

In Retirement, Jack Gibbons Returns to His Roots— a Gentleman Farmer and Science Policy Exponent

The retirement of President Clinton's science adviser, John H. Gibbons, on 3 April set off a veritable festival of tributes. Clinton and Vice President Al Gore were among the first to honor him a few days later in the ornate Indian Treaty Room of the Old Executive Office Building, down the marble-floored hall from Gibbons's fourth-floor office. Surrounded by White House officials and staffers, Clinton expressed how "eternally grateful I am to you, Jack" and how "invaluable" was the advice he received "on so many complex issues" from the Office of Science and Technology Policy (OSTP), which Gibbons led for more than five years.

On 28 April, Gibbons was saluted by representatives of ten science and engineering societies, who gathered in the Senate's cavernous Russell Building caucus room, which since 1909 had been the scene for many of the Senate's most dramatic hearings, including those on the Titanic sinking, the Teapot Dome scandal, the Army-McCarthy controversy and the Watergate investigation. By contrast, the reception for Gibbons was congenial. As director of Congress's Office of Technology Assessment (OTA) for nearly 14 years and of OSTP for more than 5 years, Gibbons always "possessed the ability to speak truth to power," declared Senator Edward Kennedy of Massachusetts. Two House members who had each chaired OSTP's advisory board, New York's Amo Houghton and California's George E. Brown Jr, hailed Gibbons for his untarnished and unrelenting contributions to public service. Brown recalled that Michigan Representative John Dingell had commended Gibbons, upon joining OTA in 1979 to provide advice on science and technology to Congress, as "the last great chance for this outfit." Another House member, New York's Sherwood Boehlert, absolved Gibbons for the collapse of the Superconducting Super Collider (SSC) in 1993. As a Congressman and a Republican who had voted against the project, said Boehlert, "I have to take much of the blame."

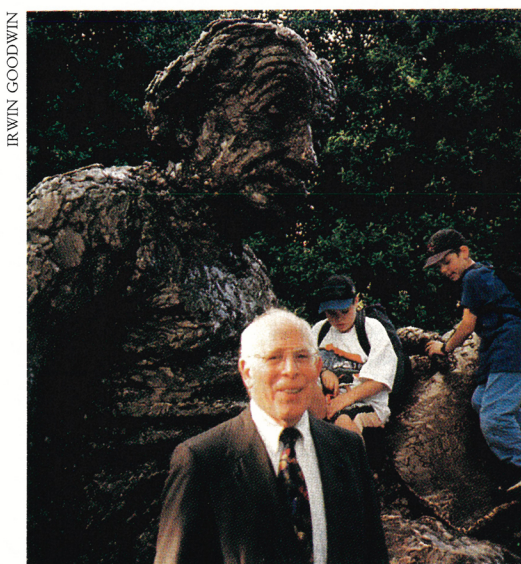
On 4 May, Gibbons was again honored, this time by the National Acad-

emy of Engineering and a group of professional engineering societies. Before dinner in the Great Hall of the National Academy of Sciences, Neal Lane, director of the National Science Foundation and Clinton's choice to succeed Gibbons at OSTP (see PHYSICS TODAY, April, page 47), offered the benediction. Lane praised Gibbons for his "honor, humility and unwavering good humor." Responding to Lane's remarks, Gibbons began with a few one-liners: "Like Henry the Eighth once said to one of his wives, 'I won't keep

ment, he tells them that he has put a lot of what he wants to say in a collection of his speeches and essays, *This Gifted Age: Science and Technology at the Millennium*, published in 1997 by the American Institute of Physics (which also publishes PHYSICS TODAY). He says he expects to accept a couple of offers he's had to serve on boards of directors and to attach himself to a university or two. He has agreed to teach and lecture on public policy making at MIT later this year.

In an interview on 17 March with PHYSICS TODAY's Irwin Goodwin, Gibbons said he found policy making in the Clinton Administration to be relatively easy, because he had "two bosses who not only understood the issues but were also committed to advancing science and technology in politics and policy." But he and his staff at OSTP did encounter difficulties with the staffs of Clinton and Gore. "You can't meet with the President or Vice President every time some troubles arise," said Gibbons. "You have to learn how to work out a personal relationship with people in the West Wing [of the White House] or in the OMB [Office of Management and Budget] or some agency, so that you understand their problems and they hopefully understand yours. It takes a degree of diplomacy, sometimes biting your tongue, but that goes with the territory."

When Gibbons entered the White House in 1993, the R&D agencies and science and engineering societies were euphoric about his appointment. Since he had spent almost 14 years as the head of OTA and knew many of Congress's leaders on a first name basis, it seemed like Gibbons was the right man in the right place. But officials at the agencies and in the societies soon found that the Administration's R&D budgets were barely keeping pace with inflation. When the Republicans took control of Congress in 1995, Gibbons's problems escalated. He fought to retain departments and agencies that newly elected Republican conservatives targeted for extinction, and he sought to uphold the R&D budgets. Even so, officers of some pro-



GIBBONS: Relaxing at Washington's Einstein statue.

you long," he told the dinner guests. He also recalled seeing a bumper sticker that read, "Engineering—where physics gets down to work." He concluded on a serious note about his retirement: "Like another Virginian, Thomas Jefferson, my profession is farming; my passion is science."

It was an apt characterization. Gibbons, who was born in rural Harrisonburg, Virginia, operates a 30-acre horse farm near The Plains, Virginia, where he spends most of his time. He recently bought a mechanical manure spreader to make his tasks less arduous, and he also is handling his own e-mail for the first time. When friends and colleagues urge Gibbons to write his memoirs about his years in govern-

fessional societies openly complained that Gibbons was ineffective, and officials in some agencies privately criticized him as indifferent. "Jack's years in the White House can be plotted as a U-shaped curve," observed a leader of one society who did not want to be identified. "He leaves at the peak of his effectiveness, but he was at a low point for a long while."

For his part, Gibbons said he's "enjoyed almost every moment of the job. And I know that the longer I'm away from it, the better I'll feel about it."

Following is a portion of an interview conducted by Goodwin in Gibbons's office at the Old Executive Office Building.

Q After more than 20 years of government work in Washington, aren't you sort of pleased to be in retirement, at home in rural Virginia, where you were born and where you now can sleep late if you like?

A Oh yes, I'm content to wallow in bed until 5 or 5:30 in the morning. I told my wife, Mary Ann, the other day, I've worked for about 45 years now; I've never had a sabbatical or more than a two-and-a-half-week vacation. I've always run from one job right straight into the next. I've never hunted for a job since I was in grad school. It's sort of a release and a little disquieting.

Q Looking back on your five-plus years in the White House job, what do you believe to be your main accomplishments?

A Well, I really resonated—which is a word physicists use with good reason—with the unshakable belief held by the President and the Vice President that science and technology provide brand new options for society, and that a society committed to an elegant use of science and technology can grow the economy and protect the environment at the same time. They also are convinced that the notion of smoke and pollution as a necessary accompaniment to progress is just plain wrong. It's been a struggle for all of us to get that truth across to everyone, here and abroad. The newest incarnation of that conflict is in the global climate change agreement. But the President has steadfastly maintained that science and technology are indeed the engines of economic growth, as well as the source of environmental protection. Science is the wellspring for the general enlightenment of our society, as well as the opportunity for the future.

Q When the President began his first term, the science community wasn't sure of his commitment?

A Yet it was as true in 1992, when he ran for office, as it is now. From

the very earliest time. He also was convinced about the idea of partnering, of breaking down the old notion of confrontation between the public and private sectors and of moving toward real partnerships between government and industry. That's why we started the Partnership for a New Generation of Vehicles [PNGV] within a month after we got here. We're now five years into it, and it's looking very good and everybody now seems to be in favor of it.

Q Whose idea was that? Did it come from the Big Three auto makers or from the Energy Department or the White House?

A Gore and Clinton both talked about it during the election campaign in 1992. When I came in with Skip Johns and Henry Kelly [both technology staffers at OSTP] in January 1993, we looked at the technologies that might produce a truly major change in our national industrial structure. We targeted the automobile in terms of the opportunity to introduce brand-new technologies over a decade or so. It seemed probable that cars might abandon heat engines and move toward chemical engines, that there could be all sorts of ubiquitous applications of new materials, electronics, manufacturing techniques, safety features and more. These changes, we thought, would have an effect on air pollution, global climate change, carbon dioxide production, dependence on imported petroleum, and it would stretch out our own natural resources. So we saw all that as the *sine qua non* of that kind of partnership arrangement. The Big Three US automobile makers were willing to go along with it. They were much more concerned about CAFE [corporate average fuel efficiency] standards, and we said, "Look, we can't—and won't—say anything about CAFE, but what we're trying to do is move to new ground with you folks. And if we're successful, CAFE may become passe, but we're not going to link it to CAFE." And they agreed. They would have loved to link it to CAFE.

Q Wasn't there a worry that such a partnership would stir up antitrust problems for the Justice Department?

A There was, but Congress had pretty well treated antitrust appropriately. To its credit, Congress was careful. The thing is that the Big Three partnership also embodies the new reality of industrial competitiveness that many people still don't understand—that these three companies could be extremely competitive in the marketplace, and yet at the same time cooperate closely on advanced research, because it's in their mutual self-interest, and that these companies

understand exactly when they are going to start saying, "Well, we don't want to talk about that technology any more now because we have some ideas about how to use it and we would rather not share that with you." You can already see it happening in the PNGV, where they worked closely together on these generic technologies, and then they started moving off on their own. And that's exactly the way it ought to work. And partnering among government agencies, through the National Science and Technology Council [NSTC], has enabled us to create a new kind of atmosphere in the Federal government, so that the agencies begin to understand that it's a win-win deal to work together, instead of trying to protect their own turf. That has taken a long time to put in place, but I think we have found now that sense of community amongst the agencies that wasn't there before, and I think it's working.

Q Doesn't it depend for the most part upon the people involved?

A It depends a lot on personalities, but it also depends on a kind of momentum and institutional memory. So I think it's going to have a staying power past our time in office. It surprised many people that NSTC helped create international bilateral science and technology collaborations with Russia, China, and South Africa. For instance, NSTC let it be known in the agencies that particle physics is not only a domestic activity, but a major international activity, paving the way to our collaboration [on the Large Hadron Collider] with CERN, where the US wasn't top gun. There were some who said, "Let's not have another SSC." The SSC was a terrible loss for the country, but I think we'll build big accelerators here in the 21st century.

Q What was your reaction to the loss of the SSC, which happened on your watch?

A It was among my greatest disappointments, but the SSC was a goner when we arrived. By the time we got here in 1993, the enormous pressure of the budget deficit was weighing heavily on everything. We were running a budget deficit of \$275 billion, and the debt was climbing. In that atmosphere, OTA bit the dust. Other parts of the science and technology enterprise were threatened. By 1995, the Energy Department and Commerce Department were in danger of destruction. The space station could well have been scrapped. We decided in that case that support from conservatives in Congress was sufficiently strong that the space station would not suffer the fate of the SSC, and we then shaped it as a mechanism for letting

the public know that we were shifting our focus from the cold war to a post-cold war enterprise, that it was not only a national laboratory to prepare for future flights to the Moon, Mars and the universe beyond, but an international partnership of 16 nations and a lever for a variety of things, including advancing technology in a very unforgiving environment—just a lot of reasons. So the space station, I'm glad to say, was not just saved, but reoriented in a way that made it much more productive.

Q *There are still some fears about cost overruns and schedule delays for the space station.*

A Yes, there's no question about that. One reason for that has been the misfortunes of the Russian economy. [NASA administrator] Dan Goldin always comments on the station's complicated technology, and, as a consequence, it doesn't lend itself to cost accounting like a bridge or a fighter airplane. So there's a great amount of handwringing about it in Congress and the media. The numbers are maybe 5% or 10% above the original estimates. What new fighter plane was ever built without that sort of price escalation? So I've been very pleased that the President put first focus on getting the budget deficit down, and that meant a very tight line to walk for the S&T [science and technology] community. But he continued to say that the S&T budget held the kinds of investments he wanted to give preferential treatment. So we've been able to maintain the support of science and technology—not at a rate that we would like, but at one that still kept it fairly level through those really tough years. And now the President's proposing a substantial increase, given the fact that we're now moving into, surprisingly, a true balanced budget that we didn't think was possible three years ago.

Q *Even so, the projections are dismal for the S&T budget in the out years of 2000 to 2003.*

A Each year these look a little better, though. For instance, we've gone from a time of declining budgets, even in current dollars, and [with] some pretty wild fluctuations, to one that actually now moves upwards, something like 32% in five years, which is better than inflation. And it has a continuity to it that is moving in time, and I just hope we can keep it up.

Q *Only three years ago, the AAAS [American Association for the Advancement of Science] asserted that R&D would face a 30% decline.*

A That's right. Now, of course, we're told the Senate Budget Committee wants to make cuts in the discretionary

parts [that include R&D and education, among many subjects] and provide tax cuts or other measures, and the House leadership wants to use the expected budget surplus for tax cuts. I just hope the American people aren't going to let them get away with it.

Q *Isn't there a danger that science will be replaced by pork at the table?*

A Congress seems more interested in concrete and water and things like that.

Q *Such things enable members of Congress to bring home the bacon.*

A That's right. But, you know, science brings home the bacon to their districts at far higher rates of return than traditional pork. The thing I think the American people are beginning to understand—and Congress ought to understand better—is that if you want to deliver to your district something that is really meaningful, forget the concrete-pouring people and zero in on the research and technology infrastructure of your district, because that's where growth and jobs and incomes are going to come from.

Q *Do you think many people make the connection between science education and meaningful new jobs?*

A I think that's a cop-out. I think the evidence is there that we are failing our children miserably, that we are not providing them with the wherewithal to successfully compete in the next decade or two, and it's going to come back to haunt us.

Q *Since publication of "A Nation at Risk" in 1983, public education has been a White House priority.*

A It's probably higher for this President than his research priority. He is desperately concerned about the state of education, and he wants to combine these. He wants more of our research activity to be associated with advanced training and graduate education at universities and in cooperation with our national labs.

Q *Is that why the Energy Department labs are increasingly involved in education at most levels?*

A I think the labs recognize that bringing in graduate students enlightens and enriches their vitality. When I was working at Oak Ridge [National Laboratory], I had a graduate student or postdoc every year.

Q *DOE sometimes seems out front of the White House on arms control issues.*

A Hazel O'Leary [the Energy Secretary during Clinton's first term] and I had a real "buck and wing" one day with the National Security Council. I'm glad we won, but it wasn't easy. It ended in a decision that I'm really pleased about. I wish we could have gone faster and further, but if you look

back five years, we now are substantively engaged with Russia in arms control. We have lab-to-lab arrangements—Los Alamos and Chelyabinsk [each major nuclear weapons centers], for instance. We have helped institute accounting and control methods for nuclear materials. We have mechanisms for warhead disassembly and quality assurance in the process. It's a whole new ball game. I just hope that we continue to work together and that we move into START II and START III.

Q *What are the chances that the US and Russia will achieve virtual disarmament in nuclear weapons?*

A They're very high, because that's in our mutual national self-interest.

Q *Still, there are members of Congress, in the Senate in particular, who oppose collaborating with Russia on arms control.*

A Well, we have all the leading scientists in the defense community with us, along with all the former Joint Chiefs of Staff. Yet, it seems there is a rigid ideological perspective that opponents put forward. A lot of them want to go back to testing nuclear weapons. They're just not ready to enter the 21st century.

Q *That must be among your disappointments.*

A John Locke once said, "Keep government haphazard and ad hoc, and that way you can keep it under control." And I agree with him, in a way, but it leaves a price to be paid: It's extremely difficult to move ahead very fast in a system of government that depends on rather intricate balances of parties of interest. It is disappointing that we haven't moved further in terms, for instance, of arms control.

Q *But we have done amazingly well in less than a decade, and the end of the cold war has given Americans great confidence, which is evident in our economic growth.*

A I'm pleased about that. I'm also pleased in helping bridge the agencies within the White House, between the Economic Council and OSTP, between the National Security Council and OSTP. That makes the day-to-day working arrangements vastly more productive. I spoke with Allan Bromley [President Bush's science adviser] the other day about this up in Boston, and he said that's one of his disappointments, that he hadn't been able to make more of those connections. They don't come automatically. There's a long history of OSTP sitting outside the government process. I think we've made some significant moves in the right direction.

Q *Hasn't the support of the President and Vice President been the*

reason for your success in the process?

A And Erskine Bowles, the President's chief of staff. All three. Our work with OMB has been not perfect, but it has been improving.

Q What about the Defense Department [DOD]?

A Bromley had problems there, but he didn't have Bill Perry [the former Defense Secretary] or others like him at the Pentagon. Again, it depends upon personalities. You have to recognize that the military services want hardware and people to fulfill their missions. To them, research is an overhead that they would just as soon get rid of, because they don't see it as part of their perceived needs. On the other hand, the Defense Secretary's office tends to agree with us, and when the services began to try to carve into the research budget in preparing their 1999 budget, we found out about it and went back around, worked with DOD,

and those numbers in the 6.1 and 6.2 [basic and applied research] programs are back where they should be.

Q What other dysfunctions disturbed you?

A Well, we've gone to hell and back with the Congress over the past five years, and I'm awfully pleased that I can leave Neal Lane with the 105th Congress instead of the 104th Congress. I have a sense that there is a return to a degree of bipartisan support of science in the Congress, the Senate Budget Committee resolution notwithstanding, and I would hope that we could continue to build on that consensus—a consensus that says, This stuff matters for the nation's future. It is the highest yield investment we can make in assuring that our future has options and has economic strength and that we are good stewards of the environment. I would hate for us ever to return to the kinds of nonsense that

went on with the 104th Congress. We have a big job to do to raise public awareness of the role that science and technology play in the lives of people, particularly to their health. Harold Varmus [director of the National Institutes of Health] has been one of the most eloquent spokespersons to this point. He's frequently pointed out that you can't advance in health care without engineering, computer systems, computational biology, physics and chemistry. It takes them all. The President has told me personally that he understands and appreciates this now much more than he did even a few years ago, and that he understands the imperative, therefore, for support of all of science, not just one piece of science, even if what you're after is a health care system. And I hope this will get across as we wrestle with the 1999 budget and out-year budgets.

At White House, Stephen Hawking Enthralls Clintons and Guests With Cyber-Lecture on Physics

It was inviting: A lecture at the White House by Stephen Hawking, the Lucasian Professor of Mathematics at Cambridge University, to mark the second in a series of millennium events on 6 March. So it wasn't surprising that some 250 guests turned up in the gold-draped East Room, where First Lady Hillary Rodham Clinton noted in her greeting that among them was "the largest gathering of physicists ever at the White House."

After "chatting" with Hawking in the Oval Office for 20 minutes, President Clinton and his wife escorted the astrophysicist into the jam-packed room to a standing ovation. Frail, hunched in his wheelchair, unable to speak, his ruddy face bearing an unchanging smile, Hawking expounded his thoughts for 45 minutes by way of a synthesized cyber voice that had been stored in his computer.

Since early in 1963, Hawking has suffered from amyotrophic lateral sclerosis or ALS (also known as Lou Gehrig's disease). In 1979, his elevation to the Lucasian chair (once occupied by Isaac Newton) raised him to prominence in cosmological circles, and the publication of his *A Brief History of Time* in 1988, along with a TV documentary film in which he starred, did much to create a public awe bordering on adulation.

Much of Hawking's "talk" touched on themes from his book, which became an international best-seller. But he offered some revisions and additions for the receptive audience in the White House and, by TV, cable and Internet,

for viewers and listeners in the US and the rest of the world. Thus, in 1980, just after being named Lucasian Professor, he had suggested in a lecture entitled "Is the End in Sight for Theoretical Physics?" that there was a fifty-fifty chance of achieving a complete unified theory of the laws of nature before the end of this century.

"We have made some remarkable progress in the period since then," said Hawking, "but the final theory seems about the same distance away." He asked in the disembodied monotone, "Will the Holy Grail of physics be always beyond our reach?" His answer, "I think not." He continued: "At the

beginning of the 20th century, we understood the workings of nature on the scales of classical physics, which is good down to about a hundredth of a millimeter. The work on atomic physics in the first 30 years of the century took our understanding down to lengths of a millionth of a millimeter. Since then, research on nuclear and high-energy physics has taken us to length scales that are smaller by a further factor of a billion. However, there is a limit to this series, as there is to the series of Russian dolls within Russian dolls. Eventually, one gets down to the smallest doll, which can't be taken apart any more. In physics,



PRESIDENT CLINTON AND STEPHEN HAWKING: Chummy in the Oval Office.