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Interviewee: Dr. Joshua Lederberg

Session #1

Interviewer: Sharon Zane

New York, New York

Date: March 26, 1998

Q: Let me say that this is an interview with Dr. Joshua Lederberg for the Carnegie Corporation oral history, part of the Columbia University Oral History Research Office. It's the 26th of March, 1998, and we're at Rockefeller University in New York City. What I normally do is go through some background stuff, but you may not wish to do that.

Lederberg: I don't think you need to.

Q: Let's just cut to the chase here. Maybe as a way of getting into the whole commission, let me ask you, to give me a little background as to how you were brought onto the board at Carnegie, why that happened.

Lederberg: Well, I've done no homework on my own. I'm very much involved in some historical projects, but I'm still stuck in the forties and fifties in my own autobiographical memoir. I've made no effort really to collect the material of so much more recent events. You will have to remind me when I was appointed.

Q: I will tell you exactly. You were appointed on 12/13/84. That was your election date. So, 1984. Your connection with Carnegie was through --

Lederberg: David [A.] Hamburg was a very close, dear, personal friend, a professional colleague. We had related to one another on innumerable other kinds of programs and projects. He came to Stanford University to be head of the psychiatry department not long after I arrived there in February 1959. He was head of the department when my wife did her residency in psychiatry. He and his wife were witnesses to our marriage. [laughing] I've known their children since they were very little. Eric [Hamburg] worked in my lab for some time. I hope David has as much respect and affection for me as I do for him and Betty [Hamburg].

I grieved when he left Stanford to go to the IOM [Institute of Medicine]. I was part of his base camp backup home at Stanford when he went on his expedition to rescue the students in the human bio program in Africa. I've written a little bit about that in my encomium for him when he was elected president of the AAAS [American Association for the Advancement of Science]. He and I were co-founders and very deeply involved in the human biology curricula at Stanford, so we had a long history.

After IOM, he went to Boston, and then, much to my delight, he was called back to New York. I arrived here [Rockefeller University] in 1978. Remind me when he was elected president of Carnegie.

Q: 1982, but he had been on the board before that.

Lederberg: Yes, but I had no connection with Carnegie before he became president. When he did, we immediately talked about all kinds of projects that he would be interested in,

coming to New York, and not long thereafter, I was invited to become a member of the board.

Q: With any idea about what you would be doing, the projects or the basic drift of --

Lederberg: Well, we were mostly interested in more substantive matters -- education, human biology, the medical system, rationalization of medical research -- so those were much more to the fore in my own mind than the organizational procedural issues that ended up being the commission. So that was not at the top of my mind coming on to the board. It began to crystallize as an issue with the documents I just gave you, and about the same time Bill [William T.] Golden was knocking on David's door, probably much more energetically than I was, specifically on the question of scientific advice to the President. So he was by far the prime mover. He's published, or edited, two or three books, has had a passionate interest in the matter, was a major participant in the early days, so you'll get much more from him than you will from me.

Q: Did you know him [Golden] before?

Lederberg: I'd met him in New York. I did not know him before then. I don't recall my first meeting, but we traveled in overlapping circles. I had been doing advice to the executive branch, primarily and a little bit to the legislative, for a very, very long time -- oddly enough, much more in the national security area than health affairs. That began in earnest in 1970 when I was co-opted as an advisor to the Arms Control and Disarmament Agency on the negotiations for the Biological Weapons Convention, and that was a topic I

was deeply engaged with, and continue to be in the present day.

I was very happy to have an opportunity to weigh in on that. I was urging very strongly that the U.S. take the lead, that it should be a reciprocal matter and one binding on other countries. I took for granted -- I was quite startled when [Richard M.] Nixon unilaterally abjured U.S. participation in B.W. [biological weapons] development in '69, I think. I thought that might even wreck the negotiations for a treaty, because where was the bargaining chip? But it worked out otherwise, and that's a very interesting issue in political scientific dynamics, that things don't always go quite the way you might expect on crude first principles of bargaining and negotiation.

So as things finally eventuated, it became the treaty, and I hope I can say that I played a role in convincing the diplomatic types that this really was a very serious issue, that it was a weapon out of the ken of the other ones that they were familiar with, that we still had a chance to nip it in the bud before it had become institutionalized as an everyday weapon for grievances at every level. I was very worried that biotechnology would greatly complicate the character of these weapons, and was relieved when the treaty was signed. I knew that was not going to be the end of the story, but felt it was a major step to begin the process of de-legitimation of weapons in this category.

So I harp on that because that's been the hard core of my concern. If there's one message I've wanted to convey in my advisory work in government, it is the salience of this issue, the need to manage it at an international level, and then the last few years spending a great deal of time on civil preparedness, to be able to defend ourselves against attack,

especially on the part of terrorists and substate organizations. But that put me in touch with a wide range of government agencies, so I had a good opportunity to understand how scientific advice filters through political decisions.

Q: Which differs, right, depending obviously on the administration and the basic outlook?

Lederberg: Oh, yes, on the administration, on the topic, on the agency. The President isn't going to hear anything he isn't interested in.

I knew a lot about PSAC [President's Science Advisory Committee] during the sixties. I was invited to, not a formal tender, but Phil [Philip] Handler asked me, when he was thinking of retiring from it, would I consider sort of being his successor as a biomedical member? That was a time I was just well launched into writing a weekly column on science and public affairs for the *Washington Post*. I found that a very engaging way to offer my advice, which was obviously targeted on the Washington professionals, and I felt it would be an immediate conflict with being a confidential member, or a member holding material in confidence for PSAC. How could I write on an issue where there was a matter that I knew but could not discuss as part of the discourse? So at that time I declined, but I was in close touch with a lot of its members. I'd been on a few of its panels going back to the early sixties.

Dick Garwin had been at the center of a crisis about PSAC, which has many, many perspectives.

Q: Who is Dick Garwin?

Lederberg: Richard Garwin. He's a physicist at IBM. He was on PSAC for many years. I've forgotten what role he played in the commission, probably on some of the panels if not else. He's been a very deeply engaged scientist in policy on many fronts, mostly on nuclear weapons policy. A very smart man. But he'd be quick to say that he thought that Richard Nixon was so corrupt that he did not feel that his membership on PSAC bound him to silence on matters where he thought Nixon was likely to mislead the nation. That was his vantage point. But then he publicly challenged a decision Nixon had made with respect to the supersonic transport, and that tore it for Nixon. Nixon dissolved PSAC after that. He did not want to see members of a council of his scientific advisors take public positions opposed to him.

And that is a delicate question. As a matter of political science theory, I'm a little bit more on Nixon's side, because I think that's the only thing that can work. If you can't sustain the confidence of the President, how are you going to have a board of advisors? And that's what I went into in these letters. So when Hans Bethe talked about reviving PSAC in the mid-eighties, I thought it needed that emendation. I thought it would not work unless there was a public statement like mine that there are contracts that could be written between scientists and the executive, that the executive could expect to be honored and, therefore, would have enough trust in his group to really use them. That really hasn't eventuated. We have a PSAC, but the President doesn't trust it and doesn't do much with it, and makes many of his appointments on grounds of diversity, as much as on trying to get the expertise that he's looking for.

Q: What is the explanation for that?

Lederberg: Well, if you look at the commentary in the Golden books, you'll see some people saying that's absolutely inevitable; the President is going to pick whomever he damn pleases in that regard, you can't force advice down a President's throat, which is absolutely true. And he may not want to hear a lot of scientific advice. He may not feel that he personally needs to be engaged with it. He's got a Cabinet of people dealing with technical issues. There's been quite a bit of chitchat about how legitimate is the demand for scientists' access to the President. Some would say that they're trying to make themselves into a select priesthood, they're not elected officers, but they want influence beyond political legitimacy. So you can find quite a lot of discussion along those lines, and we did go into that in various reports.

You'll see it probably better ventilated in the books that Bill Golden edited than almost anywhere else, although I did try to bring it up in some of the prefatory material that I wrote on some of them. But I felt there was a place for compromise, that the President ought to be stimulated to get the best expertise that he could find, but do it on terms that he could accept. So the reason I wrote the letter was not only to plead the case, but I was talking to the President as well, saying, "You can do this in a way that will not be prejudicial to your own political interest; in fact, it will enhance them." He wouldn't listen to what Bethe had to say, which is essentially forcing it on him, or putting such pressure behind the obvious rationality of it that it amounts to forcing it.

Q: [Ronald] Reagan was President at the time?

Lederberg: I guess so. You could get it by the dates. There was some concern at the time that the President was getting very bad advice technically, especially on the Star Wars issue, and I think, in retrospect, almost everybody would agree with that. Jay Keyworth was his advisor. Jay didn't stand up to the political pressure very strongly, although I think he had his own reservations about Strategic Defense [Initiative; SDI]. He was not going to voice them once there was an indication of which way the President was going, but you'd better ask him. I can't put words in his mouth. But that gives you some idea of the atmosphere in which this was developing.

Now, further arguments on the matter. At the time that PSAC was invented, in the [Dwight D.] Eisenhower administration, there weren't very many other structures, and the National Security was the most cogent of them, the one that had the greatest technical content, actually. There was plainly a real need for that, when we were trying to make decisions about the feasibility of delivery of fusion weapons, missile systems, things of that sort, what's our possibility of defense, on down the line.

There were extra scientific issues as well that scientists felt they had a special handle on, and in some measure they do, although they shouldn't arrogate too much. That is, what kind of deals could we consider and should we be making with the Russians? What alternatives did we have if we let the arms race go unabated. I think most scientists put a much higher cost on not checking it than most of the rest of the public, and I think with some technical justification. But besides trying to make that case in the public media,

there were many who wanted to have an avenue of doing it directly to the executive.

Since Eisenhower's time, almost every agency has developed its expertise very substantially. The Defense Department has a Defense Science Board, has innumerable contractors, it does an enormous amount of analytical work. A lot of the decision-making has been derogated back to the departments in these matters. I'm just quoting some of the arguments for why PSAC is not as important in today's climate as it would have been during the Sputnik era crisis. There was some merit to that, but I think not so much. I think a presidency that made a wise choice of technical advisors would be a better presidency, but you've got to pick the right people. It's got to include expertise, but I think it also has to do with their conviction that they're working in a confidential relationship. But the latter hasn't been much of an issue because there hasn't been that much use made.

I'm not aware of any significant issue for the last eight or ten years that PSAC has debated, where it mattered one wit whether they kept it confidential or not. Happily, we might say, we haven't been through quite the same kinds of crises that motivated it in the first place. The Star Wars issue was probably the seminal one in which getting the best technical advice to the highest level was really quite critical. And, of course, even there, certain division of opinion, more then than now, about issues of feasibility. I think the main thing that's eroded the Strategic Defense concept is that there are so many other delivery systems, that even if you solved the ballistic missiles. You don't really know how to deal with cruise missiles. That's not touted very loudly, but I think that's one of the main reasons for the reduced propanancy of the SDI.

Q: But that's obviously one of the big issues remaining today.

Lederberg: Oh, it still remains, yes, and it becomes a quantitative matter, and it also had so much to do. I mean, some of it got to be quite preposterous. There were people saying, "Well, this was technically unworkable and everybody knows it, but at the same time it will cause problems in our relationships with the Russians." Well, if it's technically unworkable and everybody knows it, they ought to welcome it. Why waste our resources on it? And if it has other impacts on their behavior, then they have to be factored into the arguments for why you would want to do it. So it gets pretty complicated.

I did not personally weigh in deeply. I'm not unfamiliar with the SDI issues, but I didn't regard myself as a primary expert. I thought I could look very much more broadly on the impact of action and reaction on U.S.-Soviet relations, but at the technical level, my expertise was in chemical and biological weapons.

So that's the background. So, somewhat to my surprise, I mentioned this to David, and said it might be worthwhile convening a modest study, have some sort of report to indicate -- well, to thrash out the issues I've just mentioned. But then Bill Golden was knocking on his door and he had much more ambitious plans than mine, and somewhat, to my surprise, Dave had come back and, in effect, said he was going to make this the centerpiece of his program at the Carnegie, and would I consider -- I don't know who said what first. I didn't want to chair it; I was happy to co-chair it. So that was fine.

Q: Is there that much difference, just by the way?

Lederberg: Well, it meant I did not have to commit myself to attend every single meeting. There would always be a backup. So that's the big difference between the two. In our actual operational role, we never disagreed on anything that I can recall. We'd take three-minutes' conversation to iron it out, but I just wanted to be sure that the continuity of the staff meetings and the planning efforts and so on would not suffer at the hands of my own schedule.

Q: And you and Bill Golden saw so much eye to eye, is what you're saying?

Lederberg: Oh, yes. If we differed at all, I think he had more unmitigated enthusiasm, and I put in some of the critical nuances that I've just been discussing with you. I was more willing to entertain them and discuss them than perhaps he was. I could see problems with the proposition. I thought, on balance, we could make a very good case. For Bill, it's hard to find those problems.

Q: Did you play a part in the selection of the commission members?

Lederberg: Oh, yes. Bill and I and David, and a couple of other board members, went over it very carefully.

Q: Anything you can tell me about the selection or composition of what you were looking to do?

Lederberg: Well, we would want to use the same principles that a President would use. [laughter] We realized it was very heavily weighted to fairly senior citizens, but we also felt we needed people with a lot of experience, contact, judgment, wisdom. We thought we'd get younger people in to staff the program and be involved. It would be an important learning experience for them as well.

We wanted to make it as bipartisan as could imaginably be done. We learned over backwards in that regard. Since we were dealing, at that time, with Republican Presidents who hadn't cared much for science advisors, we particularly felt the need that we had a Republican voice, and we had some good people.

Q: And a large group like that, its effectiveness in working together?

Lederberg: Well, we had a substantial staff and we had all kinds of panels. They did all the substantive work. The plenary commission provided overall guidance and legitimation. I think almost every commission member was on one of the other detailed panels, so that worked fine. Do you have the list of the members?

Q: Sure. Do you want the whole --

Lederberg: The commission membership.

Q: Here's the task force. Here's this commission and advisory council. It's there.

Lederberg: So that was another way. We had kind of a two-tiered group -- we could get a bunch of people who might not either wish to offer the time but could still provide their imprimatur and maintain some involvement. I don't think Gerry [Gerald R.] Ford ever did anything in that regard, but we were glad to have his name on it. We had Dave [David] Packard, who did actually play a substantive role. I'm looking for the former Secretary of Defense. No, not there.

But on the commission as well we had Andy [General Andrew J.] Goodpaster; he was a gem, absolute gem. You can't correlate things by age. He was probably the oldest member by far of the group, and still just as bright and youthful in spirit. Did you interview him, or do you know him?

Q: No.

Lederberg: So I have no apologies for the group we put together. A splendid group of people. Not everyone was functionally active.

Q: It's always like that, isn't it? On boards, you've got people who work and --

Lederberg: Yes. Well, it's a matter of what engages their interest, but just about every other one, and I wouldn't exclude him either, they all pitched in. Jimmy [James E.] Carter obviously had his own choice of what he would do and not do, but he was quite actively involved. We had a pretty good attendance at our commission meetings, and they were engaged.

Jim [James D.] Watkins turned out to be a very enthusiastic member. Education is his primary concern. I had known him when he was CNO [Chief of Naval Operations]. I was on his executive panel. A very different set of issues. Then he went to the Department of Energy and I got on his advisory panel there. So, yes, there was an overlapping directorate, but we were looking for that kind of thing on the part of others, because one of the functions of these civilian advisors is exactly that they sit in different agencies and different parts of the bureaucracy, and they can do a lot of cutting across channels that's sometimes hard to happen inside of government.

Now it's very hard for me to focus on details. I just haven't been giving a lot of --

Q: I don't need the details because they're in there. I want overall things. For instance, if you have a memory of what it was like to hash out a goals statements, or to come up with the recommendations. Was there significant struggle in doing that?

Lederberg: No, there was remarkably little dissent. I can't remember any "go down to the mat" kind of issue at any point. I think there was certain self-selection. People weren't going to come on to this commission unless they felt it was something that needed to be done. It was obvious that our report was going to be leaning in that direction.

I would say the most interesting illuminations came from enlargement of the scope. I had only thought about the executive. Then Bill said, "Well, we've got to get Congress as well."

I don't know when the judiciary came up more forcefully. I know Helene L. Kaplan played

a large role in that. That ended up being one of the more innovative aspects of it. There may have been more new ideas on that sector than in all the others. Most of the other stuff is a good way to collect it all and bring it up to date, but it would be hard to find anything that was totally original, and it shouldn't be. The propositions are so self-evident, they could be reached a long time ago. But the judiciary had been very much less a target of inquiry of this kind, so I thought that was probably the most refreshing material that we got.

John Brademus kind of took over the congressional part of it, and well he might. He knew all about it. He was aggressively interested in it. He took a rather more partisan tack than I would have preferred, and I think that might have antagonized a few people and may have limited its effectiveness, but whether anything would have worked, I'm not sure. But he's also a member of a club. The senators were, in some way, better positioned, because the Senate is more of a club than the House, and they certainly helped out in that regard, but none of them put the energy into it that John did on the congressional side.

Q: Did David Hamburg have a lot of input?

Lederberg: Inspirational. We were all pointing to the same sort of targets, but he would egg us on. He attended all of the commission meetings, had a lot of wisdom on the details, but he left the direction of it pretty much to the council. I guess if there was a doctrinal cleavage, it had to do with how far do we shape our report to try to deal with the exigencies of today's administration and tell them what to do right now, and how much to lay out a set of principles that might be around a little further on, especially as any given

administration might seem slim pickings? Bill was all for taking an activist approach, and I was more for doing the academic analysis of trying to understand the process and lay out the principles. So that was probably the main difference. Nothing we'd have ever gone to blows about.

It developed quite an operatum, very enthusiastic people. I really have to stress they did all the work. We did what our titles indicated. We co-chaired, and the commission provided advice, and the advisory council did further, helped select the panels, the memberships reviewed the final reports, [because we had to] be willing to put our names on them, they all had our signatures in front of them, and that's the way it went.

The other kinds of issues about its structure would have to do with how much about process and how much about content, and that did trouble me over a period of time. It's all process. Content comes in sort of inevitably, it sometimes defines what the appropriate process will be. But I thought that to have a commission on every aspect of government that has technical components and come out with substantive recommendations would require an apparatus ten times the size of what we had here. So we largely did downplay the specific substantive issues, and we tried to speak more to what's the best way to get to the right conclusions rather than what we thought they ought to be.

The exceptions, I guess, where people had especially strong feelings, seemed pretty self-evident where they were going to go -- the ones on education and some of the stuff in national defense. Bill [William J.] Perry was very keen on procurement reform, and I think did lay the groundwork for the work he then tried to do later on when he was

brought back into government as deputy secretary. I have to mention he somewhat regretted being promoted to Secretary, because he felt that he would be less able to push that particular theme which he thought was really quite central to the success of the department, and there's probably some truth in the outcome. I think he did go a certain way, but without his own special energy and whatever, many aspects of procurement reform are still stalled. Of course, as long as Congress takes such a deep interest in where the money is spent, don't expect too much. I'm a little surprised how interested many people have been in these reports. I could have expected that talking about bureaucratic organization might be the dullest subject in the world, and maybe it is, but it's been a matter of lively interest. The dissemination has been immense; people refer to these all the time. A certain number of actions actually have been taken in various places.

Q: That's what I wanted to talk a little bit about, too, because there was work to be done after this was done, is that correct?

Lederberg: Well, I think the most glaring deficiency is the State Department. I know [Secretary of State] Madeleine Albright is taking an interest in the matter and maybe we'll see a fresh look at it. Jim Watkins has exploded in anger about that. I don't know if you saw his Op Ed in *Science* magazine a few months ago? You might want to locate that, on just those issues, about how poorly we are served in our international relations. And he's one who is in a good position to know.

Q: When Carnegie undertakes a big effort like this and then the council or the commission is finished and you've produced this document, very different things happen depending on

what the substantive issues are. Would it be fair to say that the follow up was more internal rather than external?

Lederberg: I think it always has to do with educating the people who were part of the study, and connecting them to their continued further roles. It's people who are going to carry these ideas further. I think they're well embedded in many parts of government at this time. We had Ash [Ashton B.] Carter, an M.I.T. [Massachusetts Institute of Technology] professor, as an advisor. He then became Assistant Secretary of Defense, very much connected with collaborative threat reduction and things of that sort, so we had this kind of movement back and forth. I think those individual interchanges probably are as important a medium of knowledge transfer as the reports themselves. Somebody like Graham [T.] Allison moves back and forth all the time, but almost anybody you want to list on this advisory council, half the people, had that kind of back-and-forth involvement, and equally so, or the more so, for the individual task forces. So what goes on in the minds of the people is as important as the written documents.

Q: I'm looking for long-term impact.

Lederberg: Well, I think we did play a role in [George] Bush's decision to invigorate PSAC. We certainly connected very closely with Jack [John H.] Gibbons, and, I think, had more than a little to do with his appointment. In fact, we had everything to do with his early appointment as a science advisor in this administration, and that's really important, because then he played a role in selection of a great many other folks all around the government. Those six months make a crucial difference between the two. So I think

that's had an irrevocable effect already on the recognition of these issues.

I don't know if you saw a book called *Prune Book*.

Q: John [H.] Trattner.

Lederberg: I know we collaborated with him. Let's see if Carnegie funded him. Yes, sponsored by the commission. This is probably as important a product as any in really pinning down very precisely what the jobs were that needed to be filled, what their qualifications ought to be, and so forth. I'm sure Jack made great use of that in his own work in getting the government staff in this administration. A lot of it is much more intangible. There was an enormous amount of conversation. Some of this came out in the written reports. People read them, they were broadly disseminated. It's hard to find immediate cause-and-effect relationships, with the exceptions I just mentioned to you about the Council of Scientific Advisors. Its success is mixed, largely on the somewhat equivocal interest that the President has placed in it. I think [Vice President] Al Gore has had a little bit more of a relationship to it, but exactly what does Mr. Gore stand for in this administration? It's always a problem of any Vice President.

Q: Looking back, or just even standing here, how do you feel about this method of getting something to happen, this study and report, with the backing of a foundation like this?

Lederberg: Well, as intangible as are the consequences, I still feel good about it. I think it kept the focus of attention on a set of issues, and they really have to do with expertise in

government, not just technical -- understanding the balancing issues that have to be thought about and just having gotten so many people involved. That way of going about it, I think, has its own merits, not just because you are sure you have a wide diversity of opinions that flow into the reports, but just their own engagement. So I think the country is better off for it, and I think even doing a little bit towards improving the efficiency of government, has a very, very important set of consequences, so I have no question whatever of its being worthwhile.

Now, this was out of the box in its emphasis on procedure. I think that alongside of this might have been a choice, and we just never got to it, of two or three seminal substantive questions on which we could have provided examples if the President had a very good group of advisors on this particular topic. This is the kind of thing that it might have come up with, so probably an outstanding opportunity was very carefully thought about before David felt it was just too much for him to take on, which was remodeling the health-care system. That would be the most obvious and outstanding one.

I think we could have had one in national security that went much further, although we went a long way, but it was not that explicit. Even during the time of the commission, much more since then, of course, there have been such dramatic changes in the world, but I think Carnegie could convene -- it has the usual capacity to convene expertise in a wide range of things. And David's done that. He has his other programs in avoiding nuclear war and conflict avoidance. They may be a little bit abstract. I think if I had my druthers, I would have narrowed the focus a little bit more on a couple of them, but I can see merits to the way he went about it. But we did not do that in our own commission, so we can be

faulted for what we didn't do, I think, more than what we did, if we were going to grapple for what's the government up to.

The one study I can think of --

Q: Let me flip the tape.

[END TAPE ONE, SIDE ONE; BEGIN TAPE ONE, SIDE TWO]

Lederberg: I, in comparison, think it's called the Murphy Commission on the reorganization of the State Department or of government's role in international affairs. You might want to take a look at that as a kind of yardstick. Almost none of it was adopted. Gave a lot of very concrete recommendations, but it's the one other study I can think of that was primarily devoted to structural questions on a somewhat narrower frame. There were some good things that were taken up by it. I can't remember more than that about the detail, but you might just want to put them side by side for comparison sake. That was done about ten, fifteen years earlier. I don't know if you've ever run into it. It will be referred to in our State Department study.

Q: You've had a big interest in the interchange between scientific community, or whatever, and government. How are you feeling about that today?

Lederberg: It is much more decentralized than it was. As I look at almost every agency besides State, I think they're in pretty good shape in that regard. The DOD [Department

of Defense] has a Defense Science Board. Each of the service chiefs have their own groups of advisors. I think the Navy's outstanding in looking for people for their very broad range of views and perspectives. State has almost none of that. They don't want anybody outside telling them their business, to a degree that exceeds everybody else. The FBI has an advisory group on DNA technology; I sit on that, too. So, I mean, this kind of thing is dispersed through government, so I don't think we have too many complaints on that score.

I think the issue is not availability of advice, but what drives the votes, and I think until we get electoral reform, there's probably not too much point in pushing most of these other issues that much further. People in Congress are going to pay attention to who comes bearing gifts, and the executive branch is not devoid of that, either. As long as that quest for money for campaign contributions and so on so dominates who the Congress and the President are going to listen to, I think those are much bigger problems than the nuances of better or worse technical advice.

I think also technical people are much less shy than they used to be about voicing their concerns, so the media -- and I'm talking about semiprofessional and professional, as well as the popular media -- provide more avenue than used to be the case. I guess my own columns would be an example of that. I had ways of speaking to the Congress and indirectly to the President, if you like, without being on any formal commission. That has the advantage that there's more of an open market of ideas. There is something that some people will take aback at there being a select few who are appointed to provide the advice, and that can be corrupting if in the necessary framework, if they're getting confidential information, they can't spill everything, that they get a sense of omnipotence or

omniscience out of being at the center of things and not part of public discourse of ideas. I'm very much a Jeffersonian on that score, and I, again, have said some of that in some of the prefaces to the reports. So I don't know that we either can, on account of the electoral corruption business, or need to, rely that much on formal structures. Important issues should be ventilated. We have groups like the National Academy of Sciences that's consulted all the time.

We had a disaster in the Republican administration knocking out the OTA [Office of Technology Assessment], and as far as I can tell, this was done precisely because it did all the right things -- open hearings, multiple points of view, ventilation of issues. It suffered from none of the elitism that I was commenting on before, and I think Congress shot itself in the head. It's always in competition with the executive about access to expert knowledge, and it destroyed one of its organs in doing that. So there's now more of a monopoly on the executive branch. But the open media compensate for that. I think there's more the Academy can do. It's more open itself now. It's putting more of its interim reports out on the web and things of that sort. By the way, the web itself is a major, major factor in opening discourse at many levels. So we'll go about much of this at different levels, but I think the root problems of political life in this country are not the difficulties of that of PSAC. They go much deeper. I've mentioned what they were.

Getting people to be interested in public life is a major part of that.

Q: And probably scientists.

Lederberg: Least of all.

Q: Is that fair to say?

Lederberg: It's true. I mean, I can't imagine why any professor would want to give up the excitement and challenge and prerogatives of that situation for the exposure and the mud-slinging and so on that goes on in political life today. And so many very good people have been leaving Congress lately. I mean, it's almost an exodus. These are serious and deep problems. They don't have that much to do with what we're doing here. So, you know, electoral reform might be another topic that a Carnegie could go into, talking about grievous issues in political life. And maybe even making political life tolerable. I don't know that they can come up with any real solutions, given that we don't want to hamper the freedom of the press, etc., etc, but maybe we can get past Monica Lewinsky. The sheer absurdity of it may make that set of issues more disposable in the future.

Now, what Vartan Gregorian will think of doing, whether he thinks that political reform is going to be his bag or not, I have no idea. I've not been on the board for a couple of years now, and I can't predict.

Q: Was that a satisfying tenure for you, being on the board?

Lederberg: Oh, I enjoyed it very much. Very fine people on the board. We had presentations of many of the other kinds of programs that were, a lot of them, very dear to David's heart -- early education, adolescence, things of that sort. I was very happy about

that engagement. I mean, it's a no-lose situation. It doesn't take a lot of time, you have a lot of exciting opportunities, and doing good things. It wasn't very demanding on the part of the board members.

Q: Last question, I guess. What would you say to a young scientist to encourage him or her to look about a little bit, beyond their narrow specialties?

Lederberg: Be very careful. And I'll pull out a piece on that, too, if you'd like. With the current climate of academic gate-keeping, you put your career at risk if you don't succeed in your own very narrow specialty. So make sure you've got your pins in place before you take those kinds of risks. A few people can transition a little earlier. Ash Carter made it, but just barely, in switching careers from physics to international relations, basically, at M.I.T. But I guess I'd have to advise to do this carefully 'til you've got a secure position in the academic world. That means having secured your reputation as well as the formalities of tenure and things of that sort. The system can be very savage on folks who don't perform according to the straight and narrow rules. I'm sorry I have to say that.

Q: I was going to say, that's sort of a depressing --

Lederberg: Now, the place for remediation is in undergraduate education. I think that's where the breadth ought to be learned, and that's part of what David and I were trying to do in the human bio program. It was far more than human physiology; it really embraces social sciences alongside of the evolutionary biological perspective on human nature. It was also very policy oriented. I gave a course on health, and by being unrestricted as to

what I meant by that, it was a highly interdisciplinary and problem-oriented treatment.

Of course, any problem-oriented treatment is interdisciplinary, because your issue there is not with which discipline you bring to bear, but how do you solve the problem.

So I think more educational exposure at that level, and the undergraduate interval is the time for that. By the time you're in graduate school, I think you're down the path where you have to specialize. Professional education is a little different. There's still room for breadth there. So during the first year or two of medical school, ditto in law school, I think there are opportunities for educating for the greater breadth. And maybe people with professional degrees, as opposed to the scientific degrees, have a little more latitude that they can sort of get away with. They don't have to produce a cadre of research papers year after year on a very carefully circumscribed topic in order to succeed.

Q: And educating government to accept or at least to incorporate a scientist's view of things?

Lederberg: Well, I think the only way you're going to do that is through speaking out more broadly and getting people with some reasonable education interested in government.

Those are the only ways you'll accomplish it. The media play a role. They've gotten better -- at least if I judge by the *New York Times* -- more authentic, balanced presentations of scientific progress and so on, but so much of the stuff in the media is so sensationalized and whatever. I'm not sure I'm striking an average when I say it's gotten better. But at least there is access, and people will read what they want to read.

Okay?

Q: That's it. Thank you.

[END OF INTERVIEW]