

**INTERVIEW WITH
ARNOLDO HAX
SEPTEMBER 7, 2012
Sloan Oral History Series**

A: Arnaldo Hax
B: Bob McKersie
G: George Roth

G: This is George Roth with Bob McKersie, interviewing Arnaldo Hax on Friday, September 7, 2012.

B: We get these transcribed, and then pass them back to the person to do whatever they want to. I saw John Van Maanen upstairs. He said, "I looked at the first page." I think he's a perfectionist. He's trying to polish it up. We're not looking for these things to be highly polished, but they will go in the archives.

There's another input; George has been working closely with people in the Dean's office on this. Our Dean sees an opportunity to celebrate business education at MIT, since in 2014 we have the 100th anniversary of the undergraduate program, which started as Engineering Management and then became Industrial Management. So the interview material we have—and George is good at clustering the themes—could be one input to several. They're hiring a public relations firm to put out a book about all the good things that have happened, primarily in the Sloan School, because it's a little hard to do much before 1952. George, what would you add, in terms of what we've been up to?

G: Our intention is to do these interviews in the style of an oral history, to have people tell their stories of coming to MIT, what it was like, and capturing that for a record – partly around this period looking back to 100 years, but also for people 50 years from now that will wonder, what was the Sloan School like in 2012, or perhaps you came here in the 1970s.

A: Right. 1972.

G: Most of the interview is about you telling your story. But toward the end we have a couple questions that are more directed around themes and the distinctiveness of the school as you see it, and how that's changed over time.

B: The first place to start, Arnaldo, is to tell us what brought you to the Sloan School, when you came, and what was it that pulled you into this place 40 years ago?

A: You know, I might say –probably all of us will say more or less the same thing—that I was a rather unique person, so let me tell you why I say that.

I was born in Chile. I graduated from engineering school in Chile. I decided immediately to come and get a masters degree, which I did at the University of Michigan, in operations research. I really wanted to have some graduate education and expand my educational background. But I was totally committed to Chile.

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The second I graduated I went back. My professors at Michigan wanted very much for me to stay for a Ph.D. I said, “No. This is not what I have in mind. I want to serve in my country.”

I was appointed – a long story, odd in a way. When I was 25 years old, I became Director of the School of Engineering of the Catholic University, which was absolutely insane. How could I be such a young guy doing this? But with it come wonderful things, one of which was to establish a program with the University of California at Berkeley. Then, funded with the Ford Foundation, we completely reshaped the entire engineering curriculum in Chile founded a new campus, and so forth. I was doing these fabulous things, and professors from Berkeley were coming in great numbers to work with us at Chile.

Then they said, “Why don’t you go and get a Ph.D. at Berkeley?” I was invited by George Dantzig, the father of mathematical programming, to work with him. In fact, I was given an appointment as a research associate. So I wasn’t just given an assistantship, but I was given a job.

When I arrived, Dantzig was waiting for me. Dantzig. My God! At that moment I started working on my Ph.D. thesis with him, and I broke all the records in history, because in two years I graduated. I had a background from Michigan, but the central fact was that the moment I arrived I started working on my Ph.D. thesis. That, incidentally, is going to be an important backstory to the story because I did my thesis on a very difficult problem, which was large-scale, non-complex programming. And there was a pride to deal with a tuition system, hour by hour in the national guard. The Pacific Gas and Electric company paid for it. That’s the project that Dantzig had, a completely complex problem because it was not steady-state. That’s why I am here. Thank God I studied thermo dynamics. That is important because, as you will hear me say, played a fundamental role in my coming to MIT, without my ever knowing it.

So I said, “OK. I’m finished. I was thinking of spending three years, four years.” And he said, “Why don’t you just spend one year in something very different: understanding how these things are used in practice.” That’s where I joined ADL. I met George’s father, who was at Arthur D. Little at that time. ***

I got a lot of offers. One offer was Harvard. But I didn’t realize how much honor I received by being invited. I said, “No. I’m not going to – getting into the academia here. I wanted to see all these things are done. Arthur D. Little was a fascinating place. There were people who really knew operations research (OR), were two vice president who really knew Operations Research. One was George Kimball, who was associated with MIT, Martin Ernst, David Bauman, fabulous people. I started learning things beyond belief and traveling around the world. The fact that I knew some languages was very helpful to me because I was doing cases like designing an information system for the President of Iberia; working on the national housing problem of Brazil; working with Venezuela in programming their oil activities. The thing was that it was getting harder and harder to disconnect. One day I said, “This thing cannot continue because this consulting life, at the end, is for the birds.” It’s wonderful, full of attraction at the beginning, but I don’t want to be a consultant.

Then Harvard called me again. I was working with a guy who had been a colleague at Berkeley, Steve Brandy. We were writing the first book that we wrote together, with

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Tom Magnanti as well. So I joined Harvard, but with full intent of spending just one year and then going back, I told them. That was 1970.

B: All right. How many years had you been with Arthur D. Little?

A: I was three years at Arthur D. Little, and I was now beginning my last year before returning to Chile. Incidentally, since I wasn't going to do a career in academia, I hadn't written anything, including my thesis. I hadn't published anything. In that sense, I was not very smart if I really intended to go into academia. But then I joined Harvard.

In 1970 I joined what was called at that time the Managerial Economics Group. A fabulous team of people.

B: Was John Litter there?

A: No. John Pratt. John Pratt, Bob Schliefer, Howard Raiffa. What a man! These guys invented decision theory, a very powerful design of mathematics and applied OR.

B: And Bayesian statistics.

A: Right, right. Which I had not been thoroughly involved in before. I had a great time. But, frankly, I didn't like Harvard, for two fundamental reasons. One, its excessive, horrifying concentration on case studies. Everything was cases. We couldn't write an equation on the board. It was almost anti-academic, in some sense. And second, it wasn't really an academic experience. You have to provide grades on the curve. You know this system? You have to give one, two, three, and oh, what an idiocy.

That year, Allende became elected president of Chile, the first Marxist ever, and the country went down, it was turmoil. All those conflicting things; violence. I was ready to go do something exciting. The people I was going to work with had left the country. Everyone was saying to me, "Arnoldo, you have to be out of your mind." Guess what happened? I extended my visit one more year. They asked me to develop a second-year course, which I did. I wrote 20 cases.

But you have to get approval for that from a second-year committee, and I realized the people who were on the committee. I have put together this thing, based upon things I did at ADL, which I thought were fascinating. How to put together a mathematical system for the logistics of outcomes, how to set up an inventory, and a set of systems for Sears and Roebuck. I had all of this documentation in front of the committee, and this guy Hugh said, "Professor Hax, why should our students know this stuff?" He said, "If our graduates should need this guidance, they would hire a guy like you." I realized they had complete disdain for the kind of things that I cared about.

Guess what? In California, I had met Jerry Shapiro. He was getting his Ph.D. at the same time in Stanford while I was doing mine. And Stanford and Berkeley joined together in meetings a lot. We went to a congress in Mexico where one of my dear professors in Michigan, a

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big gun, his name was Merrill Flood. Merrill is president of the Operations Research Society of America, he is the one that invented the transportation method of OR. Was an extraordinary guy, and I was very close to him in Michigan. Merrill was an older guy. He came to visit Sloan. Sloan was desperately trying to hire somebody to be the head of Operations Management. They didn't have somebody like that, and they needed a guy with solid OR foundations, with a sense of applications. They offered the position to Flood.

Jerry was on the committee, and Jerry said, "Why are we going to hire this old guy? This guy's at the end of his career." They asked Merrill, "Merrill, who do you think is the most brilliant work in a young person in OR?" Merrill had gone to Pacific Gas and Electric Company, and he saw what I'd done in that project. He said, "Probably the most interesting guy there now is Arnoldo Hax." Jerry talked to me, and said, "Arnoldo, you've got to come." So, I applied.

During the interview, I remember I had a seminar with Bill Pounds, Abe Siegel, and Ned Bowman, among other people. It was a small group. At that time I had developed a very powerful system called the Hierarchical Production Planning System. My work has only tried to be holistic, embracing everything. The idea was a net of models. They start with where and how you would put a plant, how big should it be, what warehouses to have, all the way until you conduct the scheduling in an hourly production.

Bill, in particular, was very impressed by my work. He really loved it, and he said, "My God, this guy's for real. He's doing some fascinating things." And, as I said, I was different, because of the three things. I had studied with the best in OR, getting the best training in OR you could possibly get. George Dantzig sent a letter that was amazing on my behalf. The second thing was, I spent three years in ADL doing practical stuff. Getting involved in the applications, and getting a detailed understanding of what these things could and could not do. And third, I had gone to Harvard. Harvard – if you really want to go to excellence in teaching, where people spend enormous amounts of time doing that.

When I arrived in Sloan, the first year I arrived, I won the Best Teaching award. I was a very different fellow. I never intended to be, if I had played that game, I would have gone from graduation from university. The University of Rochester had a professor, a prominent guy who was visiting in Berkeley, who knew my job, my work, and they offered to appoint me associate professor without tenure having just graduated. I said, "I'm not there."

And so I came to MIT.

B: In 1972, as an associate professor without tenure.

A: Right. They realized I was little bit different. By then, you see, I was 35 years old. I wasn't a very young guy. Well, I was young, obviously, but not a recent graduate. They offered me an associate professor without tenure. Four years later, they appointed me full professor with tenure. They had done only once before.

B: Without that other step.

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A: The guy who had done that was none other than Bob Merton. The reason that I am saying that is that Pounds and Siegel treated me in an extraordinarily different way. For some reason they evaluated what some other universities would not evaluate. I got a grant from the Office of Naval Research. I started having some very good Ph.D. students. I know how to play the academic game, if you needed to play. I hadn't had a need to do that. Let me tell you, to me, MIT was the most extraordinary place from the very beginning.

B: You mentioned Jerry Shapiro. Was Tom Magnanti here? I'm trying to understand who else was in the general area of Operations Management, Operations Research, as you entered.

A: Well, one thing was very clever, the Management Sciences area. We were all in the Herman Building. John Little was the head of Management Sciences. And within Management Science was Operations Research, Statistics, Operations Management, Marketing, Management Information, and Accounting. You had maximum collegiality.

I arrived in my office, and in my office were Tom Magnanti, and the guy, who later on we fired, unfortunately. His name was Hausman. Poor Hausman had been recruited from Cornell, where he had tenure, to come as a professor without tenure. The guy who killed him was Jerry Shapiro. He had a lot of publications in management sciences. But Jerry said, "This guy's playing games. He's playing a publishing game. If you take a look, he's working on the margin. He's working on minor, trivial extensions of other papers in management science. If you take a look at the contribution that this guy is making, he's not going to do it." He had to leave.

Tom Allen will tell you that proximity is everything. Magnanti was sharing the same office space with me, I was working with Bradley on the book, and I invited Magnanti to join us. We wrote a book that became very famous in OR, *Applied Mathematical Programming*. It really was an applied book, but also, in the methodological context, it covered everything in mathematical programming: linear, non-linear, integral programming, large scales, mathematical programming, and uncertainty. It was printed for more than 25 years, and is on the shelf of all the guys in OR.

We started working with Tom. Later on I started hiring people. I had a phenomenal taste for hiring. I hired, for instance, Gabe Bitran, Steve Graves, and Charlie Fine. All terrific guys.

We quickly became the top Operations Management group in the country, until I made, I don't know whether it was a stupid mistake or not, but I decided to embrace strategy.

B: That's got to be a big question, when that happened and how that unfolded for you, the shift from what you brought, as you say, very unique experience and ability to relate powerful analytical tools to real-world problems. When I arrived in 1980, you were by that time in Strategy.

A: I always have had a taste for the big picture. I really wanted to have a holistic view. I started thinking that Operations Management ended when the real big questions started.

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It was limited in its scope, concentrated on manufacturing, distribution, and logistics. That was an area where I felt tremendously comfortable in. After a while I began thinking the problems are much bigger than that. I happened to run into a guy who made a colossal impact on me, whose name was Herbert Simon.

I spent two weeks with him in Dubrovnik, in Yugoslavia. You might be interested about that time. The Yugoslavs had developed a different form of governance where they truly managed a company or firm jointly between executives and the workmen. It was not participative – nothing to do with that, it was joint – where the responsibilities were assigned both parties. People in the US had expressed some interest, and the Yugoslavs expressed some interest in really testing these ideas, and confronting it with the more conventional way of management. They had a unique two-week conference, where the primary guy was Herb Simon. I just couldn't believe it.

That guy completely changed my perspective. I almost thought I was wrong. In what sense is the end of the economics? It is not, this idea, this belief that man is a rational decision maker, that you optimize things, that you develop the full understanding and make rigorous choice based upon very clear criteria. And he said, "baloney. It's not that man is rational, but that he is bound rationality. And it's not optimization, it is satisfying. And the important thing is not the decision, but the choice.

The first important thing in the stage of decision making is an intelligence phase, where you identify the issues you would like to study, and then you begin a design phase, where you articulate the alternatives to pursue this, and then the choice. And the choice is where mathematical programming and all of what I've been trained to do, is fundamentally irrelevant, was kind of in the irrelevant scheme of things.

In relation to that, at the same time, something happened to me. Very often I had that happen to me that industry is ahead of me. With my continuous involvement with industry I have been able to somehow recalibrate what I'm doing. There was a peculiar American guy who was in charge of Latin America with headquarters in Mexico, of a pharmaceutical company called Searle. He called me and said, "Arnoldo, I need your help, because you are a smart guy."

"What do you want me to do?"

"I want you to help me to do the strategy for Searle in Latin America."

I said, "What?" I didn't know how to spell the bloody thing. But he said, "Incidentally, being a student of yours, being a Ph.D. student," and he remembered so well, he said, "and to make it attractive to your student, I'm going to pay him this." And he raised his hand. \$5,000, which was a good amount of money for a Ph.D. student. We went, and that was Nico Majluf.

A: As you can well imagine, our first reaction was, "Let's model this thing," and we did. But then we realized that modeling, dear old Porter, who I respect immensely, who is also a very good scholar, and very well rounded and formed in serious economics. When we started the study, he said, "I realized from the very beginning that this thing was not going to be able to be structured in ways that you could model it."

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That was Herbert Simon said, there are two decisions – two kinds, programmable, and non-programmable. The programmable decision, you seem in total control. You reach a level, and you cannot structure it. It is non-programmable, you cannot tackle this way. You rely on frameworks. It's not that you abandon rationality, but you frame it. You establish a framework.

At that time, surprisingly, strategy was not being taught at Sloan. None. There was not a single course in strategy, which was something. Remember, we're talking about pre-Porter, where even in Harvard, for instance, there were things called corporate policies.

B: It's called Policy.

A: Which was hand-waving stuff, right? Cases, and you talked around it with very little in terms of intellectual foundation. There some interest beginning to emerge among some senior faculty, most important were Zenon Zannetos and Ned Bowen, and then me. Zenon was a little complicated. Abe and Bill were so good to me. I cannot begin to tell you how kind and concerned and supportive they were of everything I wanted to do. They said, "Arnoldo, why don't you do it? Why don't you switch?"

A very exciting thing happened, which I think you already have covered with somebody. At that time there was a reorganization of the structure of the school. The idea was, management sciences had run into something extremely powerful by putting under one umbrella all of these disciplines. That provided us with a setting in which the whole was much bigger than the sum of the parts.

Bill, who is a very wise man, said, "Why don't we try the same thing with the rest of the school?" It was a piece of cake what to do in the secondary, Economics, Finance, and Accounting. Except, they took Accounting out of Management Sciences. The obvious thing to do, because the weakest part of Management Sciences was accounting. These guys were going nowhere. By folding it into a place where all of the serious, wonderful staff. So they put together that.

The remaining staff was called Behavioral and Policy Sciences (BPS). They assigned John Little to be the area head. Why John Little, who know nothing about behavioral issues? Because he had proven to be a great manager of these areas. I come in, and they asked me to lead the strategy part. The idea was, why don't you do in Strategy, Arnoldo, what you did in Ops Management. And I tried, but I wasn't nearly as successful as I was in Ops Management. Strategy was a complicated field. We didn't know how to tackle it in terms of providing the proper disciplinary stuff. There was not a unifying fundamental disciplinary approach. Later on, the economists started grabbing it, which I think is debatable. But now it is a mixed bag of sociologies, economics, and so forth. It has become a mixed bag with guys like me or say Michael Scott Morton.

B: Was Michael Scott Morton part of the first cluster, when you took over Strategy? He came in from the Information Systems side. It's very interesting how people reach Strategy. Ned Bowman came to Strategy from Operations Management. People don't normally start in Strategy. They come to it after they've mastered another discipline.

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A: Then. Now they do. Now they graduate with Ph.D. in Strategy and so forth. In our time that was not the case. You had to migrate from somewhere.

G: When BPS was formed as a group and John took it over, was there a Strategy group?

A: We formed it. Before, Zenon had begun to do something. Ned had begun to do something. Then we decided to do something in the Sloan Fellows program. There was a problem because Ned wanted to teach. I said, "Fine. You teach it." But then he said, "Under one proviso that you never talk about anything that has to do with Porter." It was very hard to discuss it without that. I had a course, prior to Ned's course, which was called Planning and Control; it was more of the nuts-and-bolts stuff. And then came the Strategy Management course Ned was teaching. It was gradual. I do not know whether, in the end, it was good or bad for me, from an academic perspective. When I was in Ops Management, I was regarded as an extraordinary, powerful academic in the field. My contribution, I had plenty of stuff, was regarded as one of the most outstanding contributions in the field. When I started moving into Strategy, my work started losing some of this academic rigor. I had lots of fun. It culminated in something I'm pretty proud of, which is the thing we call the Delta Model.

B: Well, that's a whole subject, to talk about Delta, Saturn, and your Structured Theses. We got a lot of things to talk about, and how you proceeded.

A: Right. You see, when I changed buildings, I changed fields, and I started teaching completely different things. I started concentrating more and more in the executive programs, in Sloan Fellows. I was chairman of both the Senior Executive Program and the Sloan Fellows program. I still played an important role in the MBA program. I was a popular teacher. I was always regarded as a very good teacher, getting a lot of very good feedback, and that helped me a great deal because that was something I loved.

My writings became more framework-ish. But no apologies on that. I never lost the spirit of OR. What does that mean? I was solving problems, developing tools, establishing methodologies, helping a rigorous process to take place, and testing that in a wide variety of settings. And the work was with Nico, you can imagine what we were doing. Since 1980 I have a home in Martha's Vineyard. He would come to the Vineyard and we worked, and I mean worked. We got up in the morning at 8:00am and started working. We took a brief break at Noon to go to the beach and take a swim. We'd work until 7:00pm. We had dinner, and then worked again after dinner. It was insane. I happen to be married to the most wonderful woman in the planet, who has always been extremely supportive of me. She's an adorable person, I cannot tell you more about her, she is incredible.

I think the things we did with Nico, I have not seen any publication where it tells you how to address the three dimensions of strategy: corporate, business, and functional strategies in an absolute comprehensive way.

And then we came in, shall I tell you the story?

B: Sure. Then maybe we will take a break for food.

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A: Let me just tell you the story. Lester Thurow had become Dean of the Sloan School. He was Dean in 1987. He was six years Dean. I was on sabbatical, at ISEA, and he called me on the phone. It's funny, because I had come to MIT, and Lester knew I was coming. We were friends with Les. Les was not an easy person to be real friends with... but we were friends. He knew I was coming, and he knew that I was alone. My family was in Barcelona. He invited me for breakfast. He said, "Arnoldo, I'm delighted to tell you that I'm on the search committee for a dean." Abe has now decided to drop.

I said, "That's very bad news, Les."

He said, "What do you mean by that?"

I said, "Because you should be our next dean."

"What?"

"Yes. You should be our next dean. You are the only member of our faculty who could provide this expansive presence, image, to us. There is nobody that has this ability, which is as connected. And this is what we need. We need more recognition."

He said, "You're crazy on that. I have all kinds of activity."

I said, "No. You could make this compatible. Are you sure? You sure?"

"Yes, I'm sure. You could do whatever you do, and be Dean at the same time."

[Laughter] And he became Dean.

He called me on the phone, and he said, "Arnoldo, I'm Dean." [Laughter]

I said, "Gosh. Congratulations, Les." I was so happy. I really felt that Lester was going to be the most remarkable dean we would ever have.

He said, "And I would like for you to be my deputy."

"¿Que es?" I said, "My God."

"What do you say?"

I jumped for joy because he had done something remarkable. He had gone to the Aconcagua, which is the highest mountain outside the Himalayas.

B: Yeah. It's like K2, isn't it?

A: I think it is one of the top ones. It is very tough to climb. It is on the border of Chile and Argentina. He had gone there, and he fell. He had a deep fall. He fell like 100 feet in rocks, it was significant. He was totally impaired to go to the next stage. There are places where you can stay. So he said to his entourage, "You go ahead. I'll wait for you here." And while he was there he wrote three memos. He was thinking, "What could I do?"

I know which memo was number one, which I read, which is the memo, "What happens if I were to be dean?"

I think that I know which was the second memo, which was., I think, "What happen if I become a member of the cabinet?"

I don't know what the third memo would have been.

He had a remarkable vision of what he wanted to do, and an infinite capacity to articulate it. Basically his mission was three dimensions. We were the recognized leader, very important in head of State. But the three dimensions were technology, then globalization, and

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then management of change. And technology we would embrace MIT. In fact, one of the very first things we did was to engage ourselves in the Leaders for Manufacturing program, which is a fabulous example of how to combine the best of these two schools.

The second thing was globalization. The third thing was management of change. I think we accomplished well the technology side. I think we accomplished reasonably well the globalization side. Not so sure about management of change.

I joined Lester with a sense of happiness that I cannot describe. That we really were going to do something dandy! We were going to become, by far, the best school in the country. I was the last guy in the hiring process because they had to come to me, and I would tell them, "Come here because this is going to be it." I remember one year that we had a 100% batting average. We made 12 offers and we got 12 acceptance. Among them, people like Richard Locke, Rebecca Henderson, and Steve Eppinger. We did something very peculiar. We decided that one of the things to facilitate this technology thing, we were going to hire two engineers. Who are the best guys that I graduate? They said, Steve Eppinger and Karl Ulrich. And we hired both of them. You know what happened to Karl, though?

B: He's at Wharton, isn't he?

A: There was Karl and Steve. Karl was better than Steve, clearly a better teacher. Karl was a very charismatic guy and both of them were working very much together. They were developing these development things, and Steve Eppinger was wise. He said, "I'm not going to go to tenure with this guy because he is going to obscure me." They had written, I don't know whether they had published or if they just had the manuscript, this book. And every one of these was a shoe-in.

Then he came to the Personnel Committee, and my dear friend, Bob Pindyck. He took a look at the book. You know that engineers have this thing called "engineering economy." They teach courses like that and they talk about MPVs. They said that an MPV is a projection of cash flows and then you discount them with a discount price. What is discount rate? Well, they don't know. It's a number you plug in. In finance, the famous capital asset pricing model, which is the Bible #1, 2, 3, and 4. The capital board decides what is the discount rate. The discount rate has to do with the risk involved in the individual investment that you are making, adjusted for inflation. They had not dealt with this issue that way, they were conventional. Pindyck said, "This is an affront to the School. This is a disgrace, it's a shame that these people are... rant, rant). How could you possibly be..."

Glen said, "There are some issues of marketing that also are not very clear and spelled out." And Karl, and this was payday, so Steve Eppinger doesn't have a claim in that game. He's going to be the same guys that killed Karl. But surprisingly, nothing happened.

B: The next year.

A: The next year.

B: Yeah, illustrating Herb Simon again, how decisions get made!! But have you kept up with Karl? Karl is at Wharton, isn't he?

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A: Yeah, and he's doing great. Thank God for Wharton. Wharton has taken many of our rejects. Peter Rangers (sp?) was one who became an extraordinarily successful guy there. They do not have this concern, this inferiority complex, of saying, "If he's not good for MIT, he cannot be good for us."

B: Right. This is fabulous. Your recall, your ability to lay out the stories, is terrific.

G: I have a couple questions and then maybe we'll take a break and follow the post-Lester period. When was it that you were in Yugoslavia? What summer was that, do you remember, with Herb Simon?

A: I tell you exactly because by then I had joined Harvard. It must have been between 1970 and 1972, probably 1971. You know what happened to me? You won't believe this. It's the only time that something happened to me and I reacted in a way that I'm ashamed.

Herbert would come and speak in such a way that you could record him and type it and send it to the press. Perfect! I mean absolutely perfect. And he spoke with profound seriousness. He did not mumble, he did not make jokes, he was all business. He spoke clearly. If I read his message, he had an incredible way of just paralyzing you. I have never been so captured in my life with such a powerful manner as he had! Oh! And the current thing he was saying, which was incredibly unknown to me, was in an area that was very different from the ones that I had been exposed to. I tried to reach Herb Simon before that, and I saw that Herb Simon wrote a book which turned me off completely, surprisingly, it was a language that I didn't get, with March and Simon?

A: Simon had written a book with Modigliani on inventory. I didn't come to him thinking that I was God Almighty. I had to speak too, and I was one of the few faculty members there. I spoke during the first week. The second week we were going to do a second round, and I was speaking. All of a sudden Herb Simon came out the door and sat down. And you know what happened to me? I froze. I could not think! I absolutely couldn't. I said something horrible. I said, "You know, we just saw Professor Simon coming into the room and I'm sure that you would be so much more interested in listening to him than listening to me, so I will ask Professor Simon to please come up." He was furious at me, obviously. I mean this idiot is doing this to me. Who does he think he is?

B: That's a great vignette! I want to come back to Herb Simon when we have lunch.

G: I'm glad I asked because that was much earlier in your career. That's when you came to Sloan. That influence of strategy must have been in the back of your mind for quite a while with your operations work.

A: Right, exactly. It was there and it impacted me. By then, I had not really done much in terms of reading and so forth, but it cast a phenomenal concern to me about organization. I became a *persona non grata* for the OR guys. Let me back up.

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Operations Research was started during WW II by a bunch of scientists in Great Britain that were totally ad hoc. They were people from mathematics, physics, from all walks of life. They were addressing unsolvable problems and problems that have never been treated. Like, what would be the optimum way of bombing Berlin? Or having a fleet of submarines to protect a harbor.

Then some universities started developing this, and the first two books came, one from here, from Ken Morris and George Kimball. The second one, which really was influential, was Churchman, Arnoff, and Ackoff in a brilliant book called *Interaction to Operations Research*. It was a big thing back then. I had a professor in Chile who was very missionary, and he fell into that book and set his value course on that, and I took the course. When I took the course, I thought, "My Lord! This is it! How elegant!" Not only optimization but all of these things on uncertainty, queuing models, and simulation. I thought, "Wow!"

Then the Operations Research Society started publishing his first journal and you could see during the first years where OR was the most relevant discipline on the planet. They were talking fantastically relevant, important issues. And then it became an academic, with all of the stupidity of academia, right? "Publish or perish," and this fragmentation of disciplines into garbage. Publications of things that have absolutely no interest to anybody except this awkward group of academics that were referring this garbage among themselves.

Remember, my thing always was that I wanted to be holistic and I wanted to be pragmatic and applied. I was seeing the field going in a way that I didn't want to. Even my colleagues, Gene Morley, working on, I saw fantastic people, Rob Freund. These guys, even Gene, became methodologists, tool-makers, they were not working on real problems.

So I started with this disenchantment on the one hand because I saw the way... And academia has a way of doing this, this parody saying, "Instead of now counting the publications..." which we do at MIT, we do it very well. When we said, "Take a step, ask what is the contribution of this person? What does it mean? What is he or she doing?" As opposed to counting the papers. You have ten papers on management science, "oh you must be terrific." The whispering of Simon in my ear, the trends of OR in academia, these tactics made be reflect on whether or not that was the field that I wanted to continue working.

G: The other thing you mentioned was the strategy for the pharmaceutical company in Latin America.

A: Right. Searle. It's funny because later on, the CEO of that company was Donald Rumsfeld, the guy who led us into Iraq, the Secretary of Defense. Rumsfeld was the CEO. That's where he made his money.

G: When was that?

A: It was when Nico was a PhD student, in 1974, 1975 or 1976.

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BEGIN PART TWO

Discussion on standards for scholarship for operations research...

A: The standard was the age of mathematics, or contributing to the solution really centered problems. I remember there were discussions like this with faculty when we were celebrating some anniversary in the OR Center. And they didn't interview me. I told them, in fact, that I felt disappointed about OR, that the way OR was now. Once he saw me in the parking lot, later. He said, "Arnoldo, I want to tell you one thing. I used to have a great admiration for you. But you really are disappointing." Well, what the heck! You don't always win! It's not an easy thing.

G: It seems to me that the drive to measure contributions by publications drives people to write articles in quantity, which oftentimes are easier to write when you're arguing finer points than developing a whole new idea or area of application. It seems consistent across most fields that this happens.

B: Has the same thing happened in strategy? What is your sense about whether we're working on interesting and important issues, problems, and topics?

A: We lose sight of concerns, and addressing very important issues. There seems to be a kind of incrementalism in academic work. People recite and re-recite the same thing. In some sense, it's a given. There are very few major contributions. Sometimes I talk about eloquent people in my classes. I said, "I have a colleague at MIT whose name is Eric von Hippel. Eric is a guy who has had only one great idea in his life." And the people laughed. I say, "You know something? I'm saying that as a great compliment." Because most academics never have had a great idea. A great idea is one that changes the balance. The first time you hear it, you think it's crazy, and when you hear it again, you think it's obvious.

B: We should put on the record how you would describe Eric's great idea.

A: It's a magnificent thing he did, and he did it in the most careful and detailed way possible. He was intrigued by what he called the "sources of innovation." The issue is who innovates. Before he started his spectacular work, the conventional wisdom was that firms innovate. They have market research departments, they anticipate the needs of customers, they are very much aware of the changes in habits of purchasing, as it were. They learn and then go to the lab. They define the products they have to develop, and that's when innovation takes place.

What Eric did was to study over 100 innovations in scientific instruments, and painfully, with his graduate students, he went in, backtracked, and identified really who, the person behind that original idea. He realized, in the case of scientific instruments, that overwhelmingly, in 70% of the cases, were not manufacturers, but were what he called "lead users." Not any user, but very clever users who were fed up and frustrated by the lack of innovation that they needed from the instrument manufacturers. They would go in, develop the new instruments, do a prototype, sometimes in conferences they communicate about the nature of that. Eventually, a manufacturing instrument company would come up and detect the

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centrality of this and make it appear as if they were the innovators, when in fact they weren't. There was a time he was surprised, as everyone was. He saw it and he started going and going into another one, and then he'd do another innovation. And repeatedly, he was getting the same answer. By and large, the predominant source of innovation was the lead user.

When he was about to write this snobby article saying, "Guess what? Your customer already had invented your new product," he found a type of innovation where that was not the case. When he completed the scope of this question, he realized that indeed sometimes manufacturers innovate, sometimes distributors innovate, and sometimes the customers innovate. At the end, the answer to the question, "Who innovates?" is "It depends. It depends on who is going to reap the benefits of the innovation."

B: Good. All right.

G: Could we do the same thing with strategy? What have been the significant milestones in the development of strategy? Some of it you've talked about, coming from planning, to bring in a more systematic approach with operations research.

A: You know what I did? If you think it is worthwhile I will send it to you? Three years ago I got an honorary doctorate at the Polytechnic University of Madrid. In Spain, it is a big deal, as an enormously impressive activity. For the guy who is being presented with this honor, first there is all of this regard. All of the professors are dressed in their academic robes. They come in, the orchestra of the university, the choirs and faculty are all there. You are there to speak. They said, "Arnoldo. We would like you not to talk about the details, because the nature of the audience is not that. It's so diverse. We would appreciate if you could make an effort to talk about something you think would have a more general appeal." You know what I wrote? I wrote a piece that you might either laugh or enjoy. I wrote about the evolution of academic thinking in management in the last 100 years.

B: Oh. Wow!

A: I said, "A personal perspective, in the sense of saying it's from my point of view. I'm not attempting to do a rigorous survey." I centered on 10 people. I talked about subjects, I identify, personalize the subjects on a given individual. The 10th guy, for obvious reasons, is me. Since I was the recipient of this thing, I had to tell what I thought. But the nine are Frederic Taylor, Henry Fayol, Elton Mayo, and then Doug McGregor. Next is George Dantzig in OR. Herb Simon. Obviously Michael Porter. Peter Drucker, and the management contributions of practices that had industry beginnings. Then I made a cake of university, the MBA, and all that. And then my contributions, and that's it.

B: That would be wonderful to read! And how recently did you put this together?

A: That was three years ago when I got my doctorate. I wrote it then. I'll send it to you. It was difficult to do that because you left aside so many people.

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Note – the presentation (PowerPoint slides, in English), and transcript of the Spanish speech, are in the oral history documents archive.

END OF PART TWO

BEGIN PART THREE

B: I would like you to you say more about something that really impressed me. When I first came here, you were working on what I would call an orchestrated research project, what you called a structured thesis seminar. At one point, you were the entrée to Saturn, which a lot of people got involved in, and you had the Delta project. You want to say something for the record here? It seems to me this is such an important way to advance research, and get our students involved. I'm not sure we do as much today as we could. We have other ways in which students get involved with what's called "action learning" now. But the way you framed it was, I thought, very powerful.

A: I also want to add what we were doing with the study and management consulting track, which I'm going to add to that list of things. As you know, there was a moment in our history where we decided that the thesis was not going to be a mandatory requirement for our students. It always had been, and we were proud of that. Our degree used to be a Masters of Science in Management, and not an MBA, to accentuate the fact that all of our students had an experience of research before they graduated. Well, the thesis was not a popular option. The students, by and large, would have preferred to spend more time in the classrooms.

I wasn't part of that decision, but they decided the Sloan Fellows had to keep the thesis requirement. All the Sloan Fellows had to write a masters thesis. As you can imagine, at that stage in their life, strategy is a very relevant issue because there are, most likely, responsibilities that have to do with that. My course was not only popular, it was required. It was regarded as a pertinent and relevant education for them. I would get an enormous number of requests to provide assistance to students. It was so much so that it reached the point I would have huge numbers, twenty students working with me.

I thought we have to somehow institutionalize this, to make it more of an organized effort. We had the structured thesis where I would go and give them a party line, and tell them they could deviate from that, and have an orderly way of doing these things. We would meet regularly to hear and learn from one another.

That was extremely useful for my books, because I cannot talk about things that I do in my consulting work, because that is confidential. But all of the MIT theses are public documents, so with proper attributions and authorization from them. John Little at that time was saying to me, when he was reading stuff I was writing, "It's fabulous, the way which you organize these activities, and how full they seem to be, and how valuable the experience seems to be."

The other thing I did, when the idea of the management tracks took place, was to provide the student with a sense of education that goes beyond what is in the conventional core courses. It would enable them to pursue a job option they would enjoy and be better prepared to do that, to make the selection, and work in that job after they graduate. There were two obvious options, which were the two sources of highest employment for our students. One was investment banking and the other one was consulting. I was in charge of developing the track we

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called “strategy and management consulting.” Strategy was the most powerful consulting theme in most of the consulting companies that hire our students. I decided to divide it into two entities. One would meet on Monday from 6-8:30. The other one met on Wednesdays from 6-8:30. The students had to take both. We call it “Theory and Practice.” I think it was a very interesting thing. At the beginning of the term I wrote an e-mail to about 200 top executives in Europe, in the US, in Asia, and some in Latin America, whom I knew. I said, “Please answer this yourself. Don’t give it to your secretary. I would like you to tell me the three or four major issues you think you will be facing this year? I would like to set up a seminar around those important issues.” I collected all the responses, which provided me an understanding of how to construct a seminar that was anchored in the realities of the time.

Then what I did was to take the 12 days or so of meetings. One day was introductory, the other was closing, and we had about 10 days in the middle. I decided to pick 5 themes, typically, and cover each twice. In one case I asked a top executive to address it; the other time, a top academic or a top consultant. The student would see the same issue being dealt with from these two different perspectives.

There were 300 students participating at one point, which incidentally, the school didn’t give me any points, because it was crap! It was fascinating, the things we talked about. I would invite friends to come in, and there were times when I was very knowledgeable about their work. On Wednesdays, we would identify companies in the Massachusetts area, so they would not have to commute. We would tell them that we had seminar, and ask them to form teams of no more than five people. These teams would do consulting for them, and then they had to report. First they had to write a proposal. The idea is they would have some exposure to what it takes to do consulting. That was a way to leverage and integrate and produce things.

B: Is that still happening?

A: No. For some reason they decided not to continue with the tracks. My track was a royal success in terms of the number of people we attracted. Then, later on, I asked Gerhard Schulmeyer to join with me. What happened is that Schulmeyer was appointed professor of practice. He asked me, “What can I do?” And I was going to do a sabbatical at Harvard. I said, “Why don’t I give you this little assignment?” He loved it. After that, we did it together. But somehow some other tracks were not as popular and successful. They declared that the experiment had failed.

B: So we don’t have the tracks now. The other powerful leadership that I saw on your part, you just described how you were able to get students connected in a very effective way. You were also able to bring faculty together on a project. Michael Scott Morton had projects in the 1990s. He got faculty together. Your Delta project also brought faculty together. I’m interested to have you say a little bit more about how that happened. The notion of creating a theme and having faculty work together across disciplines is powerful. The question is, it’s not easy to have it happen.

A: Let me tell you about the Delta project, which came at a very embarrassing moment. I was at that time the Deputy Dean. Lester had gone to climb the Himalayas, the K2. We had a convocation. With the convocations, we target students who have graduated fifth year,

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tenth year, and so on. It's a beautiful event where they come, we have social activities, dinners, seminars with our faculty, young, middle, and elderly. The whole thing would finish at lunchtime on Saturday. Since Lester wasn't there, I was the one who had to say the final words.

I thought I'd drop in a remarkable experience. We started with our three Nobel Laureates: Solow, Samuelson, and Modigliani—all were alive at the time—then took it from there. How much better can it be, right? I said I believed that it was such a wonderful opportunity for us to see them again, engage in a dialogue with them. To see these beautiful faces, a little bit more wrinkled, but as full of beauty as ever. And 'God bless you' and all that, and 'we'll see you next time.'

There were two directors from Unilever there: Ian Anderson, my dear friend, and another guy in charge of R&D, Gangurian (sp?) who was Indian. They said, "Don't go away. We need to talk," and we went to the bar at the Marriott. They said, "Let's have a beer, because we want to talk to you." Okay. And their opening remark was, "Arnoldo, this wasn't worth the ticket." I said, "What do you mean?" He says "I think we has such enormously great experience, but look, you guys obviously are a very intelligent bunch, doing interesting things. But the proof of the pudding is different. And the question is: 'What are we going to do in Monday morning when we go back to our work. What we have heard here, will it give us any insight into things that we will do different?' The answer to that question is, 'None. Nothing we heard you say.' In fact, there is nothing that we couldn't have caught by reading the *New York Times*, as it were."

They proceeded to give it to me for about two hours, so much so that at that time, I was so proud of my school, that I arrived home physically ill. I told Neva, "I'm in pain. I'm physically in pain." Ian, who is a very nice fellow, called me. I hadn't even woken up in the morning. It was like 7:00am on Sunday. He said, "I was waiting to ensure that the first thing you would do is to get my message." He said, "I've been thinking about what we did to is very unfair. All we did was complain, with Gangurian (sp?). We really overdid it, and over-played our hand."

He said, "But, you know? The story is true, what we said. But, if it's any consolation, all the other schools are the same way." He said, "We already are too much vested in your school, so we are not going to change schools. At least we know that somebody answered the phone at this end." They said, "But we thought we could help you. Maybe the way to help you is for you to invite a group of faculty, and some of your executive friends, and let's have a dialogue. Let's try to see what is really concerning to us and what you can do about that?"

He was the guy who labeled it the Delta Project; "delta" meaning transformation and change. He said, "And I'll pay for the thing." It wasn't a lot to be paid, paying for nice dinners or something of that. We put together this team of faculty, which you were part of, and a group of executives, mostly friends of mine; people like Gerhard Schulmeyer, and this wonderful man, Skip LeFauve. That guy was one of the most important people I've ever met in my life; "important" is the wrong word; he's an extraordinary executive, impressive as anything in the world! There was Julia Wendt, the CFO of Merck. There was a collection of very attractive people.

On our side were guys like you, John Van Maanen, Stew Meyers, Michael Scott Morton, Tom Magnanti, and Ed Schein. That gave me the impetus to work on the Delta project because I realized that some of the things that were lacking. It gave me the inspiration to say,

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“How can I put together a different view of strategy that is more relevant to this frustration that exists with the existing ways of looking at these problems?”

You mentioned Saturn. I can tell you so many anecdotes about GM. Can I tell you some anecdotes? You will not believe me; it’s totally unbelievable. I have been in and out of General Motors many times. There are executives who came to the Senior Executive program or the Sloan Fellows, particularly working with the component side. Parker Electric, Delco Remy, these kind of guys. Parker Electric, Skip worked there. It was very frustrated, trying to tell them, “This is not the way to run a business. It’s crazy, what you’re doing.” Now, finally Gary... the number two guy, he was the head of North America.

He was always in the technologies and technical development side, and then he was appointed the head of General Motors of Mexico. He was the second-largest employer in Mexico after PEMEX. There was this tequila thing, the market went to hell, and he called. He said, “Arnoldo, you’ve got to help me doing a study, because this thing is absolutely horrible.” We put together a brilliant strategy that asked: “What is wrong with the evaluation that makes your labor cost so extraordinarily cheap?” Eventually we concentrated on Central America and the demand for *maquiladoras* in the borders. He did so well, and he said, “I owe it all to you.” He was so phenomenally successful that they put him in charge of Europe, and after that in charge of North American operations. He said, “And all that I did was to repeat what we did in Mexico.”

There was another guy, Donald Ronski (sp?), Gary’s boss on the technology side, who had been a Senior Executive. The boss at that time was the head of not only North American operations, really the most important executive job after CEO. He was also a student of mine. They said, “He has asked us to put a study together, and we would like you to help us.” They said, “We have done it, and we would like you to review it.” I said, “Fine. Why don’t we spend a week in Martha’s Vineyard? We go and review everything you have done, and then I will tell you.” The four of them came, loaded with packs, and we analyzed every single thing. At the end they said, “Arnoldo, give us a grade.”

I said, “Okay. I’m going to give you an incomplete.”

They said, “What?”

I said, “All you have shown me is the back end of this thing. You have shown me manufacturing. Where are the customers? How does the customer fit in here? What are you going to do to avoid overlapping with things you are doing? We don’t know what a Chevrolet is, what a Buick is.”

They said, “But we are all done. It’s a project called 2000.”

I said, “But you haven’t shown anything to me.”

“We have it.”

“Well, you want me to give you a grade?”

They said, “Okay. You go to Detroit, and we have it. I’ll show you everything. You’ll see. And then after, you give me a grade.”

I went there. Don Ronski was the main boss. I arrived in November.

He said, “Okay, Arnoldo. What is it?”

I said, “Don. Let me tell you something. It’s horrible. This thing is absolutely horrible. I beg you to let me talk to your boss, because you are not going to be able to tell him what I could to tell him. You’ve got to correct this thing, because it is outrageous.”

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Don said, “You see, Arnaldo, that’s the problem with you guys in academia. You deal in Cloud Nine. You don’t get a sense of what it is.”

And then in the most absolutely stupid way, I don’t know how could I say this but I said it, “Don, let me tell you what is going to happen. Bob Stemple, they are going to fire Bob.”

He said, “What!” He almost punched me. He said, “This is intolerable. You really have crossed the line, because never in GM has a CEO been fired, and he will never be. You don’t know anything! I’ll throw you out.”

And in February they fired him. It was so outrageous. In the midst of that, there was this guy who was Skip LeFauve, who had the most extraordinary viewpoint of what it takes to do something. They assigned him this fantastic project. That’s Roger Smith.

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BEGIN PART FOUR

B: You told that wonderful story about GM and we got their names: Bob Stemple and Kerry Coucher (sp?).

A: One thing I'm very proud of, you can tell me whether it's important. My alma mater is the Catholic University of Chile. When it celebrated its first centennial, the president of the university called me and said, "Arnoldo, I would like you to do something special because there are many activities we would like to do in celebration, and you are a prominent alumni of ours. Why don't you think about something? You don't have to tell me what, but think about it."

Franco Modigliani had just won the Nobel Prize, so I went to see him. I was a good friend of Franco's, for some peculiar reason. We were very close. He had a house in Martha's Vineyard. I went to see Franco, and I said, "Franco do you want to come visit Chile with me?" And he said yes. Then I went to see Bill Pounds. I said, "Bill, do you want to come to Chile with me?" And he said yes. I said, "We're inviting with our wives."

So we arrived, we held a three-day seminar. There were at least 1,000 people there. And supposedly they charged \$500/per person or something, so about a half-million dollar were being collected at the gathering. At the end they said to me, "How much money are you charging, Arnoldo?"

I said, "Nothing."

They said, "What about your friends?"

I went to Franco and asked: "Franco, how much money are you going to charge?"

He said, "How much have you charged?"

I said, "Nothing."

He said, "The same, then, nothing."

Same thing with Bill.

I said, "My god! This is incredible."

So they took us to a nice little place in the south. I came back. This was going to be just one event. But the president of the university said to me, "Arnoldo you've got to keep on going." And I did nineteen times.

The nice thing is that I brought my friends with me, including you. That allowed me to bring my MIT friends to Chile and show them my beautiful country. I was happy about that.

B: You did 19 of those. A bigger question, when you came, the school was much smaller, didn't have all the international programs compared to the school today. It's been quite an evolution. One of the things Bill Pounds wanted us to ask people, "Where do you see the school today, and how would you characterize it?"

A: I'm really happy you raised this point because my answer to you is this. First, this school was incredible. The degree of cohesiveness, friendliness, tremendous spirit of the corps that existed. I came from Harvard, which is very cold and the faculty very divided. Coming to this place was absolutely fabulous.

My first thing was the Senior Executive Program and the magic was that we learned with one another. I learned from Ed Schein, from Mike Scott Morton, from Bob Pindyck,

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from Jay Forrester. I can say it over again and again, from Ed Roberts, so many people – and I never got an MBA. I have this operations research education. It allowed me to expand my views, to understand my colleagues.

You mentioned Eli Shapiro. You didn't mention the other guy, Penn Brooks, our first dean. Our second dean was Howard Johnson. Neither one of them had an advanced degree. Our third dean was Bill Pounds. Bill wrote one paper in his life, an obscure paper that was published in *Sloan Management Review* called "On Problem Solving," which was because Bill studied under Herb Simon. It was on problem solving, where the important thing was to identify the problem, as opposed to solve it.

We were called the Industrial Management School at the beginning, to emphasize that we were committed in the Men at Manus stuff to work on things that have relevance to industry. We were a reaction against Harvard, to bring more scholarly work, with more applied things. It worked, but it was also partly the fact that we were very small and therefore we would do everything. When I arrived, I was a player everywhere, in the Ph.D. program I had six Ph.D. students working with me. I was in the Masters program. I was in the Senior Executive Program. I was in the Sloan Fellows Program. We would meet in a small room, we all were there. All of that is lost. I'm not saying that it was nostalgia because, it had to be lost. You cannot continue to be a fundamental player unless you become a bigger, more bureaucratic organization, loaded with stuff, with so many faculty you don't even know who they are. Now, I can't identify 50% of the faculty, I don't have a clue.

It's like this old man looking back and reminiscing about the old days. Which is not the intent, but it obvious that there has been an incredible transformation. Incidentally, it is a transformation that has not been, in my view, as significant in the rest of MIT. The rest of MIT has not changed as significantly as Sloan has. Among other things, the older manager has changed, where the rest of MIT hasn't. We have become a huge entity with all of the periods of commoditization.

If you ask yourself now, "What is the distinctive offering that Sloan has?" I will tell you what I say when they ask me that. The distinctive differentiation is on entrepreneurship and technology. I say that I don't know, almost as an excuse, because I don't believe that is so distinctive. Leadership and entrepreneurship is now commonplace among all of these schools.

You have to be in limbo not to recognize that. And technology, we haven't really embraced MIT to the degree that we should have in order to really make Sloan totally differentiated. Maybe an exception is the 100K project, where you see multidisciplinary teams of students of science, engineering, and management at their best.

If I were to be dean of the school, thank god that is not the case, my fundamental concern would be to address this question of what is the differentiated quality of value proposition to our students? What singularity do we have, or are we one of the same?

There is a strong critique of the MBA. It has become a commodity. You go to Chile, Guatemala, Germany, and you find the same bloody thing. It's the same thing with trivial

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and no fundamental difference. We were not that way. We provided a completely different option.

B: That's right. We were a School of Management with a thesis requirement. We weren't offering the MBA. We've become School of Business, not a School of Management.

A: Right.

G: People were doing interesting auxiliary things, like the Medical Deans program. You had these programs that took people out of the corporate sphere, which brought in some interesting elements to the general management education here. This is now largely gone because so much executive education is right here and takes up so much of people's time.

B: You mentioned how valuable consulting is, connecting with companies and their problems. Maybe you can't talk about it in detail, but it certainly helps. This is something I'd like to track down. I think our faculty does less consulting today, and because of that is less connected with the concerns of companies.

G: Right. When I was in the Deputy Dean office, you had the same experience I did. I was in charge of faculty relationships. I was the guy requesting faculty to submit annual reports and the outside activities report. I often heard people express concern about faculty overthrowing it, and in a way "cheating" by doing more consulting than the rules allowed. None of that was happening. My greatest surprise was to see how low numbers, I mean incredibly low, forget about junior faculty, even senior faculty, that was the greatest surprise that I got in office, to see how little involvement they had. That is bad because it was in the area of strategy that there are faculty which, if you put them in front of the president of a company, they would not know what to talk about, they would not have an exciting dialogue. Maybe that's the way it is and should be or not? I don't know.

As you well know, Ed Schein invented this label, "Career Anchors." Certainly I was anchored by MIT, I was offered these other possibilities, but it would never have occurred to me to leave. I have the impression that I had the best job I could have ever aspired to have, and I loved it every single month. Maybe the only part I didn't love as much was when I was the deputy dean. I thought I was going to be extraordinarily happy, but my happiness lasted about half a year. I began to realize there were certain things I didn't know, and some disappointments here and there. I realized it wasn't my cup of tea to run these things. If I were to run something, I would rather run something for real!

B: When you were deputy dean, there was only one Deputy Dean, right?

A: No, there were two. Shall I tell you the story? I don't know whether you want to talk about it. When I mentioned that Lester called and asked me to become the deputy dean, Ed Roberts, for reasons I do not understand, has not liked me very much. I think it is because at one point when I was deputy dean, the Management of Technology program was not something that was in my list of things. We were expanding so much, why don't we contract? Ed talked to Lester and said, "You are making an outrageous mistake appointing this idiot."

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B: Oh really?

A: Lester was concerned. He told me that. I said, "Lester, if you're concerned, let's undo it. If a senior member of your faculty is opposing me in that capacity, there is no need to do it." He said, "No, what I'm going to do is to bring a third person," and he brought Glen. Glen Urban was deputy with me, and that was fantastic for both of us because Lester was away a lot.

B: Right, Glen developed all these research centers and consortia and so on.

A: Correct. He was in charge of research, and I was in charge of faculty and the academic program.

[Transcript stops at 19:58 in part four, as per George Roth's request. Discussion is on the accident resulting in a broken leg that Arnolando had while traveling with his wife Neva in Oslo. Resume transcription at 30:30]

B: This has been terrific; you've been one of the stars, to have you tell about your journey.

A: It has been a beautiful journey. The old guys, we had a very nice relationship with one another. I presume that the same thing is true with the young guys.

B: We have heard, we heard about Rob Freund coming and connecting with a cohort. I don't know if that has continued as they become tenured faculty, but we talked about the camaraderie of the group that was hired in the mid-1980s. Might have been the time when we had 100% batting average.

A: I thought with that we can look at the future with total peace. Out of the guys, we still have retained Richard Locke, we had Eric Nysum, and one of the greatest stars, Andy Low. He didn't teach for three years, he had this award, the Oring Award, that he couldn't teach. A lot of these people, the 12 that I hired, some have gone, and didn't get tenure. Out of the 12, maybe 3 or 4 survived.

END OF INTERVIEW