

INTERVIEWER: This is the 150th anniversary interview with Ray Stata. And I guess the first question I'll ask you is can you tell me a little bit about your family and growing up in Pennsylvania?

STATA: I was brought up in the farm country of Pennsylvania, and I had my share of work picking tomatoes and doing farm work and decided pretty early on that this was probably not what I wanted to do with my life. But nonetheless, it had an influence in the sense that farmers are entrepreneurs and their own bosses, and so I think that sort of settled into my psyche. And also my father was a self-employed electrical contractor, so I think the idea of entrepreneurship was sort of embedded in my thought process fairly early on from those early days.

INTERVIEWER: Any particular mentors or influential people from those earlier years?

STATA: There was one that was quite accidental when I was in high school. In a basketball game, I jammed my neck into the wall and ended up in the hospital in traction for several days. And it turned out next to me was an elderly gentleman who I struck up a relationship with who had spent his career as an engineer and knew a lot about the engineering world. So by that time, based upon, you know, digging around the library and reading about science and physics and chemistry and so forth, I had had an interest of pursuing this when I got out of high school. So I kicked up a conversation with him about where would you go to school if you wanted to learn about this, what does an engineer do anyway, and what do scientists do in their life. But the bottom line of that conversation as we talked about schools, he said look, if you want to be an engineer or a scientist, he says there's really only one place you should consider seriously and that's MIT. I said well, what's that? Massachusetts Institute of Technology. He said that's the place you should set your sights on and he went through the reasons why he thought that was true. So as a sophomore in high school I left the hospital, went back, started getting the brochures and reading and did set my heart on MIT as a result of that chance encounter.

But other than that, in terms of strong influence on my life and what I did later in the high school years or whatever, you know, not a lot.

INTERVIEWER: So, when you first got to MIT, what do you remember about your first impressions of the students, the faculty, the environment?

STATA: Well, for a country boy from a small town in Pennsylvania where you know, our high school

was not like the Bronx High School of Science, it was intimidating -- there's no question about that. You know, most of the people had advanced placements in calculus and I hardly knew what calculus was. So for me it was a real catch-up to a field that I could stand abreast of the students here, and actually wondered whether I could actually make it or not.

A thing that reinforced that, which I'll never forget, in the physics department we had a very famous Dr. Buechner as I remember. He was quite a renowned physicist teaching a freshman class. The first examination we had, which I think made deliberately difficult, and I didn't do particularly well on it and neither did anybody else in the class. He came out and he says well, he says, you know probably a lot of you birds don't belong here. I would say what I can tell from these test scores, probably about 30 of you should drop out. Because I don't know that you're really cut out to do the kind of challenging work that we have here at MIT.

You know I'm not ever sure why he challenged us in that way, maybe just to wake us up, because he certainly woke me up and made me doubt even more about whether I could do it. But as the months and the time went by and other exams I did better on, I gained confidence, and by the end of the first year I felt that I was going to be able to do well enough to be a proud graduate of this place and stand up against some very bright people along the way.

INTERVIEWER: Can you talk a little bit about what it was like at MIT in the 50s, just what the school was like?

STATA: Yeah, well one thing was very clear, there weren't very many women around. There was five or six percent so they were sort of a rare sightings on the campus, and of course, that's one of the dramatic changes over the years. But probably not all that different, so it was a pretty grueling experience. I mean you had to work pretty hard.

In my case, so I came here from a family not of means and so I had to work to earn part of my keep. And so the work on top of the school work was a pretty grueling experience. So, from that point of view, it wasn't a fun place. I think maybe today -- I mean there's different kinds of fun, but a pretty serious experience. I think that part, the drinking from the fire hose, you know that probably hasn't changed a whole lot. But the other thing that had an impression on me was that the faculty and type of material that we were challenged to learn didn't pull any punches. I mean they threw at us the heavy-duty, non-edited versions of the tough stuff and they expected us to be able to grapple with it. And indeed that I think set up a self-confidence, you might say, that if somehow the other -- you could deal with the kind of material that you had to learn here, and you could do that in competition with the kind of students that they

garner from around the world, that by the time you got out of here, at least for me, it developed a sense of self-confidence that I could go out in the world and do great things against some very smart people. Probably, obviously, the things I learned in my course materials, not just in engineering, but equally important in humanities has been very important in my life. But probably building the confidence from the farm boy in Pennsylvania to somebody who could go out and start a company and build it over the years, I attribute a lot of that to MIT and the experiences that I lived through here.

INTERVIEWER: That's quite a gift.

STATA: It is. And I felt always a deep sense of gratitude to MIT, because without that experience, without having listened to the gentleman there in the bed beside me about this being the place to go and setting on my sights to do it, I mean I can't imagine I could have accomplished the things in life that I did.

INTERVIEWER: Were you part of the fraternity system?

STATA: I was not. I looked at that and, again, sort of bit of a loner in personality, I didn't see myself mixing into that. So initially I was in the dormitories on senior house on the east campus, and then later on actually got an apartment with a roommate and lived off campus.

INTERVIEWER: What made you choose electrical engineering?

STATA: Well, I think everybody who comes here sort of -- not everyone -- but many people would think do they want to be a physicist, do they want to study physics, because a lot of the early introduction excitement to science that you get in high school is in physics, chemistry, and engineering you don't know anything about. So from point of view, continuing to learn about the things that I found in the library in the high school about science was the thing that really attracted me, and so I toyed with the notion of physics as a major. But as I got into it, I come to think about the practical aspects of what was I going to do with my life, did I want to be an academic or whatever, and become clear that engineering would be a better course for me to fulfill my aspirations. And from that point of view, there was a bias toward electrical that came out of just the appeal of the subject matter, and maybe some of my early experience in working with my father as an electrical contractor. You know I know some, a little bit about electricity at least.

INTERVIEWER: Did you used to go out with him sometimes?

STATA: Oh yes. As a matter of fact, I worked quite extensively with him in doing the work -- weekends, evenings, summertime. So I did actually participate in -- it was sort of one-man business, it was a big business, but I was his helper.

INTERVIEWER: What made you decide to stay at MIT for graduate school?

STATA: It was really part of the 6A program, the cooperative program were sort of an automatic extension of your undergraduate education. So there really wasn't -- once I decided to go into co-op then the Master's degree is part of that program.

INTERVIEWER: Were there differences between being an undergraduate here and being a graduate student?

STATA: In that sense -- the 6A program and life as a graduate student in that program is more closely related I think to the undergraduate experience than the graduate experience. I never really felt I was part of the graduate school environment other than the extent to which you had to write a thesis and you had to develop a relationship with the faculty to do that. But otherwise, it was kind of an extension of my undergraduate experience. So I don't think I ever felt I was deeply part of the graduate school.

INTERVIEWER: Were there any professors who mentored you at the time?

STATA: I got to know a few, but for a variety of reasons not only were there challenges with respect to studies and work, but also on the home front, I had some challenges that made life for me a very, very busy time. So, the luxury of being able to really get to know faculty and develop deep relationships with them, I missed that. I missed out on that.

INTERVIEWER: Is that a regret?

STATA: Yes, it is, because I've talked to others who maybe they were just more aggressive and made the opportunities. I give myself the excuse of being too busy, maybe it was my own fault. But I didn't put the time and effort into developing those relationships, and those who did I think during their experience here and afterwards, I think they gained from that some things that I did not.

INTERVIEWER: What's kept you interested in electrical engineering for so many years? What is it about the field that keeps you engaged?

STATA: Well, once you get into any particular discipline or department of learning, there's a program

that's been mapped out of what you need to know to be an electrical engineer, a very thoughtful program, and some very challenging and interesting subjects. So I think just the appetite to learn about all the different dimensions of what was engineering about, and particular electrical engineering was just a continuous challenge. I always very much enjoyed being exposed to new areas of learning and coming to grips with that and putting that into my portfolio. So, I think the curriculum sort of drove you along on that path with the expectation there was always more to learn. So I never tired of that experience. I've found it quite fascinating and rewarding.

INTERVIEWER: What did you think about doing when you finished your graduate degree?

STATA: I had in the back of my mind fairly early on that entrepreneurship was my destiny, and primarily I think because of a personality trait, but also perhaps in ways that I'm not aware of -- my experience of living in farm country amongst people who were self-employed, and my dad being a self-employed person. But for me, I was always rebellious against authority, and the notion of having a boss was so repugnant that somehow I couldn't imagine myself working for somebody as my career. So that kind of planted the seed in my mind, well, if you're not going to do that, you gotta work for yourself or create an environment where you can be your own boss. So that notion was in my mind very early on, certainly by the time I got to MIT. And so I had the vision of how am I going to get to there, and the MIT educational experience and the grounding, and electrical engineering provided a lot of the background and tools. Also, it turns out that my -- you know, what I learned in the humanities program for me was a very important thing which maybe I can come back to. But when I graduated I already had in mind that even now in my work experience, how do I learn about business in preparation for some day starting a business.

INTERVIEWER: So why don't you tell me more about the value of the humanities at MIT.

STATA: Yeah, that was sort of an unexpected bonus of my MIT education. I didn't really -- in reading the books and materials and so forth as a school of science and engineering and that's what I anticipated. But then when I got here, back when I went, they had a course material that as a freshman everybody took the same thing and humanities, and then in the second year you had two options, so they had a very well thought-out program of what they thought an educated person should know about things other than science and engineering. And so that introduced me to the great thinkers -- I mean that was the program -- to the ancient philosophers and more modern philosophers and opened up just a giant vista of learning

opportunities that was begun here but continued after life at MIT through reading and studying throughout my life. And it turns out as I've ended up, okay, as a corporate leader of a company that got of some size, the human side of the equation of life, particularly in the business context, I think a lot of the beginnings of learning that I had in the humanities and followed up on subsequently became just as important to me and perhaps in some respects more important in terms of my success as an entrepreneur.

INTERVIEWER: Are you talking about the handling human resources?

STATA: Yeah, but I think more abstractly than that in terms of thinking hey, what's life all about, if you have a corporation what's its purpose, why are we doing this, why am I doing this. So the whole idea of thinking more deeply about what life's all about, and I think those questions were raised in the humanities program and got me thinking about a lot of different dimensions of learning that proved useful later. And then as I went through establishing culture for our company, I drew upon a lot of that learning to create an environment that worked, that had as part of that environment an understanding of human beings and their aspirations and what a work environment should do to address that. Partly it also came back to my own personality and my aversion to authority and my desire to do my own thing, and guess what, I think most really bright people who are well educated have those same instincts, maybe mine are a little stronger than most, but certainly I found that throughout my career, and so how do you create an environment where they like me, okay, didn't have to have a boss -- maybe they did in some respect, but small b rather than a big B. So I think an important part of the success of our company is my understanding of the need for that, and I think those kinds of understandings and so forth had their roots in the learning that we had in the humanities program.

INTERVIEWER: And I have a lot of questions about the culture of Analog Devices, and I'll get that in a minute. But how would you describe the characteristics that you think make a good entrepreneur a successful one? What does it take?

STATA: Well, there's several factors to being a good entrepreneur. First of all, you gotta be prepared for hard work. You know some people are workaholics and some people aren't, and I think to be successful as an entrepreneur in a start-up company is it's a grueling and challenging experience which requires a lot of effort. And amongst other things, therefore, requires good health and stamina. But beyond that I think an instinct of wanting to change the world in some way, maybe big or small, but a dissatisfaction with the way it is and always looking for ways to

make it better, and using the instrument of a company through products and technologies and services to change the world in some way. And I think entrepreneurs have to have those instincts, then they have to think kind of holistically about how all the pieces come together in order to be successful in business in developing strategy.

And so there's a certain amount of I guess creative thought in the sense of business strategy, of trying to figure out where does the world need to be changed and how can you really be successful doing that against other people who are also trying to change the world. So I think having ideas, therefore, about the business. And an ability to engage others and align others in the company to share that vision, because that's where he gets to be all about -- to have a bunch of people who are independent-minded souls and want to do their own thing, but nonetheless buy into the vision of opportunity that the company represents, not only in terms of what it does in the product space, but also in terms of the values that it represents.

INTERVIEWER: Do you think successful entrepreneurs are born or can they be created?

STATA: I think that there's certain characteristics without which it would be very difficult, and I think part of those is in some matter or the other to be able to communicate with others in an effective way and being able to sell your ideas and to get other people to join you in the journey. And some people just are not skilled at that and, therefore, that's a real problem. I didn't mention, and it's an obviously very important factor, is you have to have the capacity to take risk. You have to be comfortable with walking out on the plank and facing the prospects of failure, and having a certain amount of courage and being able to go out on that plank and face the possibility of failure. So that's a personality trait -- that is something I think you're, if you're not born with it, somehow it develops pretty early in your life. And it's very hard to be an entrepreneur without a high capacity for risk.

INTERVIEWER: So let's step back a second, and how did you wind up at HP after you left MIT?

STATA: Well, HP was the premiere instrumentation company. A lot of the things I did in my thesis in my graduate program in gyroscopic instrumentation was, you know, I used their instruments, I was more into instrumentation than any other aspect of engineering. So from that point of view, I knew a lot about the company and I was interested in instrumentation per se. But beyond that, in the back of my mind, I had this thought some day I'd like to start a company, and so I want to go to work for a company that I can really learn something from, a company that I respect and that I could sort of copy, you know, that I would learn from them and not

reinvent the wheel. And from that point of view at that point in history, you know, I think HP had to be if not number one, close to number one for any survey you'd want to take, and certainly for me as a company that shimmered with success and vitality that was an engineering driven company that's had very high values and morals and had leaders through Packard and Hewlett who were quite extraordinary. So, in going to work for that company, it was like a mini MBA. You learned the HP way, you learned how they think, you learned why they did what they did, and for me that was a tremendous grounding about hey, what's this business all about anyway and how do you do it and how does it all fit together. I didn't go to business school, but that experience at HP brought me a long ways to understanding that.

INTERVIEWER: What is it you think you learned there that you then took forward?

STATA: I would say the thing that was the more transportable, enduring learning was the culture of the company and their management process and their values. They published a document, which was largely created by Bill and Dave called the Corporate Objective -- what is the purpose of a corporation. And later on when I started a company, I copied that kind of word-for-word because it was so beautifully done in terms of making it clear, you know, what was the purpose, how do the pieces fit together, what was profit all about and so forth and so on.

So, from the point of view of philosophy of business, from the point of view of the values of creating an environment where bright people would want to come and work and a culture that made that possible, I learned a tremendous amount from HP. And certainly copied a lot of that in what I've done in my life.

And in joining HP, I had a kind of a two-step process in mind. I wanted to get in the second step of that process into the sales world, because I wanted to encounter customers, and you really learn about business through the experience of engaging with customers. But step one was to work at the company and learn what goes on inside the company. And in stage two was to learn about the outside world, and by that point, I figured I didn't know it all, but I knew enough that would be a basis of being able to start a company. As it turns out in retrospect I was wrong about that, but at least at the time I thought I knew enough.

INTERVIEWER: What is it you think you, in retrospect, that you think you missed by not staying there longer?

STATA: I think that a lot of the -- a lot more in-depth understanding of things that I only understood superficially, I could have developed that more deeply in terms of marketing and the product development process and other aspects that I only got just a very thin layer of insight into. So

the extent to which I would have stayed there for a few more years, I think I would have continued to learn, and therefore, later would not have had to reinvent some of the wheels that I had to reinvent. But, you know, when history was written, it was enough to get started. It was probably a more grueling learning experience than it would have had to been had I been better prepared, but it all worked out.

INTERVIEWER: So why don't you tell me about that entrepreneurial beginning.

STATA: When I was just in the graduate school, I met Matt Lorber who also worked at the instrumentation lab where I did my thesis. And when I went off to California, and in return just by sheer accident in Harvard Square I bumped into him. At that point he was desperately looking for a roommate to share the rental cost of his apartment, so I joined him. And there upon began a discussion, because he, in a similar way, had entrepreneurial instincts and a desire to some point in time to start a company. So we began to plot and scheme and strategize about how would we do that. We later solicited another partner who also had worked at the instrumentation lab, and three of us began to the plot and scheme. At the end of the day, that company that we started, Solid State Instruments, was a failure by almost any measure you want to pick, except the fact that we sold it later and got the nest egg to start Analog Devices. But I would say it was a failure because the primary motivation to start that company was the entrepreneurial instinct, the urge to just do it. And so we had a fairly feeble strategy, it was not very well thought out. We didn't have any funding -- it was one of these boot strap things that we didn't take any salaries and my wife supported me. So, in many ways it's not the ideal way that you would want your company.

But nonetheless, we were fortunate enough to zero in on after the fact a product strategy and the development of a product, which we found a company that wanted to buy, you know, basically us as the engineers and creators of the product, and therefore, the company. So from that point of view I guess it was it's time to start a company and let's find some excuse to do it and any excuse would work. And I've often reflected on that because a lot of times would-be entrepreneurs go on and on and on about trying to find what's the perfect place to jump into the water to the point where they never jump in the water. That this idea is not good enough, that idea is not good enough.

And I think a lot of times just by being in business, by being exposed to customers, by being exposed to opportunities more often than not, you know what you end up doing as a company is quite a bit different then you thought it would be when you went into business. So just doing

it is an important part of entrepreneurship, and particularly if you do it when you're young. So what's the penalty of failing? You're going through an experience, you've learned, and that's the way I thought about that first company. I thought what have I got to lose? The worst thing that can happen is it fails, and it turns out it sort of almost did, except we did get the nest egg to start Analog. And more important than that in that company, we got the idea of what our next company should be. We got the strategy and the product idea, and in this case, much better formulated, much better thought out from our experience of working in that company.

INTERVIEWER: So can you tell a little bit more about how that happened?

STATA: Yes. We were an instrumentation company, and one of the fundamental building blocks of instruments, particularly back in those days where there were mostly analog-based technology, were operational amplifiers, devices that took in the signals from the outside world and conditioned them -- that took out the signals in the outside world and conditioned them for measurement and other things. So, back in those days, as an instrument manufacturer, you had a design and manufacture your own op- amps, your own everything. I mean there was no place to go to subcontract any of the manufacturing. So we made -- we designed and manufactured our own op- amps.

About that time, a company here in the Boston area, Philbrick Researchers, and another one, Nexus, started companies to provide off-the-shelf operational amplifiers. So rather than design and make your own, you could buy these and just plug them in. So we went through the assessment of well should we continue to make our own or should we buy them? And the economics and the virtues of specialization drove us to the realization that hey, we should not be -- we should buy what -- we should not make what we can buy, and we should focus more on the end result objective of the instrument. And we came to the conclusion, well, if we came to that conclusion, wouldn't a lot of other companies come to that conclusion over time? And so that kind of launched the notion of starting an op amp company. Of course, because we had researched these companies as suppliers, we were sort of expert in our understanding of who are competition would be.

INTERVIEWER: So what would you say was the motivation -- if the motivation for the first company was to be your own boss, what was the motivation for the second company?

STATA: It was also to be my own boss. It turned out with a partner, but nonetheless as close as you could get to your own boss. But in this case, I think with a bit longer horizon, again, back to the

change the world theme, we saw an opportunity, relatively confined small opportunity, but to do something better and different than was being done by those competitors and in a way that customers would benefit and appreciate. In saying that, I must admit that we didn't have any grand visions about Analog becoming a billion dollar company. The total available market at that time maybe was \$10, \$20 million. And our objective was to be the leader -- whatever we did, we had the mantra say, whatever we do, can we envision that we can be the best in what we do. And in terms of now providing off-the-shelf op amp modules that people could buy rather than make, and so that really meant beating the competition and being the leader in that field. So that was clearly what we set out to do, and in a relatively short number of years we did that.

INTERVIEWER: So let's talk some more in-depth about setting up this company so that you could attract good people and make it a good place and retain good people. Tell me a little bit about the philosophy that went into founding Analog Devices.

STATA: I think the value part and the cultural/environmental part didn't come till later. I think in the early days it's just scrapping every day to do what needs to be done right now. And, then of course, you know recruiting and training talented people is a part of that. But the emphasis was much more on we gotta get these products designed and get them out and we're going to be the best in the market, and we can take pride in the being the best part. I think the more subtle parts of the culture didn't come until probably five years into the game.

INTERVIEWER: What changed at five years that that suddenly became important?

STATA: Well, it wasn't exactly so much the five years as it was the growing complexity of the organization. In the early days when there was only a few employees, you could essentially transmit your values and your culture in your day-by-day interface with the people. So it was there implicit in what you did and how you did it. So you didn't have to talk about it, you just did it. But as the company, the number of employees grew, then your ability to personally engage and influence through one-on-one was becoming more difficult. So therefore, one had to find a way of documenting and in a sense, publishing and then articulating what really are the values here, or why do we think the way we do, and what are we trying to achieve. So then the idea of creating a culture where you don't have to know every employee for them to know what is expected in terms of what we want to be as a company, how we want to behave as individuals in the company, what we think's important -- that could be kind of embedded in the culture of the company.

INTERVIEWER: So, what were some of the main values that you thought were important to embed?

STATA: So, the most important value comes down to making it clear to employees that you care and are concerned about their welfare. So this comes back again to the purpose, and we said the purpose of Analog Devices is to meet the needs of people who have a long-term association and interdependence on. And that's our employees, our customers, our stockholders, but I always said, with not everybody agreeing, that employees were the first amongst equals. And if we could understand and meet their needs, then they would take care of the rest. But if you didn't get that part right, you will always have difficulty with the rest of it.

So the focus was creating a culture that was genuine about the fact that we were committed to helping people meet their needs and that we care about their welfare in our policies, and also the work environment and the degree of latitude we give people, and the extent that we didn't have a lot of controls and other things that made it the kind of place where smart engineers would want to come and stay and work.

INTERVIEWER: Do you have a couple of examples of specific policies that you put into place that sent that message to employees?

STATA: Yeah, well, a lot of it is how you handle the hiring and firing process. When you find yourself at a point where you feel compelled to separate, to do that in a way where everybody knows how painful that is and it's not something you take lightly, and even having done it, you're looking to help the person in what they're going to do next. And that becomes known. I mean it isn't just Friday afternoon, come and clear out your desk. The fact that we struggle, we struggle and struggle to try not to have to separate with people, and really work at it and then we communicated that not just us as leaders, we expect it of all of you. So, we said it's not just us, it's you as well -- you have to accept this responsibility when you hire somebody, that's a serious obligation. And you have to work hard at helping people reach their full potential, and if somehow they don't, that you have a responsibility in how you deal with that.

That was one very fundamental thing that's important in companies, because security is -- do people feel that they're working in an environment where they can feel secure, where management was not necessarily capricious about what they do with their lives is a very important thing. To build fundamentally on the culture of trust, that is you work with the organization, with people in a very open way, there's no hidden agendas, everybody kind of knows what's going on -- the good, the bad, the evil -- and through your behavior and how you

do things and don't do things, you build up a sense of trust where people can -- they trust the fact that they know that you care about them or are concerned about their welfare. And you do that through all kinds of ways, but it's a principle -- build trust in relationships.

Another thing that we took on fairly early in the company is our motto was leadership through innovation. We wanted to find those opportunities in the marketplace where innovation was important and where that would be the driving point of success. And that was our strategy.

So, if you want to be an innovative company you gotta have innovators -- very simple. So, the success of Analog, particularly in the early days and even up to today, really comes down to the fact that we have great engineers. We've been able to attract and retain the best and the brightest people in our field, so that they are the leaders, we are the leaders.

And as you grow larger there's a propensity as you put into place organizational structures, and you make people responsible in a management sense for what goes on, for the managers to become the centers of power and for the engineers to somehow become the hired hands, and the larger you become and the less disciplined you are the more that can get out of hand. So we tried to early on make it real clear, okay, to the managers, that the reason we're successful here -- sure, you contribute and we appreciate that, but at the same time it's our engineering talent. And some of these really smart guys are a little quirky, okay, and it's up to you to learn how to deal with very creative people. If you can't do it maybe you're not as good a manager as you thought. So that's one part.

The other part was to put in place a parallel ladder where technical people can see an opportunity to continue their career doing technical work, not switching to the dark side and becoming managers, because the opportunities and rewards and the respect and appreciation that they have in the company is commensurate. So, a lot of companies have parallel ladders, but most of them don't work, because somehow the rungs toward the top get broken. So we try to make the concept of an Analog Device's fellow, which was the high end of that achievement, being the kind of a position that the really good engineers would aspire to reach and not necessarily divert into the management side to achieve their career goals.

So I think we've done that very well and we've created an environment where once you're a fellow, you know one of the privileges, you can't be shut up, you can't be quieted down by the management ranks. And so they can be the sponsors for others in the organization to make sure that the voice of engineers is taken into account, not just in the products and the

technology, but in the policies, the compensation policies of the company, a lot of the cultural aspects in the company -- that they have a voice in that as well as the other part. So I used to think about that as you know management with a big M and a management with a little m, and in that sense the technical organization is part of the management, in my view, with the big M, and the rest of it is the small m.

INTERVIEWER: Do you think that establishing that parallel track and incorporating those values, is that the reason Analog Devices has sort of had this reputation of being on the leading edge of technology?

STATA: Well, it starts with -- that's our strategy, right. We measure our success of whether we're not -- we can find opportunities to push the envelope. And, of course, if you don't have that as a goal, then you're not likely to push the envelope. So a certain part of it is the strategy and the aggressiveness of with which we would go for leadership. But then, of course, you have to back that up with the talent to be able to, in fact, lead the parade in terms of what you're doing. So it's a combination, and I've talked, just to make the point about management in kind of bizarre way, but let's be clear that you have to have executive talent, management talent, and the opportunities for innovation in that aspect of the business is every bit as great as on the technical side. So, you know, you have to have great creative managers and marketers and salesman -- everybody has to be terrific in order to be leaders in what you set out to do.

INTERVIEWER: I'm sort of interested in how Analog Devices grew. So you acquired a number of companies as time passed. Tell me a little about the decision-making process in terms of acquiring a company and getting larger. How did that happen?

STATA: Yeah. We never acquired companies for the purpose of size. We acquired them mostly for the addition of technology, and participated in a market niche that we weren't in but wanted to be in. So it was very much strategically driven by our sense of how broad do we have to be, how far do we have to go in order to exercise leadership, not just in op- amps where we started, but later not just in converters, but in what we started to call real world signal processing as a market segment. And so what kind of technologies and products will we need to be the leaders in that segment.

So to the extent to which we could develop that internally, of course we did and most of it came from that source. But the extent to which we saw, particularly small companies that had pioneered some area that they were ahead of us, then we would seek to bring them into the

fold. So we never were acquisitive from the point of view of adding size, with one exception. We made one acquisition when -- you know, 1990, pretty far along in the company's development, which was a company of about 20 percent of our size. And that was very much a strategic decision that was as much defensive as offensive. This was a company that was pretty confident in the areas where they competed with us, and our concern was that that company would get acquired by somebody and develop that as more a significant threat to us than they were on their own. So we -- number one, and number two, it was a privately owned company where we knew that the owners were getting along in years. So, I went to the owners, even when they did not have in mind to sell it, and convinced them to sell it to us before somebody else did.

INTERVIEWER: That was shrewd.

STATA: It turned out to be very, very successful acquisition.

INTERVIEWER: Can you articulate what it is you think is the sort of key to the success of Analog Devices?

STATA: It's many things which we talked about. I think when it starts with a strategy in terms of leadership and particular market segment, so a vision of what you want to achieve. Then an ability to hire and retain and develop and motivate the very best people in that field, particularly in the technical sense. To create an environment where, in fact, those very talented people could do their thing, who also felt that they could take risks and fail and it would not injure them. Then in some respects, almost, we're very conscious about acknowledging that people who don't fail ever at something they try to do means that maybe they haven't been as ambitious as they should have been. So we encourage that balance between being very aggressive and ambitious and pushing the envelope against the possibility of failure.

So I think that that culture of taking risks and pushing toward the frontier boundaries, and in the culture that we've talked to people feeling proud to work at Analog Devices, because, in fact, we were the leaders in our field and are the leaders in our field. We have a situation for even the people who leave us for whatever the reason is, you know it's amazing the kind of positive feedback that comes from those people and the fact that they feel good about having been there and worked there for whatever period of time it was, and a lot of it came down to the fact of how much they enjoyed the people that they worked with. So, that over time we accumulated this workforce of people who were like-minded in their beliefs and their values

and their ambitions, and they were nice people to be friends with and to work with, and so people like to come to work to be in that environment with those kind of people.

So, somehow or the other we got that going, and so that culture and perpetuating that culture, being able to acquire very bright people, keep them 25, 30 years, and to have selected an area which has a lot to do with dumb luck, okay. I didn't have any idea at the time that the life cycle of op- amps and converters, some of the fundamental products that we went in to, would be 40 years, because a lot of times people start a company in a particular area and five years later, you know, that whole area is no longer an opportunity, so they have to go off into some other business. So we were fortunate enough to have picked some basic fundamental products -- as I say, I didn't appreciate it at the time, only in retrospect -- that had an enduring value over many decades.

Now true enough, the technology has continued to change. And one of the important things that we did -- which was a very, very high risk decision but had we not done it Analog would not have become the company it became -- is we started life as a module company, and then we transitioned to become a semiconductor company only five years into the mission. At a time when we had quite meager resources, and at a time which we were very successful in the modules -- they were growing and doing very well, thank you.

But I, probably more than anybody else, anticipated the fact that everything has an S curve, and that while the product category didn't have an S curve, the technology by which you made it did. And so we went through a major, major transition to become a semiconductor company.

And in doing that, one of the objections that everybody had against doing it, that if our mantra was to be the leader in whatever we undertook, how could we possibly be the leader against Fairchild, National Semiconductor -- companies who were making integrated circuit op -amps, they were already established semiconductor suppliers? How could we, as a nobody in semiconductors, establish leadership in semiconductors, in the categories that interest us? And the fact that we cracked that nut with intentionality -- we said we don't want to just make op- amps that are jelly beans that anybody can make -- which is what the competitors were doing at the time -- we wanted to meet the needs of our customers in instrumentation. Which were very demanding well beyond what I see op- amps at that time could achieve. And so we had to sit back and think, how can we innovate here in terms of the process, to come up with a way of making precision linear IC circuits?

And we did that through depositing thin film resistors on top of jelly bean type of analog circuits and then laser trimming these resistors, to take the manufacturing tolerance out of the manufacturing process, and therefore, we were able to make ICs that were as accurate and precise as the ones we made as modules, and that our customers would buy these to do their most demanding functions. So we sort of broke through that barrier, and were the first who figured out how to do that.

INTERVIEWER: You made a better widget.

STATA: We made a much better widget. And it turned out once we got on that curve, we kept improving it, improving it, improving it. By the time the other people figured out that there was something going on here, we were way out front. So I think that the establishment of leadership in the semiconductor precision analog circuits from the technology point of view is the thing that has sustained us.

Another factor in terms of sustained long-term success is you have to be able to adapt in response to change. For example, I mentioned we made the transition from modules to ICs, and in that sense, everything has a life cycle. So, in order to be able to continue to learn, you have to have a weakness orientation, and here, Andy Grove said it in his book, you know, only the paranoid survive. At the pinnacle of your success, you're always going to be looking over your shoulder and saying where could this thing go wrong and be consciously looking for opportunities to change and improve.

And in that sense, there's one remarkable learning experience for me that came late in life but turned out to be very important, is I always had a philosophy that the way you optimize performance was to optimize the performance of the parts. And that started with employees, you know, having the greatest individual innovators, and having a division to make op- amps and be the best division in the world making op- amps. So, the way to do optimize performance of the company was to optimize the performance of the parts. And then as we got along, I discovered Russ Ackoff who was a great systems thinker, and he made the point that the performance of an organization depends much more on how the parts work together than how they work separately. That was completely antithetical to what I believed of how to build a successful company. And yet we were beginning to encounter problems because we were into the optimization of the parts thing, and I didn't have the concept of thinking about the optimization of the whole, where we beginning to run into some troubles.

But the fact that there was an openness to look at your warts and your problems and your issues and to be able to change them, sometimes in every dramatic ways, is a thing that's required for continued success. I think he said or somebody said nothing feels like success. If you're on a run and everything's coming up roses, in fact, there could be incipient challenges to your survival that you ignore, so you have to be continuously open to the possibility of the need for change. So I'd say that's one of the important things. Throughout its history, we've always been open to adopting and changing, both the products, the technologies, the structure of the organization, the approaches to management and all those aspects of innovation are important.

INTERVIEWER: And that's a hard thing to maintain when you have a larger company.

STATA: Right.

INTERVIEWER: As someone who's trained as an engineer and then spent most of your working life as a manager of some kind, do you think there's an inherent tension between the two, and which role did you like better?

STATA: No, I don't see any tension between -- let's talk about engineering training to begin with and management. As a matter of fact, in my opinion the best managers and leaders and entrepreneurs that we see in our industry are people who grew out of engineering roots. So, in fact, the training that you get about data driven, problem solving, orientation can be applied to the management side of the equation, just as it well can be to the products and technology, and people who are trained in engineering are just more skilled at quantitative thinking and analytical thinking about what's the problem, how are we going to solve it, what are we going to do solve it. So from that point of view, I think that there's an opportunity for a transition from an engineering career into a management career, and all the tools and disciplines you've learned as an engineer could be transformed to solving management problems. Now, not everybody wants to do that, not everybody can do that for reasons of personality and particular skill sets. In my case, as sort of the entrepreneur, from the onset, my responsibility was more about the success of the business than it was the success of the product or the technology or whatever -- it all had to be wrapped together, but my job was more how to make the business successful. And therefore, my challenges were much more managerial, strategic than they were technical, per se. And so I made that transition earlier in my career than others might take. But I think long experience in engineering is a great preparation for entrepreneurship and for management.

INTERVIEWER: Can you tell me a little bit about the formation of Stata Venture partners?

STATA: Yeah, that came -- when I stepped down to CEO and became a working chairman, which I am today, the question is what am I going to do with my life. For me the worst thing in the world is for the CEO to have the ex-CEO hanging over his shoulder. So, I decided really the best policy was to step aside and really step aside, and then figure out how can I contributor as chairman, but I have a lot of free time on my hands. And the part that I've enjoyed most about my career and the part that perhaps was the best at was the discovery of opportunity and the development of new opportunities. So within the company that was one of the major things that I did was trying to figure out where do we go next, how do we get there, so there was sort of an entrepreneurial bent to what I did in terms of my responsibilities and role at Analog. And that turns out to be what venture capitalists do. So when I stepped down in that role, since it was kind of logical that I would continue to do that, but to do it with new teams of people that weren't employees of Analog, but entrepreneurs who were going to go off and do their thing, and where I could help them not only from my experience but from finance and other ways. So, it was a very logical extension of my career and the thing that, as I say, probably is the part that I most enjoy and probably do the best.

INTERVIEWER: Tell me a little about how the Mass High Tech Council was founded, and why you thought that was so important.

STATA: Well, the big challenge for a technology company is forever recruiting the best and brightest engineers, retaining them and developing them, because that's what innovation is all about. And we've had -- you know there's never enough best and bright engineers, so you always want more. But even across the spectrum of engineers, the United States has for decades been plagued with the fact that we are not producing as many engineers as we need. So, in the late '70s, as I recall, we formed an organization here in the Boston area called the Massachusetts High Technology Council. It had two primary missions, one of which was to try to influence government policies that made it a friendlier places for companies like ours to start up and grow, because it wasn't a very friendly place in terms of tax policies and regulations and other kinds of things. So we thought we had a responsibility that we could better do collectively as a group to influence policy than we could as individual companies. And the other side of it we said hey, what's our biggest problem? Well, there were problems with the government but that wasn't our biggest problem, the biggest problem was enough good engineers. So we took that on as a very serious challenge and figured out how collectively

could we influence the education system and what our role would be as companies and working with universities and so forth to get more engineers that were more prepared to work in industry and help us do what we wanted to do.

INTERVIEWER: Tell me about your successes.

STATA: Well, the Massachusetts High Technology Company was unique, as a matter of fact, still is today in many ways, and one of those is that the board of directors and the members were the CEOs of the company. This is not something delegated to a trade organization, you know, we got together as the leaders and took a direct primary responsibility. So when it came time to talk to government officials or universities, whatever, we had the CEOs collectively talking. And the other thing that happened as a side benefit, which you didn't anticipate, was New England has always been sort of a-- has had the reputation that's well earned of being somewhat insular, as compared to Silicon Valley and everybody having a beer Friday afternoon down at the bar, here you go home, right, to get out of the snow. So, as a result, the companies and the CEOs didn't know each other very well. They didn't have a forum within which to get acquainted. And it turned out by providing this forum to work on common problems, they got to know each other, and there were untold benefits that came out of that learning process. And so all of a sudden little things would come up where people would go off and talk about things and find solutions to things that otherwise they wouldn't have done it that way.

INTERVIEWER: Do you have an example of something that got solved that way?

STATA: Well, yeah, there's one very big example, which was sort of a outgrowth of that experience of mutual learning. And that is somewhat later, sort of you might say a spin-off from the MHT experience, was the Center for Quality Management. So during the time when companies were scrambling to compete with the Japanese and threw out what this quality stuff's all about, there was a professor who was invited to come to MIT to introduce CQM to the Leaders for Manufacturing Program. So, I hunted him down and asked for his help, say what can we do at Analog to accelerate the pace of learning. And he said well, what you need is mutual learning, and he related the fact that in Japan they had this organizational mechanism for the executives to come together and learn from each others' experience. We had had that more generally in MHCC, but we didn't have it specifically with respect to quality. So we actually formed this organization to focus on quality management and accelerating the pace of improvement in our companies. That was remarkably successful sort of as a spin-out, and it helped our company a lot in terms of rounding the curve and becoming very good at quality

management.

INTERVIEWER: What's the two percent solution?

STATA: Well, that going back to the MHTC. We came up with a notion that part of the solution was for companies to be more supportive of universities, to provide them support in research or educational programs or whatever. But a certain amount of their profits, okay, should be allocated to supporting and helping universities. So we came up with this number, how about, why don't we take two percent and kind of set that aside and find ways of deploying that either, as I say, for research or educational programs or whatever, and to convince the companies that was part of their duty as responsible citizens if they wanted to make this a good place to build their companies. So many companies did that, including our own. I must say that that was not a sustainable principle.

INTERVIEWER: Why not?

STATA: If we look at the situation today, not just as a result of the recession, but there's such a maniacal focus on quarterly earnings, it pushes companies to be relatively short-sighted in what they do, even within the company. Now to take the point of view that we're going to take a long view and support a much longer term cycle of benefit, you put the money in here but how long does it take before the results come back. So it takes a longer term perspective to do that. Now we still do it at Analog Devices, and we still make investments for a bunch of reasons in universities, but I would say that -- and many companies do. But I'm just saying within MHTC as a dominant principle everybody signed on and did, it never caught on broadly and it was hard to sustain it.

INTERVIEWER: So why don't we get back to your work with MIT over the years. How about starting with what prompted you to take on the Alumni Association?

STATA: It really wasn't until my 25th anniversary that I had any real association with MIT. Very busy building the company and didn't see tangible, real benefits in pursuing that relationship. And I'll say without elaborating it, the extent to which I made a program to doing that, I found a very unwelcome response. So that kind of turned me off for some period of time until the 25th anniversary and I don't think I'd ever gone to an anniversary reunion before. But, you know, met the old friends, and part of that was to give some money and I hadn't really given much money to MIT. And so that started the re-engagement. As a result of that, I think the fact that I made a fairly generous contribution at that time, as I recall, MIT tracked me down and

basically invited me to become part -- I think the first engagement was the visiting committee at EECS. At least that's the part that I remember as being the most enduring and engaging. And that started a long romance with Analog Devices where I became the president of the alumni association for a period of time and I've been on the Corporation, on the executive committee, and so just last month the chair of the EECS Visiting Committee, other visiting committees--.

INTERVIEWER: The search committee for the presidency?

STATA: Yes, I was on the search for Vest, I was on the search committee there. Vest challenged me to become the campaign leader for the campaign for MIT, which just -- we raised \$2 billion. I get a lot more credit as being the chairman of that than I deserve, but I did put some hard work into it. But clearly it was very broad-based participation and Chuck Vest and the faculty just, you know, did some remarkable things to raise money.

INTERVIEWER: MIT has a pretty robust alumni association, why do you think there's such loyalty to the institution?

STATA: Well, I'm not too sure I agree with what you just said. It's all relative. Now, when I was the president of the alumni association, when I looked at the statistics I said, who's giving, how much are we giving, what percentage, what's the numbers, and now I said let's go find who are the leaders in terms of the support the alumni give to their university. It certainly wasn't MIT by a large stretch, and it turns out one of the leaders in this is Dartmouth, and so I actually visited Dartmouth, and I visited other universities, how do you do this? What's missing? One of things I found that was missing, and coming back to my 25th reunion, we surveyed the survivors of that period, classmates, and asked a question, would you, did you, or would you, how do you feel about your children going to MIT? It was remarkable the number of people who said never, never.

INTERVIEWER: Why?

STATA: Why would I want to put them through the grueling experience that I went through? It's not necessary to go through that kind of pain. Number two, a lot of them were less articulate about this point. But a lot of people, I think that's changing now but up until relatively recently, I'd say there was a -- there was enough pain inflicted during that process to where there wasn't a warm and fuzzy feeling about MIT. And we didn't have any ways of breaking through those

barriers. Now, one of the things I learned at Dartmouth, what they do is they invite the freshman to come in ten days ahead of time, they take them for a walk in the woods, literally, okay, with senior classmates and mingling, and they do an enormous amount of bonding in that starting process. At Analog -- pardon me, at MIT, when I came here and I think up until very recently, the first week was trying to find a place to sleep. I mean just an incredible, a horrendous rush trying to figure out what fraternity, what you're going to go, no, yes -- not a very pleasant experience. The other thing that Dartmouth has is a football team, right? So fifth reunion, a lot of people would come back -- we don't have a football team. So a lot of people like me never came back to the fifth reunion or the tenth reunion.

So there's a lot of patching up to do there. And I think during Vest's administration, and I think extended on now with Susan, is the whole notion of student life and learning, okay. So, all of a sudden say you know there's more to it than just these classrooms, and what are we going to do to make MIT a more enjoyable and fulfilling experience. And what are we going to do about this rush thing? What about having the freshman come in and have a place to sleep on campus to begin with. So we've now begun to go down that path, and are increasingly are finding ways of building relationships which are not so painful, and where there's fond memories, there's more fond memories than there used to be.

So, from that point of view, I think when you look at the numbers today, I think still the participation rates are not leadership, but they've certainly improved and I think they'll continue to improve. As people get along in their life and they, you know, 25 years later they're going to reflect back, a lot of alumni do, like I did, you know, come to say wow, you know MIT really had a big influence on my life. So, you know there's a debt of gratitude here that I need to think about in terms of work, wisdom and wealth and whatever combination that makes sense. And so I think later on that that loyalty that you speak to began to develop, but my senses earlier on, we have had historically more difficulty with that.

INTERVIEWER: It's interesting to me because from your description of what you learned as a student here, to find out that you really didn't maintain engagement for 25 years, that's sort of surprising, because I would expect that, but I guess the perspective of what you got out of it is a more recent perception than something you were aware of when you graduated.

STATA: Well, of course, I just finished my 50th reunion, so there was a 25- year span there where I wised up. But yeah, in the early years that was not front and center because people are starting companies and whatever, families, you know these other things, and there's not the

magic, okay, of let's go back to the football team and see all my old friends that I met walking in the woods my first ten days. So there's certain bonding there which is not as strong. I think historically we were more about heads down, you are here to learn. But we certainly don't want to lose that, that work ethic and the diligence, but at the same time I think there's ways of making the experience here a richer one across more dimensions, and we've been working on that now for a decade and I think we've made a lot of progress.

INTERVIEWER: Is that something that's a big part of your involvement here trying to change that? I guess I'm trying to -- why are you so involved, why did you become so involved?

STATA: Looking for opportunities to pay back, to make a contribution, and from that point of view, when invited to become a member of the visiting committee, I mean that's a great way for alumni to re-engage in ways in which they can really help. So I found that always to be an extremely fulfilling way to get to know the faculty, what's going on and so forth. And by the same token, the Corporation, you learn about what's going on, and I was invited to become a member of the Executive Committee, that's a more time-consuming demand, but because, again, because of my desire to not only to give back, but then you also reach a point in your life, again, a little bit later on where you're saying to what extent have I changed the world, to what extent can I change the world, and you look at MIT as a place that is changing the world. Now the extent to which you can team up in some way, some small way, and get a hold of the rope and help pull MIT along its trajectory, I've concluded, in terms of the use of my time and resources, that there's no other place in the world that society and the world is going to benefit more than MIT doing what it does better and better. So that goes beyond paying back. That goes into a realm of an understanding and a respect for the important, important role that MIT plays in the world. And as you get into it, the recognition that MIT needs a lot of help to do that. It needs the help and support of its alumni -- financially, wisdom, work -- it needs all those things. And as you get in closer touch, you come to appreciate that, and then you become more motivated to want to contribute on all those dimensions.

INTERVIEWER: How do you see MIT changing the world?

STATA: Well, it's in so many different ways. I mean it's an institute focused on science and technology. Now there are other things, you know, I mentioned humanities and those other great things about MIT, but the great thing about this place is that you know that's its core. It focuses all or most of its energies around that. And as a result of that -- and it aspires -- back to leadership - - it aspires to be the best at what it does. And it has a much better chance of doing that than a

lot of other universities that are flung out over broader boundaries. And we see that -- one dimension of leadership that MIT has taken is interdisciplinary research. They were one of the early universities to see the benefits and to develop the experience and the tradition of crossing departmental boundaries. And now a lot of others have learned from that are mimicking from that. We're now beginning to see that take place on the educational side where there are degrees that are bio computation, biological computation degrees, right, and other kinds of degrees, and I think there, MIT again is able to innovate, because they're so focused. And so we see MIT able to innovate because of the focus on what it does and to provide the model for being the best in science and engineering education. That's one part of it.

The other part is how many Nobel Prize winners have come out of this place, so how many individuals in terms of your research have in fact changed the world by what they have done through their participation here at MIT, and if not them then their students who have gone on to start companies, who have become Nobel Prize winners at other universities or leaders in other universities. So just look across so many areas and we see the mark that MIT has made, particularly in the areas of science and technology. And now we're beginning to see that immersion in the global context where MIT's ambition to contribute in a more global sense and figuring out how to do that in the best way, everybody's experimenting with that. I'm sure we'll discover that model probably sooner than most other places and that will help others to figure that out, too.

INTERVIEWER: You mentioned leadership, you've won a whole list of MIT awards and other awards, including the Founder's medal, and a lot of these are about recognizing leadership. What do you think makes a good leader?

STATA: Oh, there's so many things. But let's start with one. Certainly the ability to encapsulate a vision that in some way is purposeful and important, and then inspire others and encourage others to align with the achievement of that vision. So, the creation of the vision, however it's done, and the alignment of people behind its achievement. I mean at the end of the day that's what leaders do, and the skill sets to be able to do that is important. And part of the visioning part is being able to think strategically, to be able to canvas a lot of information and synthesize it.

But very importantly being a good listener. You can't know it all. You can only know a relatively small amount, and to the extent to which you are able to create a vision of any importance, it can only be done collectively by your ability to listen well and learn from people who are more

knowledgeable than you, and then with the help of others, synthesize that into some kind of a picture. So, certainly the ability to align and to create visions, as I said. The other is courage. Typically leadership implies that you're going to do something different and better than has been done, and so then you're into the fact that it may not work. So the farther you deviate from what is, the higher the risk profile goes up and the more courageous you have to be to undertake that. So those are important elements of leadership, too.

But I would say in terms of this ability to create alignment and get people behind a vision, that developing trustful relationships is absolutely central to leadership where people, whether they know you or not, your reputation within the organization or outside of it is being a straight-shooter, that is concerned about the issues that is of concern to you. And then also in the one-on-one situations with people you deal with more directly, to be able to get people to open up and say what they really think about you and what you're trying to do and where it could be better. It takes trustful relationships to get that. So somehow or the other you gotta develop the trust in people.

INTERVIEWER: So, tell me about the Stata Center and how that came to be.

STATA: Yeah, that's an interesting story. And it's again one of these things that you often don't know where you'll end up when you start a journey. But that journey began when I became a member of the electrical engineering computer department -- computer science department, and later as chairman. We meet every two years and a predictable part of the meeting would be an impassioned plea on the part of department leadership to please, please can we bring the computer science department, which is across the street, across the tracks, as a matter of fact, and rent a space in Technology Square. Can we please bring it together with the electrical engineering department so we're one department, because we're one of the few places in the world that claim to be one department and claim to get the benefits of the synergy of that. But how can we get that when we're living in different buildings. Please, please, please. Well, for some reason or the other that computer science building was established or Tech Square was rented 30 years ago when they started all this business with the idea that being temporary space. Well, one decade went by, another decade went by and nothing happened.

So, anyway, as I was the chairman, and I heard the story so many times, I figured out is there some way I could catalyze a change and where we would, in fact, bring these together. So, I went to the president and said how much would I have to give MIT for you to make that a

priority? And they weren't prepared for that question and I kind of caught them off base, and all of a sudden now they had to really think hard about that and the priority of that. And after some period of time they came back and said well, for this amount of money we would do it. And so I said you got it, so why don't we do it. Of course, the vision of what that would be was another square box on Vassar Street that was not very ambitious in what it would accomplish, but at least it would move the people from over there to over here, and the amount of money it took to do that was not trivial, but it was not huge. Now once we got into it and MIT made a commitment to do it and they got the department leaders involved, they said oh boy, let's think about what we could really do here. So the vision of what they could do in bringing CS to the campus became larger and larger and richer. And we ended up hiring a very imaginative architect, which is a little bit more expensive than the ordinary run of the architect. And then all of a sudden we discovered maybe we should have a parking garage and maybe we should enlarge the infrastructure facilities for future buildings. So that became a huge project, but it started with a fairly limited ambition and a commitment to that ambition and it grew into something that's very important to the campus today.

INTERVIEWER: Can you talk a little about the design?

STATA: Yes. That I remember very well. It kind of boiled down to the I.M. Pei legacy, I think the name of that company was Cobb, but anyway it was the I.M. Pei organization that had grown out of his work, and Frank Gehry, and that was the choice they were going to make. And President Vest invited me to his office and said look, we gotta decide here, and we've got this possibility, we've got that possibility, and before making a decision I'd like to have your opinion on that. And it didn't take me long to offer that in terms of MIT's about the future. And from that point of view, you know, Gehry is sort of a futuristic architect, so why not. He says, oh, thanks a lot, he says that's actually what I feel. Of course, I think he had pretty much already made up his mind on that, but it was the courtesy that he would have extended to ask my opinion. But he took a lot of flack for that. There was a lot of alumni who liked to live in square boxes, and the idea of this crazy building didn't make a lot of sense. So he took some heat for that, but at the end of the day it turned out to be a very important decision.

I had the opportunity of the faculty got involved, our architectural department got involved, and I wouldn't even begin to try to have influenced the decisions about what the architecture should be or what the building should be -- I was sort of an observer. But at least people were considerate enough to invite Marie and I to various steps in that process, to visit Gehry's

studios and to see the amazing evolution of how that thing went from a pile of blocks on his desk to creation. It was a tremendously interesting and inspiring thing to participate in.

INTERVIEWER: Now that the computer science has been brought into the fold, has that changed -- can you see any change that that makes?

STATA: In remarkable ways. It went well beyond what was envisioned to be the benefits. I'll mention a few of the things that have changed.

One of which is the current department head, Eric Grimson, decided to change the titles of his two associate department heads. They used to be associate department head for computer science, and associate department head for electrical engineering. He says no, no -- you're going to be associate department heads but without designation, because I don't want you to think that way. The other thing is you're going to have your desk, you're not going to live out there in the computer science department, your desk is going to be next to mine, because we're going to work together as a team. We're going to have faculty lunches that used to be separate here together. We're going to have search committees now, which are both sides of the department. We're going to have curriculum development that brings together people to do things that would not have otherwise been imaginable in terms of the new course materials they've developed.

And beyond that there's just every day, day-to-day life and the fact that people bump into each other and have these casual conversations that they couldn't have before. An untold benefit in terms of innovation grows out of that. So they the benefits of being next door, being integrated are much more than the arguments that were put forth as to why do it.

INTERVIEWER: A lot of what you've done either directly or indirectly has sort of been in the service of the public, and I wonder was that something that was intentionally important to you or was that just kind of a by-product of the things you got interested in?

STATA: Give me some examples.

INTERVIEWER: I'm thinking about helping to foster education in technology, or the things that you've done internationally, which we probably should talk about.

STATA: Well, it's the same thing of going back to the MHTC and the CQM experience. You see opportunities and need for the world to improve from where it is that can only be achieved by collective participation by putting your shoulder to the wheel all along with other people, and

put energy and resources into making the world a better place. And you discover your particular areas where you can add value, for example, in the case of engineering education is a place that it's not only so important to our country and to our industry, but also something I've learned about and can add value, so you look for those opportunities. And in that sense as a citizen of the country, I believe a certain amount, you know, somebody's gotta do that work or we're not going to have the country that we are so proud of. Just as somebody's gotta do that work at MIT or we're going to have the MIT about which we're so proud. So you can't say that's not my job, it's gotta be part of your job. So I think that's the orientation to look at it, and then you try to pick spots where you could have leverage or you think you could have leverage.

INTERVIEWER: So, tell me about the stuff that you've done internationally.

STATA: So, the place where I spent the most the time and effort in that regard is in India working with the Indian Institute of Technology in Madras. And through business, I got introduced to a faculty member there, and that faculty member had a vision about what he wanted to do to change that university, and ultimately through that perhaps a lot of the university structure in India, to make technology and science to be more in the service of society. That was kind of his vision. And one of the models is MIT. And one of the outcomes, we only touched on it a little bit, but, of course, one of the great outcomes at MIT is all these companies that are generated, all the entrepreneurship, and all the jobs that are created as a result of these thousands of companies. So he looked at that and looked at IIT, Madras and the other IITs and said we're not doing that, we're not having an impact on society. So he said about recruiting other faculty members from abroad to fill up his department, and they set out for that vision to create an environment for entrepreneurship, where there would be start-up companies that would come out of the university, where they would tackle the problems in society and bring technology and science the the solution of those things. He's been working at that for 25 years now and has made remarkable progress. In terms of changing that place to be more like MIT, not quite there yet, but more like MIT, and as a result of that has impacted the other IITs to be thinking similarly.

So from that point of view, again, it comes back to you've only got so many days on this earth and so you look for purposes, purposes that are meaningful and where you can get leverage. So I saw there a situation where if I could help that group realize their vision, what an impact it would have. What a good use of my time and some of my resources. So I was motivated to do

that. So, I used to travel there at least three times a year, sometimes four, I've cut that back to two, but I still go over there quite frequently. There's a bunch of spin-out companies that have come out of that experience. A lot of learning about entrepreneurship. A lot of things are being done in the villages that didn't used to be done in the villages. So it's a gratifying experience. Part of all this stuff is you look for things that makes you happy and satisfied with your life, and when you do those kind of things and you can see the impact on them, you feel good about that.

INTERVIEWER: So, we're very close to the end of the two hours, and I guess what I would like do is I'm wondering do you have any hopes or aspirations for MIT as you look toward the future, like where would you like the institution to be in 10 years or 20 years?

STATA: Well, what I see happening -- I had the opportunity to see it happening under Chuck Vest's tenure and now I see it happening under Susan Hockfield's tenure, and their leadership coupled into the tremendous faculty resources of this place, somehow they're able to keep imagining and envisioning how to make it a better place, how it adapted to the changing requirements of the time. And as I said earlier, I think MIT does that better than any other, certainly science and engineering institute, and I would venture to say better than any university, period. And so the important thing is for them to stay on that track, and for the continuous ambition of MIT to provide leadership in the world, because there's a deeply felt sense in the faculty, in the students that they want to produce, just as there was at Analog Devices, is if you're going to do something, do it right, be the best, be the leaders, because that's how you have the greatest impact and have the greatest satisfaction from your work. So, I think this drive to continue leadership, to be open to learning and not being caught by your past successes and failures is an important part of it, and I see MIT extremely responsive culturally in terms of the resources and talents to do that. Certainly one of them, we touched on that briefly, is what is the role of U.S. Universities in the global context, what is it? In the past it's been nominal. But I think in the future it's pretty clear that the places like MIT have a larger role to play and that has to be invented in such a way that it doesn't detract from what they're very good at here at home base.

I think the other thing I mentioned, but I think it's so important is back to Russ Ackoff's axiom that the performance of an organization depends much more on how the parts work together than on how they work separately. Universities have been, I would use the word, plagued -- I think at some point blessed but more recently plagued with a disciplinary silo orientation of

excellence -- I mean that's what universities were about, to build depth and excellence with disciplines. And MIT were one of the early pioneers of saying yeah, that's true, but when it comes to research it isn't just about a discipline, it's interdisciplinary, therefore, we need research centers, now we're beginning to see that happening on the educational side, but we've only just begun on that score. And I think that the part that I would hope that MIT would continue and accelerate, the model of the future university that took into account the fact that it does have to do with how the parts work together moreso than the parts. So we can't -- you know, we must maintain the excellence and the discipline and the value of the parts, but then recognize at the end of the day it's how they interact that will make the difference in the world. The problems that we face in society today are extremely complex. The problems we face in industry in terms of the products and the kind of markets that we tackle aren't as simple as they were 40 years ago when we were doing things, and it just requires large teams of people with multidisciplinary competencies and experiences that come together and learn to work together to take on these huge, humongous complex problems.

So, I think that's where MIT is headed, that's where they've always headed, and in my opinion, I think the extent to which they can accelerate the pace of learning how to think and act as one organization that goes well beyond the constraints of the disciplinary boundaries, that's where I think the success of universities in terms of how they'll impact the future will lie.

INTERVIEWER: Is there anything else we haven't talked about? STATA: Well, I'm sure there are a lot of things, but we've probably talked about enough. I would be remiss not to say that we've talked a lot about me in this conversation, but we go through life in partnerships and certainly I've had the partnership of the employees of Analog, but also I was fortunate to marry a woman who's been a partner for, how many years, 47 or something. But again, was aligned with me and with what we tried to achieve in our life, and gave me the support and the freedom and the latitude and the encouragement, okay, to work the kind of hours that I had to work and do the kind of things that I had to do, and I don't think it could have been done without that. So, I was lucky -- I found a good one.

INTERVIEWER: Make sure you tell her you said that when you go home.