"POLICY, POLITICS, AND SCIENCE IN THE WHITE HOUSE:
CONVERSATIONS WITH PRESIDENTIAL SCIENCE ADVISORS"

UNIVERSITY OF COLORADO AT BOULDER
BOULDER, COLORADO
April 28, 2005

DR. JOHN GIBBONS
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1993-1998

DR. PIELKE: Well, thanks, everyone for coming tonight. We were driving up University, passing cars that couldn't make it up the hill. Dr. Gibbons said, well, we'll see who the real people who enjoy science policy are, tonight. *(laughter)* You didn't disappoint, so this is great. This is the third event in our yearlong series "Politics, Policy and Science in the White House: Conversations with Presidential Science Advisors." And I'm Roger Pielke Jr., and I direct the CIRES Center for Science and Technology Policy Research. We're extremely pleased tonight to welcome John Gibbons, who was science advisor to President Bill Clinton from 1993 to 1998. This series is supported by a number of groups around Boulder and the Front Range. And I'd like to thank them for making all this possible. CIRES, the Cooperative Institute for Research in Environmental Sciences here at C.U. Also, we'd like to acknowledge the support of the Graduate School and Office of the Vice Chancellor for Research, the Provost Office, the College of Engineering and Applied Science, College of Arts and Sciences, Deans Fund for Excellence. And from beyond CU we appreciate the support of Southwest Research Institute, Colorado School of Mines, and the Boulder-based ICAT Managers.

It takes a lot of groups to make something like this come off. And not only does it require sponsors, it requires people who work hard to make it happen. And I'd like to acknowledge a couple of people in particular. Bobbie Klein conceived of this series and has really made it all possible, and I'm very grateful to her. And Ami Nacu-Schmidt, who's standing at the door, also played a key role. There's a few other folks who played a key role and who I haven't mentioned, but your contributions are very much appreciated, so thank you also.

This is our last event of the academic year. We'll start up again in the fall when we have science advisors to Presidents Johnson, Nixon, Reagan, and actually, John Gibbons' successor, who is the second science advisor to President Clinton. And we hope you'll come back and join us for those. We have a content-rich website for this series, and the Web address you can find in your program. There's plenty of background readings. There will be a video for people who weren't brave enough to come out in the snow of tonight's talk and a transcript. And you can find John Marburger's video and transcript from last February. Just this week we added an audio file and a transcript from Bob Palmer's visit last week. He's the former chief of staff to the House Science Committee. And we welcome your comments and feedback.

You'll notice in your hand out we have a little form. And if you'd like to receive mailings about events at the policy center, check which ones you'd like, and we won't sell your email address to anyone. We promise.

Alright, now to our main event. Tonight's format, for those of you who attended John Marburger's visit, will be very familiar. Dr. Gibbons will first give some prepared remarks, fifteen to twenty minutes of comments. And, while he's doing that – what we did with Dr. Marburger is, we took note cards from the audience. And I think since we have an intimate group tonight, we might just take a show of hands. When we do that, though, we'll probably need to repeat the question up here to get it on the camera. The second part, after Dr. Gibbons gives his remarks is, I'll conduct an interview and it'll be structured much the same as our interview with Dr. Marburger. Some similar questions, some different questions. And then, we'll have a conversation with the audience.

So let me introduce Dr. Gibbons. John Gibbons has had a long and distinguished career in government and academia. In fact, if I were to go through it all – you see it in your program – that would be all the time we have tonight. So I'll get to some of the high points. Dr. Gibbons was nominated by President Clinton to serve as the director of the Office of Science and Technology Policy in the Executive Office of the President. A position otherwise known as the President's science advisor. Before serving as the President's science advisor, Dr. Gibbons was the director of the Congressional Office of Technology Assessment for thirteen years. This is a position we might characterize as science advisor to Congress. So Dr. Gibbons has been in the science advice business for a long time, and from very different perspectives. And, I encourage you to take a look at your program for additional details on Dr. Gibbon's career. So it's with great pleasure that I welcome Dr. John Gibbons to Boulder and the University of Colorado. *(applause)*

DR. GIBBONS: Is my mike working? Yeah. Good. Technology never ceases, does it? So Roger and other hosts here at Boulder, I am delighted to be back in Boulder after a long period of time. I'm around Golden from time to time, and Aspen from time to time, but this is my first return to the campus here since before some of you were born probably. But I am pleased to be back on campus. I even kind of like the snow, you know. It's – this time of the year, you know it can't last too long. And I'm pleased to be able to spend a little time with you talking about science advice to the President, and collaterally the issue of science and governance, and our nation's future as seen through one of the minority players in science – in the business of science, the icing.

You know that the first suggestion about creating a science advisor – this was by a friend of mine Harry Truman – was an individual who's still living. How many know who it was? It was Bill Golden who, then, treasurer of AAAS for a long time. And at 95, he's still going strong. Remarkable guy. And that began the process. And, of course, that was at the end of World War II when it became abundantly clear that we faced a future to be heavily influenced by advanced science, especially the nuclear science that was emerging at that time.

And, therefore, the first science advising, and for many years following, was really focused on the Cold War. On trying to keep nuclear weapons both useable but not used. And it was a major burden on the office of the President and others, who knew very little about nuclear forces, but knew a lot about their implications if we didn't develop adequate control mechanisms. I was lucky in my time because after the Cold War focus, it began to move toward a focus on the impact of burgeoning, in fact, explosive developments in science and technology on our environment, on our economy, on our very personal ways of life. And it's more and more impinged on the issue of governance under those conditions. And so, I was really lucky in that Clinton asked me to become the science advisor, and I was furthermore enormously lucky in that I was in the very first group of people that he announced. This was on Christmas Eve of 1992, announced to be

forming his cabinet and sub-cabinet staff. Because, in coming in early, I was able to help affect the decisions, the filtering of people destined for high levels of responsibility in science and technology across the agencies and a lot of things that happened early on. If you don't get to the White House early, there's no seat left. So I was very much lucky – very lucky in that regard. And not only in the choice of people, but in the selection of presidential initiatives and the first budget to the Congress.

Now, there are some questions about what are the roles of a science advisor. I know Jack Marburger has gone over some of these with you. How many of you were here for the Marburger lecture? Oh great! Okay. Well, I decided I should leave out most of what he said. Much of which I was also going to say. And give you a slightly different slant. Mainly, the role as I saw it as science advisor. So let me see if I can get this machine working. My bottom line in terms of the *(pause)* oh, it's even focused. What do you know. Can you see this at all? If I step out of the way can you see it? Well I, basically, said there are three main activities for the science advisor. And first is to be the President's eyes and ears. And not to bother him when he doesn't need to know something, but be sure to notify him and acquaint him when things do need to be known. The second is to act on behalf of the President in terms of the budgets, interagency activities, public/private interactions, international negotiations, and the implementation of his initiatives. And that's a very large measure for a very small office.

The second bullet really has to do with OSTP. The first bullet has to do with the Assistant to the President for science and technology. They are different roles and the first role, Assistant to the President, is a Senate-confirmed position, which means that in the confidence of the President, under that umbrella, I could not be required to go to Congress and testify, because those are confidential arrangements. But, in the second bullet, OSTP, which was created by Congress in 1976, I was fully available to Congress to testify, to help present budgets, and do all sorts of other things. In fact, the funding of the office of OSTP is a funding under the sub-committee on HUD, VA and independent agencies, not under the White House budget. It's separate, sort of like the military people that are in the White House. Not part of the general White House budget. And I will describe some of these activities under the second bullet.

And the third bullet is the thing that we devised early on in the Clinton Administration. Namely, to try to identify the presidential initiatives that reflect on national, major overarching national goals. And science is not an overarching national goal for the President. It's only as it serves to help achieve these larger goals that science takes its place in the crown of important activities for the president. And now I'll talk a little bit about those activities. [And I've just dropped my amplifier but that's alright.]

I would classify the activities as follows. This is in the Clinton Administration. First of all and perhaps, foremost, science and technology are seen as engines to both push and pull economic growth in our economy. And the record is clear that technology as aided and abetted by Greenspan who said, technology in his calculus accounts for fully half, if not two-thirds of all our national economic progress in the last multi-decade period. A very important ingredient. So a tool for economic growth which, in turn, helps reduce deficits and enables us to live the better life. So that's number – that was listed as number one, and it appears throughout the eight years that Clinton was in office. That was a major justification for this continued investment in

research and in technology development despite the very tight focus on reduction of deficit.

Second was improving human health which is a universal concern and interest, and we've seen steady progress in that regard. That's something that's very close to the hearts of everyone. Clinton once described to me why it is he thought that NSF was much harder to defend than NIH. He said NIH means, maybe, some day they're going to save your life, or your wife's health, or something else. You can personalize that process. But, he said, it's harder at NSF if you're going to make a new superconductor magnet. What is that going to do for Harry Homeowner? So you have to devise other ways to describe the benefits of basic science. And Harold Varmus - if you aren't familiar with the work that Harold Varmus has done — he's now president of Sloan-Kettering Cancer Center in New York. But he wrote a marvelous paper at the AAAS sesquicentennial on the essential importance of a great variety of fields of engineering and science, and even computer sciences and mathematics, on the progress of health itself. And it's a good example of where you need all of these advances in the sciences in order to see these appear in terms of human welfare. So that was an important thing. And we gave constant emphasis to the health questions. Not only U.S. but international.

Third was protecting the environment, and we didn't do all we could have done, but we tried to do as much as we could in the face of an increasingly hostile Congress, which turned Republican-dominated after the first year that Clinton was in office. And, of course, climate change was, perhaps, the centerpiece of those arguments, as well as energy. Then we can get back to that. Fourth was the prevention and the containment of deadly conflict. How can we devise ways through international negotiations and international cooperative activities to head off deadly conflict before it becomes deadly. And how can we also devise weapons systems that can help contain deadly conflict once it arises. And, finally, but not to be ignored, is the inherent value of knowledge itself as one of the overarching national goals. Reflecting all the way back to Ben Franklin and Thomas Jefferson and on forward to the future, where the involvement of the nation in exploration through science and other forms of exploration are a legitimate and historic component of long-term national commitment of people to pool their resources and make these advancements. I called it the modern-day equivalent of barn raising in which — I'm an old Virginia boy, so in the Shenandoah Valley when family wanted to raise a barn, which was more than a family could do in terms of their labor, they would get the neighbors in and the neighbors would all get together and help them build a barn. The next year, another neighbor would be doing it. So that kind of cooperation enabled the whole to be much greater than the sum of the parts.

Well, those are the sorts of things we tried to do as a means of using science and technology to achieve these kinds of national goals. Now, in order to get there, we have to devise some mechanisms for doing it. So we developed some new interagency cooperations because many of these things require multiple agencies for their success. We created the National Science and Technology Council, which was an interagency council consisting of the principals of the cabinet agencies chaired by the President, when he was available, the Vice President, when he was not available, and me when neither one was available, which was most of the time. But this enabled the agencies to be assured from the top of the line — from the cabinet officer himself or herself — that the agencies were, in fact, working together and not trying to become independent operators. A lot of jealousy between agencies just like divisions in a university. Who once said — someone once said that Harvard is a collection of independent dean fiefdoms

loosely connected by a common heating plant. Now I'm not sure about Boulder in that regard, but it can go that way.

Another thing we sensed early on in the Administration was the rising imperative to face the challenges of modern molecular biology and the things that were implied for governance. How do we foster this kind of new science and at the same time protect society from the implications of the applications of that science. At least, keep it in check so that there is a social oversight as well as technical oversight of these activities. So we created the National Biological *(pause)* Advisory – National Bioethics Advisory Council, which was comprised of people from, not only the health community, but also from ethics, and law, and social concerns. That still exists. It carried over into the new Administration, as did the Science and Technology Council. That's a form of drawing in the public to participate in a meaningful way, at high level, in the operations of the Executive Branch, which I feel strongly in favor of.

Now, in doing that, we were first guided by deficit reduction. From the first day out, deficit reduction was at the front of Clinton's mind because we walked into the office facing a projected three hundred billion dollar deficit. And a lot of people don't understand the difference between deficit and debt. This is the deficit. The debt is beyond ability to calculate almost, now. And in doing so the president said we have to have this deficit reduction. We're going to have to be tough as nails in terms of our budgets. At the same time, we've got to move ahead with our programs in government. So what we have to do is to tell the Cabinet, you've got to do new things. You've got to start things. You've got to be innovative and creative. In fact, that's where you're going to get your extra virtual money, it's going to come through productivity gains rather than through increased appropriations. And this was driven into the agencies year after year. In the early spring right about now, or maybe a few weeks before now in the year, the head of OMB and I wrote a – jointly wrote a letter on behalf of the President to all the agencies telling them about their priorities in the area of science and technology. So we gave this kind of guidance early in the budget cycle so that people could take that into consideration. And I think the agencies were pretty responsive in this regard. And I'm pleased that we were able to be a part of that.

In the National Bioethics Advisory Commission, we understood the coming need. So did members of Congress. And we had a lot of bipartisan support from members of Congress about establishing such a commission. Because, as Kennedy and Hatch told me, they couldn't do it on the Hill because they had such interference and such rancor from people about who would be on the Commission. And they finally gave up. Gore was part of that. He was in the Senate at the time. So they asked us to do it at the White House. And the President agreed. So we took a long time in establishing that commission, both its charter and operating conditions, but also in the membership of the Commission. And it did take a very long time. And, I remember, it was about two months after the Commission was formally established and staffed that Dolly was cloned, and off we went. But I'm glad we had the lead time, the foresight, to be able to establish such a thing. And it still goes, too. It's changed its name a bit. The chair has changed to a very conservative guy but nonetheless, it's still there, and still is trying to do its work.

So these are examples of some of the interagency things we tried to do. Multiple agency things. There are others, such as the Space Program, involving, not only NASA, but NOAA, and Defense, and ultimately Intelligence and Commerce in various operations in space. Space Station was a big one, and that was one of the first long briefings I had to give the President. But we went on to

things such as space launch systems and international agreements such as the Cassini spacecraft which had international participation.

In the military civil area, again, interagency cooperation took a lot of work, but it enabled us to converge the weather satellites of the government. We used to have independent weather satellite for the defense versus the civil sector. Independent operations up there. And we managed to persuade the agencies that saving a few billion here and there is really a savings, and we were able to get these converged into a single operating system. We were able to work with the interests in the commercial sector, namely Commerce and the State Department in declassifying the GPS, the Global Positioning Satellite system, and to get the acceptance of the intelligence community to continue to operate these systems. And the Defense Department, in continuing to fund the operations and in exchange, we had to fix it up so that they could protect them in case of war. But at the same time it enabled a breakout after — it was a year of tough negotiations — it was a breakout in terms of transforming a basically military system into a dual-use system, which all of us profit by having. You can find your best fishing hole a lot easier these days.

So those were many of the interagency cooperation things that my job was to try to honcho. I'd have to be within the White House in order to get the Cabinet agencies to work together, and it fell on our shoulders. Then, there were the public/private partnerships. I argued for and the President strongly supported the notion of getting away from so much rancor between the public and private sector and going to, as Clinton said, instead of going to the courts all the time, we'll drive some bulldozers together. And this is what we did. We formed some cooperative arrangements between the executive agencies and the private sector. The first, and the one I was most proud of, was to recognize the national need to have a much more efficient automobile that had very low emissions. And it was clear that Detroit could not, and would not, do that on their own. That the market wouldn't drive it. And I said, well, let's try it as a cooperative venture in which both public and private sector commit to putting in money, sharing in management and in guidance, and in the fruits of the outcome. We formed this with the big three motors, and some others later on, and six federal agencies. And we put it under the Department of Commerce because we were aiming, not just for science and engineering, we were aiming for a producible automobile, a market producible automobile within less than a ten-year timeframe. And we set the goal for the performance of the automobile well above what the market would likely deliver. And so by adding this public participation, we set forth in what was a very interesting adventure that Al Gore was extremely helpful in helping honcho.

About two or three times a year he would get all of the engineers involved, and they would meet up at the Vice President's house, they'd bring along their wives, and they'd spend an afternoon or a day talking about the most important advances that had occurred, and have a great party at the end of it. And this raised kind of an esprit de corps which was very helpful.

I was told by a retired chairman of General Motors that that work helped move ahead progress on things like hybrid technology and on other advanced systems by about five years over what would have happened otherwise. So I'm grateful that we were able to do that. Because it reflects a spirit of cooperation and mutual needs between the public and private sector instead of this tension between.

Then, on the international front, finally, I have long felt that we needed to intensify our international cooperation, and there's no better place to do it than in science, especially science, and in technology. Areas which become

common knowledge ultimately anyhow. Areas in which there's common need for the advancement of technology. And so we pushed hard on the global commons, which had to do with oceans diversity and fisheries. It had to do with global climate change research, with things such as that. And obviously, some others such as the collection of fissile materials, in which we had a lot of cooperation from our allies, as well as from Russia. And the former Soviet states in gathering up this material and getting it sequestered.

I remember one evening it fell to me again. These are happenstance things, but it fell to me because I had come from Tennessee originally to the White House, that I should call the Governor of Tennessee, who was a Republican but happened to be a friend of mine, and tell him that we needed to send a number of hundreds of tons of highly enriched U-235 down to Oak Ridge. And people said, they will never let you across the border with that stuff. But this man was in agreement, and the thing went smoothly. That highly enriched uranium is now been purchased from the Russians. It has been blended with U-238 and is being fabricated in fuel elements for power reactors.

You know that Cassini recently had an extraordinary encounter with one of the Saturn systems, and the pictures are extraordinary, including the pictures of a Saturn moon. That was an international venture in which we, basically, were responsible for the spacecraft and its launch and other things but also, I believe it was — was it not a British or a French — anyhow, it was a European consortium that had prepared the instrumentation for the lander on the Soviet — on the satellite of Saturn.

In Space Station, we are still an international group. If it weren't for changing the orbit so that the orbit of the space station would go over the Russian territory, which we did at the beginning of the Administration as we internationalized that effort from being a Cold War, U.S.-only effort. We can thank our lucky stars, not only for the success of the launches and the Station itself, but also the fact that when Challenger blew up and we lost the shuttle, it was only the Russian resupply vehicles that enabled us to keep that thing going at all. And it's only because we changed that orbit to incorporate Russia into an international consortium. It's not well known or advertised.

Well, these things then dealt with, not only the current issues, and issues that we had inherited, but also in anticipation of future needs and activities. I want to share with you a [How much time have I taken? Do you know?] *(response)* About half. Well, been doing alright. At the bottom line, the job as a science advisor, in my book, is not only these operational things that I've described to you, but also to help the President and his people gain a better understanding of where we are with science and technology, and what the future holds for us. So we can do a better job of anticipation. Then, I found out that C.P. Snow said it long long ago, that it's having a sense of the future that is behind all good politics. And I think that's a thing to keep in mind, that it's our responsibility because our community has a penchant for thinking about the future and trends, and understanding time passages and other things. The need for lead times and lag times that operate in our system. For instance, our energy transformations. And it's this giving a sense of — a credible sense of the time of the sensor. Not, not what the — not a sense of what the future will be, but what the future possibilities are, pro and con, plus and minus. And I believe that's almost a bottom line responsibility for our community, since our community influences the future so deeply.

Now, let me end up with just a couple of slides about what I think — if I could summarize my sort of last messages to the President about going into the 21st

century, and what we need to do in terms of having a sense of that future of what my bets are about the — what we face. He called it “crossing the bridge to the 21st Century,” and he kept talking about the need to have the capability to lead to provide a world which is better than we leave it. And that’s going to take a lot of work the way we’re going. And I reduced it to four challenges that we face. One, obviously, is population growth, which is silently working away at our flexibility and our capability of going gently into this century, going through this century gently if we hope to have economic growth and population growth at the same time. When you think about the fact that nearly half of Saudi Arabia now is comprised of people under the age of fifteen, you have a sense of the kind of extraordinary demands on resources and the likes, and the opportunities for frustration and terrorism that can come out of that. And Saudi Arabia is just one example of countries that have high birth rates.

So what do we do? That’s — population is number one. And I'll return to that. Second is energy, which is a surrogate for climate change and other very important dynamics that are going on now and are going to have to be dealt with in this century. And I think you’re all familiar with the facts on what’s happening and atmospheric carbon dioxide concentration. The figures — well, you know, these are ice core measurements, and these are atmospheric measurements begun by Roger Revelle and others back in the 1960, I guess, late ‘50’s. And the bounces, the annual bounces are the summer and winter of growing plants which are mostly located in the northern hemisphere. So when it’s summer in the northern hemisphere CO2 goes down as the plants grow and in the winter in the northern hemisphere plants die off, they give off CO2, and so the CO2 goes back up again. And that’s the little annual variation that goes on.

But the envelope curve rises inexorably toward levels of CO2 that are not, honestly, not tolerable, and I'll try to tell you why. Remind you why. Here’s carbon dioxide in the upper curve and the lower curve is average earth surface temperatures measured all the way back, directly and indirectly, back about, in this case, four hundred thousand years. Not a one-to-one correlation, but a whole lot of obvious relationships between those two. And the thing that is important is what’s happened in the last ten thousand years. Earth’s temperature has been extraordinarily stable. This is everything since the end of the Pleistocene right here. But meanwhile, in the last hundred years, CO2 concentration has come up from where it was in 1800 to where it is now, above three hundred and eighty, nearly three hundred and eighty parts per million with no sign of slowing down until we do something about it, because this is driven by anthropomorphic activities. And it takes us into a region of CO2 concentration and, therefore, average long-term Earth temperatures which exceed anything in the last half million years or more. And its implications are just profound. And I think you all know the numbers. You know what happens now. The current estimate is that, unless we do something here in this century, we may have a sea level that moves — by thermal expansion of the oceans — moves the sea very far inland in many countries. Bangladesh, twenty percent of the land goes under.

All the southern half, all the southern fourth of Florida goes under water. It’s not a thing of figment of imagination but a real challenge, credible evidence, and a dispassionate public, and a president that doesn’t want to address it except to say we’ll continue to do research. And it’s clear, I think, that we can’t just do research because, if you go back and look at a model of where the CO2 is going, like this orange curve, and where people generally agree we ought to try to end up with concentrations, namely around five hundred and fifty parts per million, which is twice pre-industrial, it

means we have to go through some kind of a phase change in this century in order to reach that goal, unless we just go through enormous gyrations.

And the green curve, which seems to be about the most well-behaved function, implies that you have to peel away from that business-as-usual, not some time in this century, but within the next ten, fifteen years. Otherwise it becomes a much more difficult task. And that's why I hope the President talks about this sometime soon, but I'm not too confident about that.

And then we could talk about the energy transition which is very important for Colorado, and I'll be happy to talk about that tonight. We could talk about what I call de-materialization. And one Chinese guy asked me once, does that mean you're going to become monks and start living in caves? And I said no, it means we're going to start using high technology so that we don't have to eat up so many resources in the provision of our goods and services. We're going to get smart, or smarter. And, finally, the notion of redefining progress in this sense that [if I brought it along. Ah, you're spared. No, you aren't spared. I have it.] We do need, especially in the academic world, we need to think about a new kind of a paradigm where growth is not just assumed to be exponential. We talk about sustainable growth and we somehow, symbolically, we just keep growing at three percent per year. Well, you take three into sixty-nine and you get twenty-three, and that means doubling time every twenty-three years - you can't go on very long that way. And think in terms of models in which we move toward some kind of an equilibrium condition. You know, we know a mature forest is in equilibrium generally. And it doesn't mean that it's dead, it means that it has the right mixture of age and the likes, and is highly competitive. The flora and fauna there are still in a highly competitive condition. So it's not as if it were going down the tube. It's going to a different form of growth in which competition means that we're playing a zero sum game with certain things. Not playing an infinite sum game, which is not going to stay possible.

Well, that takes a lot of thinking, and technology lies at the heart of the opportunity space to move from an exponential society to a truly sustainable society. And, ultimately, it's like Brer Rabbit says, "I'm going to say this one more time. Our only chance is self-control." And I think that's a message for all of us as we move into this century and try to prepare it for our descendants which are not very far behind us. Thank you very much. That's the end of my brief introduction. *(applause)* Now I get to be attacked, right? *(laughter)* And let me thank you again for coming out tonight. I'm really impressed, I have to tell you. And you're not even getting credit for this lecture.

DR. PIELKE: Okay, great. Well, I have a number of different topics to hit on, and I thought we'd start with some general questions. I'm sure we'd like to know what your interactions with President Bill Clinton were like. Can you tell us some examples of a situation or two that he called upon you for advice or input on policy decisions.

DR. GIBBONS: Yeah. Well, my favorite in terms of personal memory was, I was home on the farm on a Saturday afternoon, trying to get some work done, and the phone rang, and it was the President calling. And he doesn't usually do that. And he said, I'm getting ready to write a speech about the bridge to the 21st century, and he said, I'd like some ideas about what sorts of things could we plausibly imagine happening here in the next, say, decade or two, that arise from advances in science and technology. And I gulped and — when you get to that, everything you knew sort of disappears in your mind. But I said, let me

call you back. *(laughter)* So I called him back in five minutes and I said, I think there are a lot of things we could talk about, but one is a somewhat nebulous thing that I call inner space. Inner space being the difference between outer space and inner space. Namely, that we do have a big focus on going off to other worlds, and wonderful advances in astronomy. But inner space is our increased understanding of what happens at the molecular level, at the atomic level in materials. And learning how to, not only understand what happens in that inner space, but how to take fuller advantage of it as we learn how to get more out of less. And he built it into a talk, and it turned into — I think Neal Lane probably gave it the terminology of "nanotechnology." I didn't want to use nano because I didn't think very many people would know what that meant. But that was the origin of nanotechnology stuff.

And, oh, there are other times he wanted — early in the Administration he wanted me to set up a briefing on both, a simultaneous briefing in the same chunk of two hours, on the Space Station and on the Superconducting Supercollider. And I gulped hard but we did it, and he stayed there the entire time, listened carefully, and then, ultimately made decisions on the basis of that dialogue. It goes on, things like that.

DR. PIELKE: Well, similarly, everyone knows that Al Gore is famously interested in the environment, science and technology. What was it like working with Al Gore? And what was his presence like in OSTP?

DR. GIBBONS: Al had a very strong presence in the Administration in terms of science and technology. He was, I guess I would have to call, he was Clinton's guru in a lot of areas of politics, and the politics of science and the applications of science in helping achieve presidential goals, was very strongly there. Al was not a competitor, he was a partner and I, fortunately, had therefore two champions, not one. Unlike poor Al Bromley who had to fight some of the White House administrators, I had nothing but help from those quarters. You know, Al Gore went to Harvard in, I think, social science, probably economics and political science. But while he was there he took a course on population and environment from Roger Revelle. And it was in that course that Gore found his, found the shades falling from his eyes. And he came to recognize the central issue of resources and people. His ultimate book *Earth in the Balance* emerged from that. He became highly knowledgeable, especially in climate change research, and remains to this day very importantly involved. So he was a real champion. And a task master, too, *(chuckle)* because he'd always want more information. And one of my favorite workers at OSTP is Rosina Bierbaum. And he used to call her all the time. Day and night. For data information. And that was legitimate and important. So we helped feed him the good stuff.

DR. PIELKE: As a science advisor, outside observers of OSTP recognize that the science advisor wears different hats. One of those hats, for better or worse, is the chief ambassador from the scientific community to the highest levels of government – and in that role represents a very large, now, one hundred and thirty-five billion science budget, at the highest levels of government. And at the same time you're supposed to provide wise counsel to the president on how to use science effectively, and oftentimes make difficult budget decisions about scientific priorities. How do you balance the two hats between working as a representative of a larger scientific community and also speaking back to that community and maybe imposing some limits?

DR. GIBBONS: It's not all that hard. I honestly think it's not all that hard. Because, representing the process of science and its value to the American

people is an easy thing to advocate, and legitimate. There's no way I would ever get in a pleading for this or that project or a university, but I was nonetheless a strong advocate for science itself. That's consistent. At the same time, people at OMB have long been besieged with people who wanted to have more of what they were interested in. And so I try to be very careful when we worked with OMB and they'd send us, say, a budget proposal from an agency. We worked very carefully to try to, not only identify the things that we thought were most important of what they proposed, but also some of the areas where it's, in our judgment, it was, maybe, less important and therefore subject to scrutiny. And it worked out pretty well. No one tried to shoot anybody. But you have to have that kind of — you have to apply that kind of judicious oversight to these budgets or they'll get away from you and you'll lose.

DR. PIELKE: You made a transition early in your career from a physicist to a director of an environmental program at Oak Ridge, on up the line to OTA. What kind of advice would you give to scientists who might be in the audience who are thinking that maybe somewhere down the line there's a policy career there. Is there anything that worked particularly well for you or that you might have done differently, looking back?

DR. GIBBONS: Well, I think faith rewards a prepared mind, as we all know. And my good fortune was that I was working at Oak Ridge National Lab at the time, and we lived, basically, in the shadow of the Cumberland Mountains. Which, in turn, because of modern technology of earth moving, were being torn down. The mountains were literally being disintegrating — were disintegrating over there on the western horizon. And that caused me great concern about how we were mining coal and how we were using technology. And so I got more and more interested in environmental issues in the Appalachians. And my wife and I both got interested in the almost unavailability of assistance for family planning in those same counties. It was miserable. Miserable! A common — a frequent occurrence was that a woman would try to stop her pregnancy by drinking turpentine and other things that killed the women. And not a very satisfactory way to practice family planning.

So we worked hard in the Cumberlands in terms of broad environmental issues, including energy. And that led me, at the lab, to start work on energy efficiency and conservation, before it was hardly even thought about. This was 1969, 1970. And then I went on to the university, because when you gravitate toward public policy, you can't do that very well in a national laboratory. Jerry knows that very well. So I moved to the university and was the first director of a center on, let's see, it was called — first it was called the Environment Center, then it was later called the Energy, Environment and Resources Center. It was interdepartmental and intercollegiate. And that was a lesson in and of itself, was how to get these departments to go the line. I learned things like sharing overheads — overhead returns, which was a very important key to the puzzle.

But anyhow, that led me to further work on energy efficiency conservation. And meanwhile — ah, sorry there was a year in between in which — in the Nixon Administration they wanted to start doing some work on energy use in the federal government because our energy expansion of use was such that it was a plausible, if not likely, chance of a shortage of heating oil in the winter of '73, '74, and Mr. Nixon didn't like that thought very well, that we might, that he might have to face that. So he said he'd establish an office of energy conservation. And he put it over the Department of Interior because the secretary was especially a good friend of his. And that's how decisions get made. And they looked around for someone who knew something about efficiency and energy

consumption and they came and found me, and I agreed to go up and set up the office. And thirty days after I got to Washington, the Yom Kippur War broke out. And so I suddenly found myself in Cabinet meetings and other things that I had not anticipated. And it was a real learning experience, because at the time I left and went back to the university, in the summer of '74, I left almost on the same train as Nixon when he left town. *(laughter)* So I said, well, if I ever go back to Washington, it'll be some other branch of government. And then I came back years later to OTA, and then the White House again.

So as a physicist I said, okay, this is going to be my last job in Washington because I started out in a Republican administration and then I came back and ran a totally nonpartisan congressional office for both the House and the Senate. Now, if I go back and join a Democratic administration, that'll be a totally symmetric function and I can leave town. And that's what I did. *(laughter)*

DR. PIELKE: Can you tell us more about OTA, Office of Technology Assessment, which was terminated by Congress in 1995? Can you tell us a little bit about what the provision of science advice to Congress was like during your thirteen years there? What, maybe, is missing today?

DR. GIBBONS: Well, any new activity in a delicately balanced political process such as Congress, if you try to start something new in that environment, you're immediately suspect. And we were. We were called the Office of Technology Harassment by some. Because they saw us as a tool of the left-wing liberals who would wipe out American industry and do all sorts of things. It took us about six years for the gestation period to complete. And for Congress and the greater public, especially the industrial public, to gain confidence in OTA as being a place where you could really get a fair shake on an idea, and it could be reported in an authoritative way. It did not have political bias in it. And it worked, I think, remarkably well. The reports are still used.

We ran a cropper of one study we had to do, but it was a study on space-based missile intercepts. At the same time that the President was hell bent for a so-called Star Wars system. We delivered it, and it was like hitting a very large hornet's nest with a very large baseball bat. And we caught hell for it. It took a retired Air Force general and Charlie Townes and other people to look at our work and say, yeah, it's okay to keep them from trying to wipe us out on the spot. So that was one major flag raised about, is OTA capable of doing truly nonpartisan but expert analysis. I think we were right. I don't think they had a case on us. But they laid in wait a long time. Some people called the demise of OTA, which was led by Newt Gingrich, as being "Reagan's Revenge." Many members of Congress simply see no need for that kind of analysis. Even Gingrich himself said, yeah, they do accurate work. It's accurate analysis, but they do it too slowly and we don't really have a need for it. So how can you fight that? And they needed a scapegoat when they were cutting budgets, and they needed one within the congressional family, and OTA was less than one percent of the congressional budget, and less visible, and therefore it was chopped off. There are still members, Republicans and Democrats, who would very much like to reestablish something like an OTA. Maybe as a new wing of the "Generous Accounting Office" of some [that was a joke] *(laughter)* or, now they call it the accountability office.

But, to a person, both Republicans and Democrats agreed that until the situation changes on the Hill, don't bother, it's not going to work.

DR. PIELKE: So how does decision-making in the legislative branch suffer for lack of an OTA?

DR. GIBBONS: First of all, they don't get very much foresight on issues. And secondly, they get a lot of input that they try to handle themselves by, you know, a friend here or a consultant there and the likes, and it's a very spotty process, and the Congress is not well served by the community of science and technology, in my book.

DR. PIELKE: So you're obviously not in government now but you're an observer. How would you characterize the changes in the role of science under Bush Administration, the role of a science advisor? How do things look different, from your perspective, from your tenure?

DR. GIBBONS: Someone said, I guess it was Yogi Berra, that you can see a lot by observing. *(laughter)* And I haven't tried to observe too closely because the present Administration is not very transparent. But what I do see is a continued support for science. That's broadly the case in the Congress. It's not a very well digested support, but it's there – widespread. I see a shift away from this notion of – the reasons I put on the board – of presidential initiatives. Environment improvements, the economy, the other things. I see sort of a shift away from that toward a focus on the military. And now even the military budget is suffering. The DOD 6.1 and 6.2 programs are badly suffering now. And all that tells me is they're interested in building weapons, not developing new weapons for new needs.

DR. PIELKE: And those are the basic and applied research.

DR. GIBBONS: Yeah. The basic and applied. 6.1 is basic and 6.2 is applied. And so I think they're misguided. There was an article in – there was an editorial in *The New York Times* two Sundays ago authored by Bill Perry and John Deutch, who really take after the Administration on these points. So what do we do? I don't know. We suffer through. We give our feelings about the matter and we, and we hope things will come out right.

DR. PIELKE: Let's go down this path a little further. The Bush Administration has been criticized more than any administration for the misuse of science. And there's been a series of reports by Congressman Henry Waxman, the Union of Concerned Scientists, I believe you signed onto the Union of Concerned Scientists.

DR. GIBBONS: Yeah, I agreed with their report.

DR. PIELKE: What do you think about the claims of the misuse of science, and how should outside observers in the scientific university community make sense of this? Because, in some respects Henry Waxman, he's a Democrat, Union of Concerned Scientists helped to try to support John Kerry. In the work that I do I try to point out that there's something more than just partisanship here.

DR. GIBBONS: I'd say there's very little partisanship in this. It's a reflection of a very genuine concern. Not so much about the misuse of science, but the misrepresentation of science, of a very selective representation of scientific results. Of the extraordinarily creative and selective labeling of proposed projects. Like you all have heard of the Healthy Forests act, is that right? *(response)* And you know about the Clear Skies program. These are wonderful terms, and cleverly developed, but totally misrepresent what the state of science is on those very issues and what's in it. So it's much more of a PR

game than it is a substantive change for the improvement of these issues. So that causes a great deal of angst. I must say it's not just science that the angst, I think, is based on but a basic concern about openness of government, about the way that facts are, and opinions are represented in an almost totally politically oriented way.

I have to blame a lot of this on Karl Rove, who's an absolute mastermind in political maneuvering. Incidentally, you know, Rove said that the definition of a Democrat is a person with a Ph.D. *(laughter)* How's that hit you?

DR. PIELKE: Sounds like he's been to Boulder a few times.

DR. GIBBONS: But I think it is a matter of concern. Honesty in terms of representation, a fair representation of what the community has to say. And it was badly misrepresented in climate change, and it's still — they're still trying to work out of that one. But they fudge around on things such as stem cells. They claim there are so many lines of stem cells, and everyone knew that was wrong. They had just taken all of the marginal stuff they could and thrown into it. And I think it genuinely causes angst on the part of our community, which they are sort of quoting indirectly. And we ought to be raising concern about it.

DR. PIELKE: What practical advice, again, for scientists far from the Beltway and the — what kind of advice would you give to the university scientists or federal lab scientists in this environment?

DR. GIBBONS: I told this to a bunch of Nobel Laureates once who came to the White House and I had to arrange for their visit with the President. That when the mantle of something goes onto your shoulders, it doesn't come free, it comes with extra responsibilities. And the fact that science and technology now so dominate the shape of our society, and the future options we have to deal with things in the coming century, is a heavy mantle. It's kind of exhilarating to know that that's where we've gotten, but it's mind boggling to think about the kind of responsibility that comes with it. So I think we would be untrue to our own selves if we did not become increasingly aware of these issues. Aware of the current discussion of them in political circles and other places. And make our best thoughts known.

Some people say, well, if you're a scientist, you shouldn't be talking about politics. I think that's total nonsense. The scientist is a citizen just as much as an economist is a citizen. And they don't hesitate. *(laughter)*

DR. PIELKE: I'd like to turn to climate change. The Boulder Front Range area is home to one of the greatest concentrations of climate scientists per square mile any place in the world.

DR. GIBBONS: Good stuff.

DR. PIELKE: Yes. President Bush has had a lot of criticism for his refusal to support Kyoto. I gave you an extended quote from former Colorado Senator Tim Wirth, who was critical of the Clinton Administration. He said, and I'll just read part of this quote, that the Clinton Administration "Never mounted a serious campaign internationally or domestically after retreating from its public commitment to aggressive action on global warming within twenty-four hours of the successful conclusion of the Kyoto talks in December of 1997." I guess the question would be, if you're looking at trends in emissions or other metrics, scientific metrics, you wouldn't see much of an inflection point from

George Bush I, Bill Clinton, George Bush II. What's your perspective on how the Clinton Administration handled global warming and how it contrasts with the current President?

DR. GIBBONS: Well, it was a tragedy in the Clinton Administration because Clinton had lost a lot of his power. This was near the tail end of the second term. Congress was increasingly polarized. We even had, for instance, Hill demands placed on OSTP to do no travel with respect to climate change. To make no travel, and to make no statements about automobile fuel efficiency. Went down a long line. It was as bad as the — what was it called — the Whitewater witch hunt that went on earlier, of people trying to stifle the legitimate work within the Administration. We were really bound by the zealots up on the Hill. And aided and abetted, I must say, by Exxon and a few other nice organizations. And I think it was — I had left just a few months after that and gone on and Neal Lane was taking over. And I felt very disappointed but not surprised at the outcome of the Kyoto protocol meetings. Al Gore went over and desperately tried to help make it work well. A couple of my people were there trying to help out. But the bottom line was that the forces were so massed against doing anything formal, that the best we could do would be to have it, and take it as far as we could. And to go beyond that in the waning parts of the Administration would only mean that Congress would rebuff this. I mean there were votes on the Hill, Bobby Byrd, et al. saying essentially, it would be dead on arrival if we ever sent it up there. Byrd spoke because he comes from a coal state. He later reversed himself on this, but there was a lot of antipathy and suspicion about what Kyoto would imply. When Bush, however, said, well, Kyoto would mean it would cost us economically, that was a shallow shot. I mean everyone knows that economic cost of responding to Kyoto, even for the U.S., which would be the hardest to do, would be maybe a tenth of a percent in our GDP growth. I mean it shows a non-recognition of the severity of the problem and the cost of delay. On the good news side the support of research in global climate change has been strong and growing, and Bush's people have supported it, although they do it with borrowed money. *(laughter)* And that's easier than if you're doing it taking it out of your own hides.

But I have to think back to the advice a guy gave me years and years ago. My wife and I were concerned about lack of family planning capability in the Appalachian South, and we were asking a guy, who was an old seasoned reporter, about this. We said, how do we get people's attention to the plight of these folks and enable us to get some action? And he said, I tell you there's one thing you do, and that's talk about it. Talk about it. And he said it doesn't even matter which side you take. Talk about it. Get it to be part of the public agenda. And that's what I hope is going to happen with Kyoto now that it's approved and in place. It's embarrassing that we aren't part of it. But the evidence is rolling in now at an extraordinary rate on the validity of this concern. Even greater concern than we had thought a few years back. And so I think things are going to happen. But we can't afford to sit back. The longer we sit back, the tougher it's going to be to conform to that kind of an initial step in the direction of where we want to go. And there's still going to be people that are going to try to kill it for selfish reasons. Mostly the fossil fuel industry. That's where most of it lies, at the feet of petroleum and coal, at this point.

DR. PIELKE: Yesterday President Bush gave a speech, and I know you haven't had a chance to hear it or read it, but we talked about this a little bit earlier, in which he called for a major new initiative in nuclear power. Then he tied that to the greenhouse gas issue. And since you have expertise in energy, what are your thoughts on — again, looking toward nuclear power, as either a way to

limit the reliance on foreign sources of energy, or to deal with the greenhouse problem, or anything else?

DR. GIBBONS: In the late '60's I made several talks about greenhouse and electricity and nuclear power when I was at Oak Ridge National Lab. Nobody paid any attention to it. We talked about it at OTA. No one really paid attention to it. Nuclear is but one option of several to help cut down on the amount of greenhouse gases. The problem is that nuclear is coming into its own. It's getting competitive, it's getting reliable. We still haven't closed the back end of the fuel cycle, and it's still very suspect on the part of the American people and others because we screwed up so many times before in the way we managed it.

I feel that it is an important option for the future. It's the last thing we want to do is to throw away something that seems to work while we go after things that don't seem to work up to now. So I'm very sympathetic and so is Clinton. In fact, we moved ahead with relicensing of plants and other things during the Clinton Administration. So there's no real argument there. But we can't count on it entirely. We can spend ourselves into the ground trying to just bail our way out of the energy problem with folks singling out one kind of power. But we must not retreat from it. We've just got to resolve the remaining problems and adapt it. It's not going to be simple. So I say that's no news. If that's Mr. Bush's energy plan, then he doesn't have a plan.

DR. PIELKE: Let's spend the last fifteen minutes or so taking questions from the audience. See what's on your mind. We'll have to repeat the questions up here so that they get on the tape. Why don't we open things up.

AUDIENCE QUESTION: How can we depoliticize the global climate change issue?

DR. GIBBONS: First of all, any important issue is going to be politicized. Just like any important new invention is going to have opportunity for both ill and good. Gutenberg's printing press had opportunity for — great opportunity for mankind, but also for enslavement in forms. Every important new idea has this duality principle of for good or for ill. Now I've almost lost my train of thought. On the climate change thing, how do we depoliticize it? As long as it remains important, it's going to be — people are going to politicize it in that they're going to take sides. The fossil fuel industry is never going to be happy with climate change. Neither are the oil-producing countries, the Saudis and others. They funded a lot of people that we know the names of here in the States who published articles against — about climate change.

So you can't depoliticize it in that sense. But here's an example of partial depoliticization. The formulation of the IPCC. Of many nations, together. Scientists from all of these nations. The processes that they went through for reviewing critiques of their studies is excruciatingly careful. And to that sense it ought to be taken as a non-political input to, and you know, an issue. But it's going to get politicized too. People are going to claim that interests weren't represented and that sort of thing.

Every important political decision, and global climate change is an important international political decision, is going to have a degree of politicization in it. And I think our goal is to try to do these things despite this politicization. To overwhelm it, overcome it, and push things aside. And as George Brown or others would say, is the thing that will most readily push those things aside is very careful work done that can be very persuasive in terms of how it's used. Both in terms of these economics and the technology of

alternatives, and of the science itself. And I think we're making good progress, especially in the climate — paleoclimate studies. The North Atlantic Conveyor Belt now is seen as a reality rather than a figment of imagination. So I'm not discouraged about that. It's just part of human nature to have the parties at interest line up on opposite sides on these issues.

AUDIENCE QUESTION: What do you think the role of the public should be in making decisions about science policy?

DR. GIBBONS: Well I think it should be front and center because it's the public that's supporting this enterprise. And the public needs to be better informed about these issues and about the decisions that we all face as a society. Where to go with science investments, and what to do with the technologies that emerge. Sadly we're not. I have a fear that, sort of, the train is leaving the station of the advancement of science and technology and most of the people that actually are paying for the train to go are still standing back in the station. How many people, for instance in Boulder here, a university town, believe that the Earth was formed six thousand years ago? A fair number I imagine. But in the U.S. it's an unbelievable fraction of our population. So the people need to get better informed because if they're going to — if we're going to maintain a democracy we've got to have a participatory society that governs. And you can't govern without knowledge. James Madison said it well. He said, you know, if we mean to be our own governors, we must develop and use the knowledge - the power that knowledge gives us.

AUDIENCE QUESTION: I have a flip side to that question. Both the description of Clinton's efforts to advocate to the NSF versus the NIH, or the challenges of addressing the issues of global warming, or having an informed populous, might be better addressed by having a well-educated population. Whether that's the population in Congress or as OTA was attempting to do, or the public in voting and leaning on Congress to act in a particular way. So my next question is, how do we do that? What is the role of scientists, the politicians, and the science advisor in education and, particularly, in science education? Or, I can put it further and say, not what's the role, but what's the obligation?

DR. GIBBONS: Ah, the obligation is profound I think. Oh, I'm sorry. What is the obligation of the science community, including science advisors, in helping transform this public into a knowledgeable public that can properly be their own governors in a democratic society? Sound about right? [okay] I don't know. No. *(laughter)* I think we all have to take it on as a responsibility. You can't be an honest — how shall I say this — just because you're a good scientist doesn't mean that you aren't also supposed to be a good citizen. And to be a good citizen means you need to use your knowledge and your talents in the political process as well as in the scientific world. In the world of discovery. We're not excused. And a lot of people don't think that way. They think, well, this is more frequent, I think, in the biomedical community. A lot of these folks tend to think, well, we're doing really important work in our profession, and that has great national importance. And we don't have time to think about politics. But that's wrong. That's wrong. I think we all ought to be involved.

And I think we have to stand up and shout when people start going off into the far right conservative realms of religion and the likes, and then claim that they have the truth. This argument on evolution, the argument on stem cells. It sneaks into the White House. It sneaks into the Oval Office. And that's a very bad sign. So that's why I flunked retirement about four times now. And I

hope the rest of you will, too, when you get older. There was another question back there. *(response)* Oh, okay, then let's go over to the aisle.

AUDIENCE QUESTION: Could you please comment on the division of science to diplomatic relations. In particular, what role do you see the science advisor to the secretary having decision in the future position being helped to establish?

DR. GIBBONS: Okay, the issue is the role of science in our international arena. In our international diplomacy. In my position, there is — it's probably one of the most under attended options in our quiver of arrows that have to do with foreign policy in part because, as someone described the State Department to me once, the State Department is a bunch of technophobes. They are people who have almost no background in science and even less interest because they don't see it as part of international endeavors. And I found that in a number of instances with respect to world trade, with respect to other things. When I left the White House I worked with the National Academy. The National Academy was interested in this because they live across the street from State. And they said, my gosh, we don't have any science activities in the State Department. And so they went out and solicited some funds from, guess who? Bill Golden, the guy who originally made the suggestion to Truman. Golden funded a study at the Academy on the role of science and science advisor in the State Department. And then it was delivered to the Secretary. To Madeline Albright. And I at the time was also hired as a part-time consultant to go over to the State Department and talk with them about science and technology and its relevance to the issues they were facing beyond nuclear weapons. And Albright bought it. We identified Norm Neureiter, an extraordinary guy, who became science advisor to the secretary. And when Norm's term ran out — they ran out of money, actually — and Colin Powell came in, he decided to keep that office. Which was the real acid test, could you go through the transition from a Democratic president to a Republican president and still have that science advisor stay there. That was Neureiter's role, and he did beautifully.

Now they've gone from something like four post-doctoral fellows in science at State to twenty. Most of them provided at no extra cost to the State Department by the professional organizations such as AAAS, American Chemical Society, American Physical Society, engineering societies. They've chosen people to go and work in State for a year or two, and most of them stay. Once they're there the State begins to realize how important they are. They're now embedded in a number of our overseas missions. And I think we, maybe, have turned the corner in State recognizing the enormous opportunity that science and technology provides our diplomats in terms of options that we can use in our foreign policy missions. So I think it's working. But it's not guaranteed. You're going to State are you? Good luck. They need you.

DR. PIELKE: Let's take one more question before we wrap it up.

DR. GIBBONS: Back here. Oh, excuse me. You were in the glare of the light. Yes, with the light colored hair. You look like Clinton.

AUDIENCE QUESTION: One of the major things we try to do at the university and all faculty try to do at the university is to teach critical thinking. It appears that people make their way up the level politically without some of that education. *(laughter)*

DR. GIBBONS: That's a very diplomatic statement.

AUDIENCE QUESTION: And I wonder, how do you deal with people at a high level who have not learned critical thinking?

DR. GIBBONS: Well, the process of educating the politicians is sometimes — first of all, you have to approach them with some awe because they manage to get elected. And some of them never do anything more after that. *(laughter)* But it is tricky because these people face an enormous number of parameters they have to take into account when they make a decision. You know, oh, the French writer. His name floats in and out of my feeble head. It'll come to me. But he helped — anyway, a famous Frenchman said that science says the last word on everything. Sorry. Science says the last word on everything and the final word on nothing in terms of action. All of these scientific deliberations, most of them, have to be taken into account. But there are so many other parameters, so many other variables. I could tell you horror stories about some decisions made at OMB in terms of where are we going to put this or that project that's proposed by three different universities. And the other things they have to take into account when they were trying to make a decision about who ought to get the award. Sorry, it's science has the first word on everything and the last word on nothing, is the quote. Yeah. So that's my motto for tonight. Remember that we have very important things to say, but we're trying to swim in a very large pond with some other big fish.

DR. PIELKE: On that note I think that's — let's thank Dr. Gibbons for a wonderful evening. *(applause)*

DR. GIBBONS: I can't tell you how flattered I am that you came out on this night. *(applause)*