

**INTERVIEW WITH
PAUL GRAY
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Sloan Oral History Series**

B: BOB MCKERSIE
G: GEORGE ROTH
P: PAUL GRAY

P: ... I was largely ignorant of it until I was appointed Chancellor, which was a different position than it is now. At that time, 1971 to 1980, when Jerry was president, I was his deputy. The provost and the executive vice presidents reported to me, and through me, to Jerry. So in that period of time, I was not as connected in the 1970s as I was in the 1980s.

G: This is George Roth and Bob McKersie interviewing former president Paul Gray, on September 25.

B: I should ask about time. We normally don't go for more than about an hour, but who knows how long this will go. Are we against a hard stop for you?

P: No, you're not. The hard stop is 5 or 6:00. By then you will be exhausted.
[laughter]

B: All right. First, as you said, Paul, you became president the year I arrived, in 1980. So you're "my" president here at MIT, and you had a much more interactive role with the Sloan School. The broad question would be, how you have seen the School evolve over the decades? What strikes you about the Sloan School that, if someone were to ask you, "Hey, Paul. You're at MIT. You've had all these positions. There's a business school there called, or management school, I should say – and that's another whole issue, are we a business school, or are we a management school? "Hey, there's a management school there. Tell me about it." So, what hits you as the highlights of this evolution?

P: Am I correct in my memory that the name Sloan was attached in the early 1950s?

B: It wasn't there for the first year. There were a couple of years before, but by mid-1950s it was called Sloan.

P: Because my recollection was that there were two new entities on the scale of a deanship, where a dean would be a supervising person. One was Humanities, Arts, and Social Sciences (HASS). That happened, I think, in 1952, under Jim Killian. Then the Sloan School, pretty close after that. I knew nothing about Sloan, and not much about HASS, in those days. But, I was aware that there were now five deans, let me put it that way.

G: It was originally a school of management, and I think it had been established partly by the gift of Alfred P. Sloan, who gave the building, a grant of money, and also an annual

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amount of money. I think it was then named the Sloan School of Management about two years afterward. So it started as the MIT School of Management, or actually just the School of Management. Originally, it was Engineering Administration, when Course 15 was established.

P: Is that right? I didn't know that.

B: Yes. It evolved from Engineering Administration to Industrial Management. This was the label used for Course 15. We want to come to that, because I think an interesting subject is how to think about a management school in an institute where engineering and science are preeminent. The fact that it was originally called Engineering Management for Course 15 is indicative of that connection. And we want to talk about other connections that have occurred.

But to go to the 1980s, when you were president, what would be your thoughts about the Sloan School then, and the Sloan School over the next 30 years?

P: Well, in the 1980s, I was significantly engaged with Sloan. In 1985, I commissioned the MIT Commission on Productivity. An awkward name. But that was a time, the early 1980s, when everybody thought, at least the public thought, Japan was going eat our breakfast, lunch, and dinner. And the economists would say, "Well, if we got the balance price of the dollar and balance of payments, everything would be okay." The technologists would say, "No, no, no. The problem is all in the way we make things."

That led to the appointment of the commission, which was half Sloan, half Engineering, but with some other folks in there as well. So there were some School of Science folks, and some from HAS. I'm not sure if there were any from Architecture and Planning. But that produced, as you know, Made in America.

As a follow up to Made in America, I pressed the school – and I didn't have to press very hard—I said, "We just made this prescription for what's good for the nation. Part of that prescription was that management schools ought to be teaching folks more about management of industry." That led to Leaders for Manufacturing, which was the first time, to my knowledge, that an academic program was prepared with three sets of people around the table: Some engineers, some management folks, and some people from industry. It was a genuine interaction there, sharing, when they built the Leaders for Manufacturing academic program. That has morphed a bit in recent years. I'm not up on the details of that, but I think it was a good initiative.

B: Yes. It was co-chaired by Kent Bowen, whom you would know well, and Tom Magnanti.

G: I reviewed your MIT 150 interview. You also spoke about the commitment that industry made to fund that endeavor. It was not just their dollars, but I know they also had people here who actively participated.

P: Yes. They had people here. Jerry Wilson, Dean of Engineering, went with me on a lot of solicitations. We were looking for \$5 million or \$8 million donors, and I think we got them in the end. Two, surprisingly, came from the automobile industry, and others from elsewhere.

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That was an interesting fund-raising experience, because people recognized the need, thought this was a good initiative, and wanted to support it.

G: I certainly believe it is, and has been. And like many things, it's changed a little bit. It's now called the Leaders for Global Operations. Probably one of the biggest changes has been the involvement of the companies. The program and the teaching and the faculty are still strong, but the support that companies have given in terms of sending their people has dropped off some. They have different arrangements with students, and a much broader spectrum of companies without as large a commitment.

B: For a long time they tried to have a third person in the leadership. So they've had people from Digital....

G: Bill Hansen.

B: They tried to embody industry in the leadership of the program, the industry role. That was a major initiative. Today we have another thing called PIE, right? P-I-E? Which stands for what? Productivity Improvement – it's another MIT-wide. Susanne Berger is involved in it.

G: It's part of Obama's advanced manufacturing program.

P: I left the presidency, and when I returned here to this office, and to teaching in EECS and my connections have been in that for 22 years. I didn't do all this for 22 years. I retired in 2007, when I was 75, and stopped teaching at that point. This year, I will stop having undergraduate advisees from the EECS, in both cases because this field changes rapidly enough that unless you're working in it, not just teaching in it but really working in it, doing research in it, you can't be up to date. So that's why I stopped teaching in 2007. As of the end of this year, I'm finished as an undergraduate advisor.

But in that 20 years, 1990 to 2012, I had very little contact with Sloan. I was interested in the progression of deans, got to know folks, but it was a social relationship only.

G: There was something I read, which I thought it very interesting. It may be a way to think about the Sloan School versus some of the others, and I think it fits in the time frame in which you were very active. You said in your 150 interview about how MIT went from preeminence in engineering to preeminence in science, and not just chemistry and physics but life sciences. We've seen preeminence in the humanities, and I would say we have preeminence in a management school. Certainly the model for the engineering school was the Rad Lab, and all of the activities that went with that to drive engineering.

I would be curious to hear – because you were there and presiding over it – the path to preeminence that you've seen in the different schools. I'm most interested in the Sloan School, but why and how has that happened here, because I wouldn't dispute your statement, I would agree with it. It makes MIT a very attractive and successful place. But what are your views on how it happened and why in these different areas?

P: In early 20th century, MIT was the nation's premier engineering school. The things that did not come under engineering were fields such as the sciences—mathematics, physics,

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chemistry, biology, those things. MIT didn't pay a lot of attention in those years to humanities, arts, and social sciences. But by 1910, 1920, MIT was recognized as the premier engineering school.

In 1930, when Samuel Stratton retired by reason of age as president, the trustees said, "We need to change the character of MIT, and make it as strong in the sciences as it is in engineering." A very ambitious idea. It was a handful of the trustees – they were a smaller body at that time – that pushed that idea. And they were absolutely right in what they did, which was they hired a world-class scientist as president. Karl Taylor Compton, KT Compton. There were three Compton brothers, all physicists. Two of them won the Nobel Prize. And if KT had not given up physics to do administration, the thought is that he would have as well. They were all very bright, very energetic, creative guys.

Compton came to MIT with the charge from the trustees and board to improve all the elements of MIT. Not engineering, obviously, but all the other schools. They weren't called schools then. They were just – what was it then? I don't know what the school structure was in 1930. But in any case, that was their charge. He began by bringing in eight world-class scientists in physics, mathematics, and chemistry—not so much in biology. But he really seeded those departments in a way which then enabled them to develop on their own and become very important.

Everything changed in 1940 when the war was on and the Brits had just invented the microwave magnetron. But they were worried that if they stayed there and tried to make this device into useful working systems the effort would be impeded by the Blitz. Britain created RADAR – but it was not microwave RADAR. It was long- wave RADAR, two-meter wavelengths, so you knew something was happening when you got echoes, but you didn't know anything in detail. They sent a delegation including the inventor and a few other scientist and the microwave model here. That created the Rad Lab project, which was a stroke of genius on the part of the administration. But it fell mostly on the shoulders of the electrical engineering man who really was the builder of the strength of EE in the early 1930s. He was head of the department much of that time, Dean of Engineering for some of that time. Who am I thinking of? It'll come to me in a minute. Well, we can look it up.

But the Rad Lab changed everything. Over the years of the war the Rad Lab spent \$100 million of government money, and made RADAR a useful weapon in airplanes, on land, and in ships. The Germans and the Japs didn't have it. It made an enormous difference. The \$100 million that was spent was greater than the sum of all the appropriations from 1861 up to 1941. It brought to MIT many very classy engineers and scientists, and a considerable fraction of them stayed on. That initiative pushed up the status of the Institute considerably.

The other thing that was a great help is that when Rad Lab closed, which was on December 31, 1955, the government signed over to MIT the buildings and all the equipment. The classified stuff they took out. But the ordinary equipment, they seeded over to MIT. So that RLE—you remember the plywood palace, Building 20—was the incubator for a great number of things in the years that followed. It was engineers and physicists there, mostly, radiation, for RLE (Research Lab of Electronics).

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But 1971, when Jerry Wiesner became president, MIT was being recognized not just as a great engineering school but as having important works, important people in the sciences as well.

Go forward 40 years to 1990, by then the Institute was recognized as a university “polarized around science,” to quote Killian, but nonetheless a university that was being in the top ranks of universities. Not 1971. But by 1990, they were right up there, and now are competition for faculty, for money, for students, against Harvard, Yale, Princeton, and Stanford. That’s it. That’s who we fight for all the goodies. It is fully now recognized as a university. That happened in this interval from the end of the war. Compton was in Washington during the war, and Killian managed the Institute. When Compton came back, he was president for another five years. He became chairman. Unfortunately he died very soon after, and Killian was president. Jim, a very wise man. Bachelor’s degree from MIT. Total education. Full career.

B: Course 15, I think.

P: Yes. A full year, that was his education. He worked at MIT his entire career. He ran MIT Press for a while. Then he was assistant to Compton, and eventually he was executive vice president.

When he left, it was Julius Stratton, who was a short-termer. He was there, I guess, eight, nine years. Jay had been an electrical engineer here. He went to the ETH for a PhD in physics. Came back and in both EE and physics as a faculty member. Jay understood what had to be done continuously to put the Institute on a path toward its present shape.

That’s a long thumbnail of how we got that way.

G: It sounds like getting important people in place, getting a few important people in the departments in the specific fields, and support of the administration to enable an environment that is growing and thriving through financial resources.

P: Yeah.

G: Certainly that’s what the attention that MIT got, and of course we know the work that Vannevar Bush did when he went on to –

P: That’s the one I was trying to think of.

G: Oh. Okay. I was going to say Gordon Brown.

P: Well, Gordon Brown was very important, too, in that period. He’d been much involved, not in the Rad Lab, but in the Servo Mechanisms Laboratory. He was a founder of the Servo lab. After the war, he was head of electrical engineering, computer science, for – how long? – seven or eight years, I guess, during most of my time as an undergraduate, and one year as master’s degree. When I came back from the army, he was then Dean of Engineering, and he turned Engineering on its head. The basement of Building 10 was the electrical machinery laboratory. There was no full first floor. It was just a walkway around the building or second

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floor. You could look down into it. The basement of Building 3 was a steam lab. He ripped all that stuff out and re-created the curriculum to focus more on engineering science, less on technology, and do research in those areas. That was a major, major change for Engineering.

G: It connects to, in some ways, the development of the Sloan School from much more being taught by business people to having a discipline-based approach to management. Social Science disciplines, primarily, for management.

B: I was thinking about that when you talked about strengthening of science, particularly chemistry and physics as undergirding disciplines for Engineering, so they were reinforcing each other, the shift in the Engineering curriculum, but with a very strong science component here at MIT, to deliver that foundation.

P: The department that did not get that kind of attention in the 1960s and '70s. 1960s, mostly, was biology. Biology was more involved in animals and plants than it was in DNA and the genome. That was changing, but very slowly. The thing that made it change dramatically was bringing the Whitehead Institute to MIT. That was an enormously important activity. In effect, it doubled the number of people and the facilities doing work in biology. But the Whitehead was all about modern molecular and genetic biology. That changed at MIT rather quickly. The people who'd been at MIT before the Whitehead came.

I still marvel that bringing the Whitehead Institute to MIT, bringing in an institution which had no... Jack Whitehead had no experience in academe; he was self educated. Bringing a fellow who had strong feelings about who should do what, strong enough so that they tried to make an arrangement at Duke, and eventually gave it up because he couldn't get over the idea that the faculty were going to appoint who was teaching and researching, and so on. He wasn't going to have a hand in it.

Thanks to David Baltimore, who had been his advisor for a couple years when they came, they went to us, to Stanford, and to Harvard, and said, "Would you be interested in having the Whitehead Institute near MIT, and affiliated with it?" And we jumped on that. I don't know what Harvard and Stanford did, but very quickly it was learned that we were the one that was going to do it. The agreement for doing it, the affiliation agreement, was eight pages, period. It was not legalese. It was just a set of expectations.

It had some remarkable conditions. The Whitehead faculty would have their – The thing we were trying to avoid was we'd have the Whitehead faculty and the Biology faculty. The Whitehead faculty and the Biology department faculty all had their salaries set, and their appointments approved, their promotions, tenure, all that, by the MIT Department of Biology, with full-time involvement from the Whitehead as well. The Whitehead had its own board of trustees, its own charter, but the executive director of the Whitehead (they don't call him the president) had to have the approval of the MIT Provost. There were other things that tied it in. But that action in 1980-81 produced the largest faculty meetings in the history of MIT.

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B: Yeah. There was a lot of discussion. I remember. There was a lot of discussion as to how the thing would work, and would it be a good partnership, or would there be some problems with the partnership? But it's worked out to be a good partnership.

P: Yes. When we set it up, it had a ten-year termination possibility. If it isn't working in ten years, we'll dissolve it. Nobody even thought about that again, because it worked right from the beginning.

B: And Abe Siegel went on their board.

P: Abe was a very important person on that board, because he understood administration in a university sense in a way that hardly anybody else at the table did. Very important.

B: Shifting ground a little bit, you mentioned when you came here as an undergraduate, you had some classmates, some friends who were in Course 15. This requires me to reflect on my own feeling about people in business school. I got my degree in Electrical Engineering from University of Pennsylvania. There was the Wharton School, big operation, and we in the Engineering School, the Moore School, looked down on those guys in the Wharton School. I wonder if that has ever been an issue here, with people who take Course 15. They were seen as people who can't cut it like you would want people to, in a sense, the capacity to handle engineering. Is that an issue at MIT, with Course 15?

P: No.

B: Was it then, when you were an undergraduate?

P: It was when I was an undergraduate, in the 1950s. It was then. Students would say, "Well, if you can't hack it in Engineering and Science, you can always go to Sloan." A number of my friends did, and for some of them, it was the right thing to do.

B: Yeah, they've probably been very successful. *[Laughter]*

P: But that died out very quickly.

B: Why has that died out?

P: It died out, in part, because of the really strong reputation of the Sloan School, and the way it gets ranked. It also died out because there were many more interactions. There had been a number of attempts – I can't tell you the particulars of them – but it would have been in the 1970s, when I was Chancellor, when usually Engineering and Sloan would sit down at a table and see if they could figure out how to do something together, and it never came to anything. It was not until the Commission on Industrial Productivity.

B: That great example that you gave.

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P: Yes. I think it's entirely gone now. I don't think there's any residue of that.

B: There are other linkages between Sloan and Engineering. Certainly the Engineering Systems Division...

P: Right.

B: – has participation from Sloan. And what is the other degree program? SDM?

G: Systems Design and Management. It is part of the ESD division, which sits between the two. It's a Masters of Science degree, with a lot of business content and engineering content. The LFM program is still a dual degree.

P: LFM still keeps that acronym –

G: Sorry. It is LGO. Yes. I said LFM so it would be familiar. But it's now called LGO.

P: Leaders for Global Operations

G: The issue is to look at manufacturing as one part of logistics. So, production plus delivery is a more encompassing way to think about it. There are so many companies now that are manufacturing all over but also needing to deliver. It's been expanded from manufacturing to include manufacturing logistics, and that's why they call it Operations – Leaders for Global Operations.

B: I think there have been some challenges in LGO in terms of keeping the engineering side as involved as the Sloan School side. When I was Deputy Dean at Sloan, there was always a feeling of maybe we're taking over too many of the courses, and too much of the supervision of the joint degree.

Which goes to this thing we ought to explore, product versus process. Engineering really makes its contribution when they produce a breakthrough and get a product that can be tested, and it works. Many of our folks – and this would be Ed Schein's analysis – work on process. It's a little more ethereal; it's not as anchored in something that people can say, "Yeah. We can really go with that. We understand what you folks are doing." It seems soft –

G: I think what Ed said is it's harder to put your finger on an innovation that has to do with a process change in business, or an organization than is developing a product or a concept.

B: Like RADAR. RADAR works. It makes a difference. Going back to leaders, just the concept of leadership, for a lot of people it's very vague, and seen more as an art than a science.

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G: Right. How did Arnolando put it? He said these are “unprogrammable problems.” Arnolando, as you probably know, started out in Operations Research as a very technical, quantitative scholar, but his work has transitioned into the strategy field where the nature of the problem and developing solutions are very different. Yet both are very important. He was more attracted to the strategy, although he said in his oral history interview, sometimes he wonders whether he should have stayed in Operations Research for his career, rather than venturing into this kind of squishy and softer field, although he’s made many contributions in strategy field, and also in relationships that he’s helped develop for MIT.

B: Right. So, what we’re saying is, it’s always the challenge. It’s a healthy tension to bring together people from Engineering and Sloan around a program like LGO or in the SDM program, where there’s participation from both sides.

G: You would have been presiding as president at the time the LFM program started. I believe that originally started in Engineering and then was taken over by the Sloan School? Or where? It’s a joint program?

P: Leaders for Manufacturing, the initiative for it, came directly out of Made in America. When people said to us, and we said to ourselves, “You folks laid out this list of things that have to change. One of them was the management of folks who were going to manage making things. What are you going to do about it?” So we set out to fill that gap. LFM came directly as a result of Made in America. It was a three-way, troika: industry, Sloan, Engineering.

G: Administratively, which school did it sit in?

P: Sloan. It had two co-directors: one from Sloan, one from Engineering.

G: And one from industry. The third person was also called a co-director.

B: Right. That’s where we were talking about Kent Bowen and Tom Magnanti. Tom is a very interesting breed because he was Dean of Engineering for a while.

P: Yes, he was.

B: So when you get people like Tom around, you don’t have to talk about building bridges, because the person integrates in their own research and teaching, what MIT’s all about.

P: What about Howard Johnson?

B: Howard came from Executive Education, and he would not have had a leg into engineering the way Tom Magnanti has.

G: But he still became president of MIT. I assumed his background would have been engineering?

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B: Well, the same thing happened with Jim Killian. Jim Killian didn't have a leg in Engineering or Science.

P: As an aside, Howard Johnson performed an enormous task in the 1968 to 1972 period, keeping the Institute from flying apart over the Vietnam War. It flew apart at Harvard. There are still people who are embittered on one side or the other.

B: And at Columbia, and Berkeley, and many other places.

P: But Howard kept it from flying apart. It was a brilliant performance. Faculty meetings in Kresge Auditorium, 1000, 1500 people in a room, because faculty meetings were open to interested persons. So they sat in one area, and the faculty sat somewhere else so they could count noses when it was vote time. I look back on that and say either Julius Adams Stratton who preceded him, or Jerry Wiesner who succeeded him, couldn't have done that. They were wonderful people, but they didn't have the ability to defuse a situation, to do it with a little humor.

B: He had the skills. He had been at the Industrial Relations Center at the University of Chicago, where he wasn't a specialist in unions, but he was a specialist in understanding employment relationships, organizing executive education programs. In fact, when he came to Sloan, he came to head up the Senior Executive Program, and people spotted his talent for bringing people together, some mediation skills, listening skills, all those good attributes. I know what you're saying, he was the right person. And, of course, the story everybody tells is he was almost on his way to Cincinnati, to head up Federated –

P: Right. He'd accepted the position, sold his house in Lexington and was moving.

G: One of the things you talked about was how the reputation of the Sloan School has become strong as is the case with MIT. From an outsider's perspective, not one that is closely entrenched and involved with the rankings of management schools, what is your view of what has contributed to that increase in the rankings? What have you seen Sloan do differently from the MIT side?

P: I don't know that I could comment on that. I just don't know enough. I'm not close enough.

G: So you were just a follower of the rankings. You've seen that Sloan School has improved and is up there with the other schools.

B: Although the glass is not completely full, because I've heard some people say, "If Engineering can be number one, why can't Sloan be number one?" It's in the top rank, but it's not number one. So does that affect our standing, and MIT?

G: That's a great question. Did you feel that Sloan dragged down your standing as a university?

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P: No. Certainly not. No.

B: We're a respectable number four or five. Well, there can be also certain sensitivity, when people describe MIT, they describe it engineering and science. That was true on Friday. We had a prayer from our chaplain. He talked in his prayer about some great example in stem cell research, and he didn't mention anything about the financial situation that maybe Sloan could help with. So at times I think, we feel we are not only at the outer end of the campus, but we are at the outer end of people's vision. I'm just reflecting, having been in the Dean's Office for a while. But, that is maybe just super-sensitivity, or maybe it's just inevitable, when you have such outstanding engineering and science. I'm sure people in HASS feel somewhat the same way, or in Architecture and Urban Studies.

G: Or Economics, right next door.

B: Economics never feels left out. That's another challenge. If Economics can be number one, why can't Sloan be number one? That's another issue.

G: To a certain extent, we're in the shadow of a very strong school up the river who is of a much different scale.

B: Right.

G: And always, from the very beginning, as we look back, the challenge was not to be like Harvard but to find another way, which both Carnegie-Mellon and Sloan really pursued. As we've talked with others, we're not as different as we were in the time that we've achieved the preeminence, now that we're there. We're much more similar. Part of the question, of course, going forward is: is that the right path to stay on? I don't think we're in a place to answer that.

B: I think what George is alluding to – and it probably is a question to ask Paul – we still have the nomenclature of management. For many years, that meant something distinctive. We didn't just work with corporations and business. We had programs in health. We had programs in urban studies. Our students had to complete a thesis, like they have to in Engineering. Now they don't have to do a thesis. So we've evolved into more of a standard business school with an MBA, and not a management school with a Master of Science that requires a thesis.

Now, whether that's an issue for us, that's been part of our evolution since I came. When I came in 1980, we were definitely a school of management with a requirement for a thesis. And we still had some programs in the health industry then.

P: Now we don't require a thesis in this department. Haven't for some time for a bachelor's. Definitely there is a thesis with master's degree.

B: So those are questions that will concern the faculty, I think, for a substantial period of time.

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You've given us a great overview, from your perspective, of the evolution of MIT. Our effort is to understand the connections of the Sloan School to that evolution. Do you have other questions?

G: I had a chance to ask my questions, thank you.

B: Have we asked all the questions we should have asked, in terms of Sloan and its journey while you were able to observe it?

P: I think so. I think so.

G: You never had any exposure to Alfred Sloan?

P: I met him once or twice. But I was a pipsqueak at that point.

G: One of the things we recognized that helped the school get such a good start was the Sloan Fellows program, which he was instrumental in starting in the 1930s, which was run out of Economics or Course 15?

B: I think it was run out of Economics. I think it was run out of Course 14, initially. Yeah. There was a lot of participation from the Economics faculty, because at that time you had people like Douglas McGregor and Charlie Myers, and a whole group of people who eventually went over to the Sloan School. So that's been an evolution, too, where Economics is more now pure economics, not more broadly social science, which has been picked up by Sloan and by Political Science.

Paul, we can leave these here, if you think your secretary out there has a use for any of this food. We don't need to carry this away. Well maybe the cookies, especially.