials research, and I'd be glad to cooperate in its development.

*Responding to a question from Jim Roberto (Oak Ridge National Laboratory) on the role of basic research:*

I am a very strong supporter of basic research in whatever the setting—universities, private industry, government labs—and...there are those in the research community who feel very strongly. Dr. Leon Lederman [former director, Fermi National Accelerator Laboratory, and president-elect, AAAS] has expressed very well before the AAAS that there is a crisis, at least in the university research community, and we need to address that crisis. I happen to agree with him. I think that the level of funding for university research needs to be substantially enhanced, and we need initiatives aimed particularly at the problem of new laboratory facilities and equipment. We have neglected these over the years. We have assumed it would be taken care of through the overhead allowance that goes with the research contracts and it hasn't worked out. We will

need to address that problem. The problem with Dr. Lederman's analysis and others' is that they do tend to assume that a healthy basic research structure is the only thing needed (and it's not quite that oversimplified) for a vigorous technological development in this country, and that is not true.

One of the strengths I mentioned earlier, that this Society has and should promulgate, is that you have a more sophisticated understanding of the relationship between basic research and technological development and commercial success. Technological development and commercial success require many other things than the support of a strong research program. They require access to capital, they require low interest rates. The low interest rates are generally achieved if you have a balanced federal budget and you encourage a high rate of savings in the society. These, in the short run at least, are more important than whether you have a strong research base. All of us should realize that, and that's not to denigrate the importance of the strong research base. In the long run, that is the necessity you can't do without. That's what allows you to innovate, to develop the new technologies. But just because the research base is generally available to any ingenious society that wants to use it, it does not necessarily give the ability to have commercial leadership to be competitive in world trade. A sea change in the last 10 years is that we have gone from a positive balance of trade to a huge negative balance of trade, and it has infected every sector, including the high-technology sector. So we have to understand that a total solution involves more than the help of the basic research community. Now I want you to be out preaching this gospel to the politicians, to the American people. The politicians never go further than they think the public understands, so there's a necessary connection there. You have to play a role in helping to educate the public. I probably told you this five years ago as a matter of fact, and I assume you've been working hard during the last five years. That may be

part of the reason why we're seeing the changes I've already referred to (rather healthy changes within this somewhat conservative administration)—the healthy changes geared to recognizing the need for a different kind of relationship between the federal government and the private sector. So all these things are important.

*Responding to a question from Renee Ford (Materials & Processing Report) on the departure of Dr. Paul Maxwell from the Committee staff and the delay in replacing him:*

Paul was a great member of our staff. I relied on him very, very heavily. My personal opinion, although I've never had a deep discussion of this, is that he became frustrated with his inability to achieve some of the policy changes that are necessary, and he seized the opportunity for a very interesting, new assignment down in Argentina. I have talked to him down there and I continue a close relationship with him. It is not exactly true that budgetary problems were at the root of any deficiencies in the staff. I can assure you that we are in the process of seeking out the most highly qualified individuals we can find to give us additional expertise in the Committee, including in the materials sciences. I can't be more precise at the present time because just yesterday I went to the committee which authorizes committee budgets, the Committee on House Administration, and I asked them for a 16% increase in my budget, including an 8% real increase in staff funding, and I don't know yet if I'm going to get it. If we get it, we will have the funds necessary to hire, as I mentioned, several new scientific and professional staff, and you may be sure that your concerns will be met.

*George E. Brown Jr., a democrat from California, has been a member of the U.S. House of Representatives since 1962. He has been a member of the House Committee on Science, Space and Technology since 1965, and this year he assumed chairmanship of the Committee. □*

### Do You Have An Opinion?

The MRS BULLETIN wants your comments and views on issues affecting materials research.

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