SCIENCE HISTORY INSTITUTE

ROBERT P. LUCIANO

Transcript of an Interview
Conducted by

David C. Brock and Leo B. Slater

at

Madison, New Jersey

on

25 June 1999

(With Subsequent Corrections and Additions)

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ROBERT P. LUCIANO

1933 Born in New York City, New York on 9 October

Education

1954 B.B.A., in business, City College of New York
1958 J.D., University of Michigan

Professional Experience

Royall Koegel & Rogers [Rogers & Wells]
1958-1966 Senior tax associate

Ciba-Geigy Corporation
1966-1968 Attorney, CIBA Corporation
1968-1970 Assistant Secretary, CIBA Corporation
1970-1971 Assistant General Counsel and Director of Public Affairs, CIBA Pharmaceuticals
1971-1973 Vice President, Planning and Administration
1973-1975 Vice President, marketing, CIBA Pharmaceuticals
1975-1977 President, Pharmaceuticals Division

American Cyanamid Company
1977-1978 President, Lederle Laboratories Division

Schering-Plough Corporation
1978-1979 Senior Vice President, Administration
1979-1980 Executive Vice President, Pharmaceuticals
1980-1982 President and Chief Operating Officer
1982-1984 President and Chief Executive Office
1984-1986 President, Chief Executive Officer and Chairman of the Board
1986-1996 Chief Executive Officer and Chairman of the Board
1996-1998 Chairman of the Board of Directors

Honors

1988 Candlelight Award, Epilepsy Foundation of New Jersey
1989 Gold Award, *The Wall Street Transcript*
1989 Bronze Award, *Financial World's* CEO of the Decade Award Program

1989 President's Award, Graduate School and University Center of the City University of New York
1989 *New Jersey Business* "Top 10 Most Admired Executives"
1990 Distinguished Business Leaders' Award, Monmouth College
1990 Corporate Recognition Award, National Puerto Rican Coalition
1991 Alexander Hamilton Economic Award
1991 Paul L. Troast Award, New Jersey Business and Industry Association
1991 Townsend Harris Medal, Alumni Association of the City College of New York
1991 Science/Technology Medal, Research and Development Council of New Jersey
1992 Distinguished Service Award, American Liver Foundation
1992 Distinguished Citizen Award, Boy Scouts of America
1992 Hall of Fame Award, Tri-County Scholarship Fund
1992 Ireland United States Council for Commerce and Industry's Council Award for Outstanding Achievement
1992 *New Jersey Monthly* Magazine's New Jersey Business Leader of the Year Award
1992 Honorary Doctor of Humane Letters, Drew University
1993 "Freedom of the Human Spirit Award," International Center for the Disabled
1994 Baruch College Alumni Association Outstanding Achievement Award
1994 Honorary Doctor of Laws Degree, University College Dublin of the National Ireland University
1994 American Paralysis Association Special Award
1994 New Jersey Battered Women's Association, Professional Leadership Citation
1995 Baruch College Distinguished Alumnus Award

ABSTRACT

Robert Luciano begins the interview with a brief description of his early years in New York City, New York. Luciano attended New York public schools, and in sixth grade was selected to join a rapid advancement program for gifted children. After graduating from high school, Luciano attended City College of New York, receiving a bachelor's degree in business in 1954. Luciano then entered the Army, serving in the Pentagon. When he returned from military service, Luciano attended law school at the University of Michigan, earning his J.D. in 1958. Luciano returned to New York, where he practiced law for eight years. He accepted a position in Ciba Corporation's General Counsel Department in 1966. Quickly rising through the ranks at Ciba, he moved into the company's business environment. Luciano was Vice President of Marketing when Ciba and Geigy merged, and by 1975, Luciano was President of Ciba-Geigy's pharmaceuticals division. His skills as a manager helped assuage the difficulties between management and research within the company. After a year with American Cyanamid Company, Luciano joined Schering-Plough Corporation in 1978 as the Senior Vice President of Administration. Luciano sought to increase understanding in the pharmaceutical industry that cutting-edge research programs sometimes produce failure and that tolerance for failure was necessary. In the late 1970s, Schering-Plough entered the world of biotechnology, buying 13 percent of Biogen. Soon after, Biogen scientist Charles Weissmann first cloned interferon. Luciano became CEO of Schering-Plough in 1982, the same year that Schering-Plough bought DNAX, another biotechnology company. Luciano concludes the interview with thoughts on research and development at Schering-Plough, his views on government regulation, and a discussion of the future of the smaller pharmaceutical companies.

INTERVIEWERS

David C. Brock is Associate Historian at the Chemical Heritage Foundation in Philadelphia. He is currently a Ph.D. candidate in the History Department, Program in the History of Science at Princeton University. In 1995, Mr. Brock received his M.A. in the History of Science from Princeton University and in 1992, he earned a M.Sc. in the Sociology of Scientific Knowledge from the University of Edinburgh.

Leo Slater is Director of Historical Services at the Chemical Heritage Foundation in Philadelphia. A former research chemist at the Schering-Plough Research Institute, he received his doctorate in history from Princeton University in 1997.

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INTERVIEWERS: David C. Brock and Leo B. Slater

LOCATION: Madison, New Jersey

DATE: 25 June 1999

BROCK: Well, let me begin by asking you a little bit about your childhood, your family background, and your pre-college education. I understand you were born in New York or in the New York area?

LUCIANO: I was born and raised in New York City. I was an adopted son in my family. My father worked in the Department of Sanitation in New York as a truck driver. I spent virtually all of my time in the Bronx—part of the early years in Harlem. But I went to public school starting in Harlem, then back to the Bronx—public school, all through grammar school and high school, and then eventually on to City College of New York [CCNY].

BROCK: Did you have particular teachers at that time that were instrumental in your decision to go to college, or was that a family expectation for you?

LUCIANO: It wasn't a family expectation. Nobody in the family had ever gone to college. Someplace around the sixth grade, I guess it was, New York City began a program for what they considered gifted children. They went around, I don't know if all the boroughs were included, but at least in the Bronx, they went around to schools, and they collected their specimens. [laughter] They offered us an opportunity to go to what they called a "rapid advancement program" at a school in a particular section of the Bronx, which was quite a distance from my home. I was one of the people who was selected for that. As a consequence, I spent a lot of time with the same people from sixth grade through high school. We tended to go through in lock step. At the end of that period in high school, teachers just came in with a bunch of college applications. I had no thought about what I was going to do. The only thought I did have in mind was that I couldn't afford to file a college application that required a twenty-five- or fifty-dollar fee, which most of them did. CCNY's application required no fee. So I took that one and filled it out. At that time it was not open admissions as it is now. I was selected to sit for a two-day examination, and I was admitted to City College. It wasn't a particular teacher. It was the process that worked in the public schools at the time where they <u>did</u> pay attention to the group they thought had potential. They provided a lot of us with a lot of opportunities. They really did.

BROCK: How did your interests evolve at City College? What were you initially interested in studying, and then how did you become interested in law?

LUCIANO: Well, the process of elimination. I was interested in studying chemistry, but I hadn't taken enough math. So the answer was, unlike now where they give you remedial education in college, which probably is misplaced—they told me I should go to summer school and take some math. Well, there was no way I was going to summer school. That ruled out chemistry. I really didn't have any other specific interests, other than doing a task-oriented education, which I think in retrospect was a mistake. I didn't want a B.A. I wanted something that would get me a job. So I was in the business school. I majored in accounting, which I found was totally uninteresting. But I took a lot of liberal-arts courses in the process and the minimum number of accounting courses. I really had no particular desire—other than the interest in chemistry—I had no real desire to pursue any particular field. I tried all the aptitude tests, all of the interest tests, all the beautiful scientific tests that City College had to offer, but they didn't provide an answer. So it was just sort of a process of elimination and floating hither, tither and yon. I got married in my last year in college to the girl I'd been dating since junior high school. Actually, I met her in that rapid advancement class in junior high school. She happened, at the time of our marriage, to have been going to college at night and she was a secretary at a law firm by day. After college I went in the Army for two years. When I was about to get out of the Army she said, "Why don't you go to law school." I had nothing else that interested me, so I said, "Sure, why not?" No intelligent selection process here. [laughter] No plan. No grand plan.

BROCK: That's interesting. Where did that early interest in chemistry come from?

LUCIANO: You know, I don't know. But it continued even in business school. Because I took a couple of chemistry courses, and I used to do afternoon tutorials for students in chemistry. I don't know where it came from or why. It certainly persisted. I just don't know.

BROCK: Interesting. Well, in law school was there a particular field of law that captured your interest?

LUCIANO: No. I was really interested in most of them. I enjoyed most of them immensely. My wife supported me then as she supported me when I was in the Army. So I had the leisure of not working. Did work through college. But I had the leisure of not working at the law-school level. I think I liked the process, the investigation into the facts that underlie a conclusion. I think I really just sort of enjoyed that process very much. I didn't have any interest in any particular field of law. But when I graduated, I did get a job back in New York City. It was noted that I had majored in accounting as an undergraduate. Therefore, to the mind of the senior partner of the firm who was responsible for this, I was a perfect candidate to go

into the tax department. Little did he know I had no interest whatsoever—no knowledge, either, of tax law. [laughter] So I actually wound up specializing in tax law. But again, that's purely happenstance.

SLATER: Can I just move back in time?

LUCIANO: Oh, sure.

SLATER: Did you find your Army experience to be formative in any way?

LUCIANO: No. I went in the Army as a PFC [Private First Class]. It was the very end of the Korean War. The Army was trying to be very enlightened at the time and adopted modern management policies. So they gave us psychological tests, aptitude tests, interest tests, and physical tests also. I scored top grades on all of those. So then they figured they'd let the people select their assignment in order of their ranking on these various tests. So I had the first choice. I had no idea. All I knew was I didn't particularly want to go to Korea. So I selected the Pentagon. I spent two years as a PFC at the Pentagon. Did I learn anything? No. I did work in a unit, which got a lot of publicity lately, the National Agency Procurement Unit. That's where [President William Jefferson] Clinton got all those Republican dossiers in the last couple of years. I used to do that work—clearing people for access to classified information. It was modestly interesting, but there were no formative experiences involved with it.

SLATER: They have certain management styles in the military. Later we're going to come to talk about your management.

LUCIANO: No. I was a PFC. [laughter] The only management I had was, "You do this." [laughter]

BROCK: So you were practicing tax law. How did you go from there to Ciba?

LUCIANO: I practiced law in New York City for about eight years. I started with a group of six individuals. Just about the time you're up for partnership—eight- to ten-year range, more likely ten than eight—all of us sort of became itchy at the time to move on to something else. One fellow went off to work for Johnson & Johnson. Another fellow I was working with went off to work with an advertising agency that worked in pharmaceutical advertising. So I saw an ad in the newspaper from Ciba at the time. It was long before Ciba-Geigy or Novartis. I said, "What the hell, I'll send in a resume," which I did. Ciba had a law department consisting of one

person, the general counsel. As a consequence they hired me as a second person. But again, there was no grand design. I can't say it was because I was interested in that particular field or industry. I answered a few ads. I had a couple of different offers. One was a toy company on the West Coast, and the second another pharmaceutical company. I actually answered two pharmaceutical company ads. I spoke to Upjohn and Ciba. I spent some time in Kalamazoo with the general counsel of Upjohn. He probably convinced me that the pharmaceutical industry would be the more interesting, rewarding, and pleasant place to be. He was a very, very nice man, and just made an observation that you spend more time with your working colleagues than you do with your family, so you'd better like them. He said, "This industry is small enough so you're going to get to know everybody. They're basically nice people." It was an interesting point. Because it wasn't true of some of the other places I had been talking with. It's proven to be true over the years. So that's really why I accepted Ciba's offer.

BROCK: Now industry—he's describing it as small then. But it sounds like they were really doing a lot of hiring, at least expanding that way.

LUCIANO: The industry was growing. I mean the pharmaceutical industry dates to the post war period—to the late 1940s, 1950s. There were a lot of developments in the early 1960s—a lot of developments. So the industry was growing, and there was a need for people. I guess everybody was out there hiring in just about every discipline you can think of. So it was, again, fortuitous, I think.

BROCK: What was your early work there at Ciba like? What sort of things did you do?

LUCIANO: Well, with two lawyers, you can imagine we did everything. [laughter] Don't ask me why or how, I don't remember now—I became the counsel to the Agricultural Chemicals Division, but I also cleared pharmaceutical advertising work. I did product liability work in pharmaceuticals. I did some tax work, labor work. We each did whatever had to be done. There were just two of us, as I said. That proved to be fortuitous. Because in a highly regulated industry like pharmaceuticals, and even like agricultural chemicals, you get access, you get face-time with the people who are running the company. If you have something to contribute and you perform well, you have an opportunity. Really that's what happened at Ciba. I wound up in a mentoring process—not a formal mentoring process, but an ad hoc mentoring process. The man who was Chairman had come from Johnson & Johnson and had been a lawyer many, many years ago. He hadn't practiced in quite a while. He was an executive. He was Chairman of Ciba. As a result of some work I did on a plant that the Agricultural Chemicals Division was building, he concluded that my ideas would serve the company well if I were on the business end rather than the legal end. So he decided at that point, or some point along the line there, very early on, after I'd been there two years or so, that he was going to move me around and develop me as a potential successor to himself. I benefited from that enormously.

BROCK: Was that moving you from different posts in the company to see where there might be the best fit or how your talents were going?

LUCIANO: Not to see where there might be the best fit. I think he had a preconceived view of how things should develop—what sort of training you should have.

BROCK: Oh, I see.

LUCIANO: He moved me into Public Affairs. Well, he didn't move me. He just added Public Affairs to my responsibility. So I had Washington and Trenton and local communications and lobbying efforts. Then he wanted to move me into Product Management, which I resisted. In fact, I turned down the Product Management job. He made me Vice President of Administration. So I had all the administrative affairs of the company reporting to me as a first step. He believed firmly, because it was his career path, that you needed training in the marketing area. So since I had turned down the Product Management job—I'm sure he had it in mind all the time—he then made me Vice President of Marketing at some point in the early 1970s so I'd get the grounding in marketing. That was just about coincident with the time that Ciba and Geigy merged. I guess because I had administrative experience, legal experience, which was very important in the merger obviously, and I had a limited amount of marketing experience. I was the guy they asked to put the two pharmaceutical companies together. Again, no grand design or plan—a fortuitous occurrence of events. So having done that, I wound up succeeding him when he retired.

BROCK: There are two things I'd like to return to. What was the idea that you had about the plant that really captivated his attention?

LUCIANO: Oh, it was a poor business proposition from Ciba's point of view. The contract that they were negotiating just put too much leverage in the hands of the other company. Gee, it's funny now. The name even comes back to me, it was Great Lakes Chemical. It just put too much in the way of control on their side and too many of the elements of risk on our side. The contract could have been drafted and negotiated more prudently in a way that would have, if not totally balanced the scales, perhaps tipped the scales in our favor a little bit. I had some specific ideas, which I conveyed to him at his request. He asked me to make sure that the contract came out that way. That's what I did. The deal turned out to be, you know, an advantageous deal. But it's funny. I haven't thought of the name of that company in thirty years. [laughter]

BROCK: I want to jump forward again about your experience of putting those two pharmaceutical companies together. What was that like? What was the most central aspect of that complex task?

LUCIANO: Oh, the people problem. I mean, we had problems with products that overlapped that the Justice Department required us to dispose of. We had contracts overseas where certain of our competitors/associates were unhappy with the fact that they were now going to be served by the merged company rather than the company they had originally negotiated the deal with. They were all problems that had to be resolved. We had the nitty-gritty administration problems of where the headquarters are, what the name is, you know, all the little nits that you've got to deal with. But the most complex thing for the board was the people problem. Who got what job, who stayed and who went. They were the most difficult tasks—designing an organization and then slotting people into those spots. That was the most challenging part of it—so that no one appeared to be dominated by the other. Well, I was about to say that truly was a merger of equals. It really wasn't. It never is. But there was a greater degree of sensitivity, since they were two European companies, than there would have been if they were two American companies. As a matter of fact, we accomplished the merger in the United States, I believe, not only in the pharmaceutical area but in total in a much more expeditious and a much more efficient manner than they did in Europe, because there were heightened sensitivities to people positions overseas, which delayed the implementation of the merger and the benefits of the merger for quite a while.

BROCK: Did you have to handle tasks of managing that merger—putting distinct research groups together or fields of research, negotiating the merger, that aspect of the merger?

LUCIANO: Yes. Ciba had a history—I'm trying to think if it was true of Geigy also. I think it was, but Ciba, in particular, had a history of, if not hostility, a cordial détente between the research and the management side of the business. Simmering just below the surface was a lot of hostility. At some point before the merger, I was put on a committee that tried to coordinate the research programs, largely because we had one of the larger research pieces here in the United States, the major piece being in Basel [Switzerland]. But we did have to meld and coordinate the research process. But I wouldn't say that I or my people here were in control of that. It was a testy sort of give and take discussion because of this history of hostility, basically—there's no other way of describing it—that did exist. So yes, we did have to coordinate who was going to do what and who was going to run the program. But Basel largely controlled that portion of it.

BROCK: Was that an area that was—maybe partially because of the problems inherent in it—becoming more of interest to you, this management of research and development and the people doing it?

LUCIANO: Well, yes. For that reason—and because it was true then, it's true today and it will be true tomorrow—that's what makes or breaks a company in this business. Unless you have a good, well-managed research program, you're no place. It's also intellectually interesting. So yes, that became increasingly clear, and it was clear even then, I think.

BROCK: So how did it evolve that you eventually left?

LUCIANO: Well, at Ciba-Geigy, as it was then called—if you weren't Swiss, you weren't going to be in charge of the company. While we had by far the biggest and the most successful, I would say, operation, both in pharmaceuticals and agricultural chemicals here in the United States, it was a Swiss company. I met a number of people in the industry as a result of my various roles at Ciba-Geigy Pharmaceuticals. I was approached by a few. American Cyanamid had a long history in the pharmaceutical industry going back to Tetracycline. But they had come on hard times with the pharmaceutical business. They had some retirements coming up with no obvious successors. So I was approached by the man who was responsible for their life sciences, for lack of a better phrase, at the corporate level, who served on the Board of Directors of the trade organization that I served on as a representative of Ciba. He asked me if I would be interested in making the switch. I was a little frustrated at that time with Ciba-Geigy. Consensus—a Swiss hallmark—is a wonderful thing, but I don't carry it too far. The offer was better, financially, and better from a control standpoint, to my mind. That's why I left and went to Cyanamid.

BROCK: Did that entail you moving geographically?

LUCIANO: No. That's the wonderful thing about the pharmaceutical industry. It's all here in New Jersey. [laughter] I worked at three different companies out of the same house and never moved. It's not an upset to the family. I did have to drive forty miles as opposed to seven. But, as the man from Upjohn predicted, it's a nice, small, close-knit group of companies.

BROCK: Was that also the case also with your experience in the trade organization? Was that the Pharmaceutical Manufacturers Association [PMA]?

LUCIANO: Yes. Right. That was the PMA. I got an opportunity to meet an awful lot of people. That's how I got the job here at Schering [Plough]. I met the then Chairman of Schering, I met the fellow from Cyanamid, et cetera. I was very young. I guess I was one of the youngest directors that the Association ever had, along with a fellow from [Hoechst] Marion [Roussel] Pharmaceuticals. We joined the board at the same time, and we were both roughly forty-one years old. I don't know if Fred [Lyons] was younger or I was younger, but roughly

contemporaries. We were by far—they sat us at the children's table. [laughter] We were by far the youngest guys on the board.

BROCK: When was that?

LUCIANO: I think it was 1974 or so.

BROCK: What were the big issues that the industry was grappling with at the time that you would discuss there?

LUCIANO: They were largely, as they are today, political—driven by the pricing in the drug arena, which is always a tempting target, politically. It just is. Because the pharmaceutical industry makes a lot of money. There are lots of reasons why we can justify why we make a lot of money. But it keeps the demagogues unhappy, and it provides them with an opportunity to hold show hearings on the Hill [Capitol Hill]. That occupied a lot of time. There were also questions in the early to mid 1970s of productivity. There didn't seem to be a hell of a lot coming out of research pipelines at the time. While this wasn't a subject for the PMA, it was a most significant issue.

Was it true? Yes. It was true for many companies. I mean you go back there—it was true for Merck at the time. It was true for everybody. It was a productivity low. Don't have an explanation for it, but there was. That was unsettling. Then there was a lot of political pressure. Senator [Edward M.] Kennedy, Senator [Joseph] Montoya—a name I haven't thought of in a long time—held hearings. I mean, I testified at congressional hearings several times. But those were the two serious issues back in the industry at the time. And they are today.

BROCK: What were the thoughts about how to respond to the R&D productivity issue?

LUCIANO: Well, I think that was one of the reasons that I didn't find Ciba-Geigy as rewarding. Ciba-Geigy, at the time, operated largely by consensus. The consensus was derived from a group—and that's probably true of many of its counterparts, certainly true of Schering at the time, too—a group I call a little long in the tooth. There was one thing one way. I don't know if the intellectual curiosity or what got stifled, but we weren't venturing out of the bounds that we were familiar with. Ciba-Geigy was largely working, as I recall it, in anti-hypertensives and psychotropics. I mean, yes, we were a dominant force in anti-hypertensives, along with Merck, but there were other avenues to be explored. Schering had its tradition of the Prednisones and the Chlor-trimetons for allergy and the gram-negative antibiotics. They were just looking at that time for the next generation of the same class of products, which didn't take advantage of the opportunities that were presenting themselves by reason of the developments in

the scientific field. So it was a little frustrating at Ciba-Geigy, where there was a lack of control, as I said before. There was consensus, and the consensus was tilted in favor of Basel. No question about that, and perhaps appropriately so, they ran the company. It was their company. But that was a little frustrating.

BROCK: Was that something, at the time, that you were keeping on top of—developments in the academic scientific research world?

LUCIANO: Only by way of conversation, if you will, with our research people. I don't pretend to be a biologist or a chemist. But I did, for example at Lederle [Laboratories], have the people who ran their world-wide research reporting to me. At Ciba, I was on the committee that guided world-wide research. When I got here at Schering, I did have the research people reporting to me. When I came to Schering it became increasingly clear, if it wasn't already clear at the time, that you had to—that whoever ran the company had to take control of the research process or we weren't going to get anyplace. I chaired the committee that became the PRB, Pharmaceutical Research Board, which determined the priorities for the research program and monitored the progress of the research program. As I said earlier, if you were going to be successful in the field, that's the one thing you really had to run properly. So I took that responsibility myself. My successor has it today.

BROCK: What did you see as the main priorities in keeping control and managing that process? I guess what I'm trying to ask is, a couple people we've talked to have mentioned that maintaining a flow of information between people working in an industrial research and development setting and an academic research setting—maintaining that circulation has been critical to innovations, getting a big picture of where the research frontier is. Is that something that you were working with?

LUCIANO: Yes. Perhaps somewhat in a variant of what you're saying.

BROCK: Yes.

LUCIANO: One of the first things I did, at Schering, was have a meeting to review what we were doing. What we were in fact doing, as I said earlier, was spending a very small amount of money. I think our research budget was under-funded. We were spending a very small amount of money in the same areas where we had <u>always</u> spent that money, because we had a franchise to protect there. That attitude was—I don't know what it's origin was—self-reinforcing. The marketing people wanted to do it that way because they had a stake there. The research people wanted to do it that way because that's where they had made their mark and that's where they perhaps felt they had their expertise. But nobody was looking beyond that. So what we did

after replacing a lot of people is encourage—I guess it was the number-two guy in research at the time—to form little committees, let's say therapeutic areas, and go out and sit with their counterparts in academia. Let's talk about the field if it's anti-hypertensive treatments, anti-infectants and whatever, sit and talk with their counterparts in academia. Find out what the leading edge is focusing on—one man, named Frank Bullock, termed it "precursor development". What precursor events have taken place in the sciences that would likely at some point in the future, reasonably in the future—five, ten years—lead to a therapeutic solution to a problem that had a financially-attractive medical need associated with it. Frank did that. He did it extremely well, I thought. We looked at each area that we had identified and where we thought we had space and expertise, in-house, and also some commercial interest from a marketing standpoint. We took each of those areas, you know, like anti-infectants, for example, and went out and talked with academicians to find out, well, a) to validate our thoughts in the first place, and b) to try to select sub-segments of those broad categories within which we were going to focus our efforts. That took quite a bit of time. We didn't do more than four, I guess. The budget was too damn small. We concentrated the research in four therapeutic areas. I think it took Frank probably a year in each area to come up with a plan, which we as management would buy into, as to how we were going to devote our human and capital resources. It probably took about a year for each of the four therapeutic areas that we decided to go forward in. That all transpired over the 1978 to 1982-1983 time frame. It was a self-renewing process. We didn't want to change, you know, the time horizons in this business, we didn't want to change programs, if you will, every two years.

BROCK: Right.

LUCIANO: But we did want to adjust the specific target we were shooting at and refine it, say, every three years or so, while still staying within the same general parameters, to the extent, it wasn't overtaken by events. That's basically what we did.

SLATER: So if I'm hearing you right, the change to pursue new areas, to look into new possible therapeutic areas, to pursue the connections between cutting edge science and what you were all up to, really, not only had to come out of management, but it had to really be pushed through management to make it happen. You know, you had to change personnel, and so on.

LUCIANO: We changed a lot of personnel. There was a resistance, for example, of this one guy in research who once came to me when I wanted something done in particular, he said, "They won't let us do it." I said, "Who's they?" He said, "Management." I said, "Goddamn it, I'm management!" [laughter] But, it really wasn't an issue of "they wouldn't let him do it." He really didn't want to move in that direction. "They" were an excuse. We had ossified a bit, I think. We had people who made very, very valuable, significant contributions who were talented and intelligent. But they'd been doing the same thing for too long. We did have to make changes. I guess we changed—first thing we changed the head of research. But going on

down the line, I think—the heads of all but one of the disciplines were changed over a period of three or four years. We also changed a number of people on the commercial side, too. The company had been extraordinarily successful. It was facing a major patent expiration—namely, Garamycin and had nothing in the pipeline that was going to compensate for that. Everything we were doing was aimed at incrementally improving our position, which wasn't going to be enough. Because we were going to take a major hit. We did take a major hit. There had been a series, before I got here, and even while I was here the first year or so, of something called "opportunity-spending" programs. I think that's phrase that was used. We had a lot of money. We had tremendous cash flow. People were just encouraged to throw money at things. Well, you know, that's great if—well, you've got to throw money at the right things and think about how you're going to throw that money at them. That, I don't think, was being done. So, yes, there was resistance. There wasn't enough money, either. That's another thing. We were spending too little money on too many programs. So we concentrated the fields in which we wanted to operate and we expanded the dollars. We also didn't have the physical assets. We had a research facility, which was dated to, I think, the late 1930s. Guys, you know, had stuff out in the halls. Half of the experiment was being run in the hall and half in the lab. We just didn't have the physical facilities. All of that had to be recreated.

BROCK: Let's move back to when you were recruited, let's say, to go to Lederle Laboratories. Was there something about the new challenges and problems that you would face in that division that attracted you to the job? Or what was their situation?

LUCIANO: No. Their situation was not good or they wouldn't have gone outside. They had a product line that was old and getting older. They did not have anything particularly exciting in the pipeline. I went there largely because of the frustration at Ciba-Geigy and, to be frank, a better financial offer. Not much better, but a better financial officer. But they had an atmosphere that, I think, probably led to their problems. It was an atmosphere that was a "carload" atmosphere rather than a pharmaceutical atmosphere. If they could make carloads of some chemical and ship it off someplace they were thrilled. If they made money, the margins weren't the same. But the same mind set that applied to making carloads of chemicals I don't think served them as well in the pharmaceutical end of the business. I can remember the research people being terrified of management. Well, they had been non-productive and they had been getting a lot of criticism. But they hadn't been getting a lot of direction, either. I wasn't up there long enough to make a difference. But the attitude was one of—I think the research people felt depressed, if you will. I sort of became a champion for the research people. But I wasn't there long enough to make a real difference. The atmosphere of the company was too political an atmosphere. It really wasn't conducive to people working together. It was not a good environment. I did make a mistake when I jumped. But I wasn't there long enough for me either to make a contribution or to be harmed by it. [laughter]

BROCK: Soon after you got there, did you realize that's not where you wanted to be and started looking for something else?

LUCIANO: Oh, yes. I didn't really start looking. But it was clear after about six months that it was much too political an atmosphere. Now, I was treated extraordinarily well by the then-Chairman of the company, Jim Affleck. Fortuitously or not, the business did turn around. We were doing a lot better than we had been. I can't say enough about how well they treated me. But, it was not an atmosphere in which I chose to stay. I didn't go out and look actively. I was approached again by the then-Chairman of Schering, who had succession problems at Schering, and asked me if I would come to Schering with the understanding that—nothing in writing—but the understanding that if I performed, I could likely be his successor. That was good enough.

[END OF TAPE, SIDE 1]

BROCK: The metaphor of the carload or the car-full is interesting. What were the instantiations, do you think, of that carload mentality that were unsuitable?

LUCIANO: There wasn't a tolerance for leading-edge research. There wasn't the tolerance for failure. People felt that they had to produce within a short period of time or it reflected badly on their career possibilities. That's just, I think, the antithesis of what you need if you run a pharmaceutical company. I think you have to have a broad curiosity. I think you have to provide the resources. I think you have to have a high tolerance for failure—failure so long as the overall plan of a program is sound and its execution is sound. Failure happens. You don't penalize people who had a well-thought-out plan, executed it well and still blew it. That was not the mentality, I don't think, at Cyanamid. It's hard to inculcate a belief that's true. I found it very hard for people to really believe that. But I think after a time people would surely believe that that's what I really meant. But that's hard for people to buy into.

BROCK: Was there an experience in particular when you learned that lesson?

LUCIANO: No. It was the ambience, I think.

BROCK: Yes.

LUCIANO: At Schering, we had several failures of programs I bought into. But that's life. I wasn't, as I say, at Cyanamid long enough.

BROCK: Oh. I wasn't clear enough in what I was trying to say. Was there a particular experience or series of experiences that taught you the lesson of the tolerance for failure, for risk?

LUCIANO: No. I don't think that's true. It just seems to me to be the nature of the process. I don't know. I can't point to any single experience—probably just the distillation of what I had experienced over the years. I had seen programs that were well-run and programs that were not well-run. I could be highly critical of the latter but not the former.

BROCK: It's interesting. I was just reading something that Arnold [O.] Beckman wrote when he was building his instrumentation business. He would tell his research folks, "I want to see mistakes. If I don't see mistakes, if I don't see a project that failed, then I don't think you're doing it." You're not—

LUCIANO: You're not operating at the edge.

BROCK: Right.

LUCIANO: Yes. You have to expect it. That's something that I really believe, and this is a prejudice of mine. I really believe that's why none of the chemical companies ever succeeded—and I can't think of one that has—in transforming itself into a pharmaceutical company. DuPont [E.I. DuPont de Nemours and Co., Inc.] certainly didn't. Monsanto [Company] really never did. They bought Searle. Cyanamid had its moments. But all of those companies—major chemical companies, and there are others, they're just not coming to mind—never transformed, internally, into a pharmaceutical company. In the case of DuPont, for example, when they went out and bought something like Endo [Laboratories], they sure as hell didn't improve it. You can argue whether there was anything there to improve. But they didn't make a contribution. I think it's because of this mentality. You've got to spend an awful lot of money on a proposition, and you have to have a high tolerance for failure. That's sometimes uncomfortable. I'm trying to think. I just can't think of a chemical company that really transformed—in current times, not at the turn of the century—a chemical company that transformed itself, internally, into a pharmaceutical company. I think it largely hinges on that mindset to be the research process.

BROCK: That's the mindset, really, of the people who are managing the research process.

LUCIANO: Yes. The people who are managing the people who are managing the research process, even more importantly.

BROCK: You were saying that when you first came to Schering you found, you know, this over concentration in the traditional areas of research, a limited R&D budget and wants on the physical plant aspects.

LUCIANO: Right.

BROCK: What was the process like of improving the research facilities themselves? What was that experience like?

LUCIANO: Well, I became, I guess, CEO of the company four years after I got here. Once you're CEO, I mean, you can pretty much do what you'd like to do. [laughter] Since I wanted to improve—it wasn't very difficult. Just a willingness to sign checks. We got the research people to design what they wanted. We had it studied—vetted, if you will—by outside experts to see if we were building something that made sense. We went ahead and did it. It's just the time and money to do it. We have, I think now, some of the best laboratories available. If the will at the top is there, spending money is easy. [laughter] That's really not a difficult process. We're about to go through another major expansion of our research facilities. I think we have facilities that make it easier for us. You don't build the facilities to build a palace. But you build them so that you can recruit and attract people who want to work there; make it a pleasant environment for people to work. As I said earlier, you spend a lot of time with your colleagues. It's got to be a decent environment. That can't be all you have, but you've got to have that.

BROCK: That issue of recruiting and attracting the best people seems like a central aspect of what you were doing in many ways with people problems, changing people to change traditions.

LUCIANO: Yes.

BROCK: What are your thoughts about what's most important in solving these sorts of people questions or finding the best people for particular positions?

LUCIANO: You can't rise above the gray matter. So you have to have that, and that's a given. You've got to get intelligent people. It doesn't matter whether it's research or marketing. You've got to get intelligent people, people who are intellectually curious, people who know how to motivate and lead other people. The research process—the task of motivating people in the research field—is different than motivating people in the sales side of the business. The sales side is relatively straightforward. Having bonus tied to achievement is really kind of nice. Anybody can grasp that one. It requires more an intellectual esprit de corps to attract and

motivate people in the research field. I think one of the things that helped us was our early move into biotechnology, our acquisition of DNAX on the West Coast, which brought us into contact with a number of Nobel laureates and really the leading edge scientists.

I think our research people benefited tremendously from that interchange. It provided channels for us, for our research people, to attract a younger, better-caliber individual than we had in the past. Again, once you get the organization to believe in that capacity to fail, a lot of the tension, I think, disappears. I believe that. I don't know if it's true. I think a lot of the tension disappears. You couple that with the cross-fertilization they got from moving back and forth with people who were in academia. In that atmosphere, you increase the possibilities. You've got the people. You've got the facilities. You've got the cross-fertilization going. You increase the possibilities for success. Whether you succeed or not is another thing. But I think that's what occurred.

BROCK: I'd like to ask about the move into biotech. Was it in the middle 1980s that you first got involved?

LUCIANO: No. It goes back earlier than that. When I first came to Schering, the first year I was here, the fellow who was the president of research, a man named Doug [Douglas] Lawrason and I would occasionally have lunch together in the cafeteria. Schering had been active in automated screening to increase the through-put into our anti-infective screens, our antibiotic research program, and had done some pretty successful enhancements of the number of compounds we could screen. They did that in conjunction with a venture capitalist who had formed a small company and had some technology that enabled them to proceed. Our director of research was friendly to a certain extent with this individual. He had heard about several venture capitalists and several European scientists who were forming a company called Biogen. He, over lunch, started talking to me about biotechnology. After a few lunches, I became intrigued. The proposition sounded to me like one that logically had the possibility to lead to success. It seemed at the time, and still does to me, to provide new tools with which to do traditional research and to provide new methods of research with which to produce compounds. He approached the venture capitalist on our behalf and told him we might be interested in investing if we could spend some time and talk with these people.

So I spent some time talking with, I guess it was Wally [Walter] Gilbert, who was—I don't think he had a title. There was no company; that's true. So he couldn't have had a title. But Wally was one of the—I guess he was head of the Scientific Advisory Board—that was it. Wally was head of the Scientific Advisory Board—the first thing they put together. I spent some time talking to Wally and to Charles Weissmann in Switzerland and a few of the others. They were extraordinarily bright individuals who had an understanding of where they wanted to go, scientifically. They had no concept of the commercial, I don't think, no concept of the commercial applications of what they wanted to do. So they needed money. Since they needed some direction on that end of the business, we negotiated a transaction in which we purchased for eight million dollars roughly 12 or 13 percent of the company and I became a member of the

Board of Directors of the company. That's largely as a result of Doug Lawrason's ability to, at least, excite my interest in the field. So that's how we got into biotechnology. That was 1979 or so.

SLATER: The group that originally did the automation in the anti-infectives—was that isolation and purification people or fermentation people?

LUCIANO: It was automatic screening. It was automatic through-put, you know, high through-put screening. That was slightly before I got here. I think it was in like 1972 to 1974—in that range of time. They increased the number of compounds our guys could screen by several fold. I don't even remember the name of the company. But that was a collaboration that went on during the 1970s, and even it went on beyond that, I think. But I don't recall the name of the group.

BROCK: It's interesting that you were there to see Biogen develop.

LUCIANO: That was fascinating.

SLATER: One of the things that I think is interesting about Schering is, for a big firm, its very early involvement with biotech and the Biogen interaction. Twenty years on, what's the perspective? How did that perspective on that investment and that involvement change for you through those two decades?

LUCIANO: Well, early on we had no internal capability in the field. We did have a couple of guys who were extraordinarily talented who I'll come back to in a minute. But at the beginning it was very, very difficult—not only internally in Schering. One of the things I negotiated as part of that contract was not only a 12-13 percent, whatever it was, interest in the company, but a right of first refusal to three projects, as I recall it. Charles Weissmann was easy. He was working on interferon. That had all the sex appeal that one would want. Charles was and is a first class scientist, a great individual. So I grabbed that one right away. But then I had to select two other projects. Getting my own organization to give me input as to what project you want to support, that's likely to lead to a product—it was very difficult. Even getting Biogen to specify the commercial application of what they were interested in was <u>extremely</u> difficult. I wound up choosing erythropoietin, as a matter of fact, as the second project, which they failed in. I can't remember what the third one was. But obviously, it was not a success.

But there was very, very little input from either side, because it was a new field. And nobody quite knew. Everybody could see potential, but nobody could see specifics or define a market need. Trying to go from the broad, theoretical potential to a specific was very, very

difficult at the time. I do recall that quite well. A number of people thought we were crazy to do it—thought we were crazy to waste the money, anyway. But it was fascinating to go to Biogen meetings, most of which we held in Europe. There was a general direction that was dominated, I guess, by Gilbert on the one hand and Weissmann on the other hand, about where these scientists were to go as a group. But it was more of an academic orientation than a commercial orientation, in the sense that no one was really the "boss." They were working in the collaborative university academic-type atmosphere. I would sit in—I sat in on, oh, not all, but a good deal of the early scientific meetings. Not that I understood a hell of a lot, but I did sit in. Watching the interaction of the people was interesting. They were really building the science and the field at the same time. It was sort of a hit or miss proposition. Some false starts and some very promising starts, and some interesting interactions and personalities. A lot of interesting interactions and personalities. I guess, and I don't know, that that's probably true with the beginnings of any new enterprise. I don't mean new in the sense of a new hamburger company, but a new company that's scientifically oriented. It's a touch and go proposition.

But that went on for a number of years. Then around 1982 it became clear to me that what mutuality of interest we had was beginning to diverge. By then we had had the "success" of interferon. Charles was cloning and interferon got tremendous publicity. But I think that brought home to the Biogen people that, you know, there was a potential gold mine here, which, while it may have been theoretically apparent early on, became more tangibly apparent to them. So their interest and ours began to diverge. I think there was a certain resentment that Schering had access to three projects, only one of which succeeded, I might add. But there was a little resentment on their part, which is totally understandable, that perhaps putting them out to bid with other companies they could have gotten a better deal on certain of the other projects, which is the way they wanted to go. There was also a resentment that their knowledge, while it was as broad and all-encompassing as any knowledge in biotechnology was at the time, their knowledge didn't extend to manufacturing, registration, or selling, none of which, I think, they really thought were terribly important anyway. But they wanted to do their own thing. It was more difficult for us—I think it was a perfectly natural progression—it was more difficult for us to get what we wanted out of the organization.

So that's where we began to part company. We made our acquisition of DNAX, which we figured would operate in a mode that was still quasi-academic but nonetheless one in which we were the <u>only</u> commercial force that had any control, interest, et cetera. We stayed involved with Biogen for several years after that. Mr. Hugh [A.] D'Andrade became the Schering director and was involved with Biogen right up to the time, I guess, we sold our interest. We sold it at a reasonable profit and got interferon out of it. So it was a very successful investment for us overall. It also, I think, was instrumental in changing the mindset of our own internal research people. It got them more interested in outside collaborations, more interested in a new field of science. It got them contact with some of the best minds in the world. I think it enhanced their own self esteem and their own ability. So I think in many respects it was a very worthwhile event.

BROCK: Did it also open up people working on the management side of things to really see the potentials of the biotech area and the even greater level for tolerance of risk that being involved in that area brings?

LUCIANO: You see, while I operate on a premise that I want to know everything that anybody wants to tell me, I did not operate on the basis of consensus. It was my desire that we do this. And I think there was genuine buy-in. But frankly, I never asked. [laughter] If I wanted to do it, it was done. I mean, that's a wonderful thing about being CEO.

BROCK: Yes. [laughter] All my questions are phrased wrong. I should say, "What convinced you to tolerate this? [laughter]

LUCIANO: My colleagues were just saying in the Management Committee that we're six people. And the vote was five to one, but the one has it. [laughter]

SLATER: Piecing it together in my own mind, the interferon story is sort of ups and downs of its prognosis, you know. First was the early excitement, then the success of actually being able to produce this human protein. Then you have a product that's looking, you know—when they first presented it, it was the cure for the common cold.

LUCIANO: Oh, yes.

SLATER: Then it was pretty clear right away, very early on, that it was not going to be that. Then it was waiting for a therapeutic area. Did you have a moment of doubt or take any heat from, you know—

LUCIANO: Took a lot of heat.

SLATER: From some direction or another about, you know, "What is this thing, this beautiful new product we have?" I mean how did that play itself out from your side of things?

LUCIANO: The first thing that occurred was when Charles actually cloned it, we, Biogen, set up a seminar, which announced his result at MIT [Massachusetts Institute of Technology]. Our stock was selling at about twenty-seven and went up to thirty-seven. The interest was phenomenal. It was covered in *Time* magazine and the whole nine yards. It was totally blown out of proportion. Because while there were theoretical applications of the product, we hadn't

even—we made it in miniscule quantities. Getting that scaled up to the point where we could have usable material was quite a task. As I said a moment ago, we had several people who were extremely capable, among them a man named Dr. [Tattanahalli L.] Nagabhushan, who worked here in our development area. Nag worked with Charles on the scale-up. Actually, Nag deserves a lot of credit for getting that product to the point where we had sufficient quantities in pure form so we could do some clinical work with it. That was a long process. During that process, people in the financial community in particular, who had a very short time horizon, were concerned that the initial hype wasn't lived up to. Well, the initial hype could never be lived up to.

It was the same thing when we bought DNAX. I was very careful. I had learned a little bit of a lesson after that. When we bought DNAX in late 1982, I told them, "Look, don't go looking for a product out of this thing for ten years. We're buying this because we want to be a part of the intellectual processes we think will inexorably lead to products. But don't ask me what the product is, and don't bug me for ten years or so." With Biogen, with all the publicity it got, the expectations were extraordinary. Then you just don't live up to those expectations, certainly not in the time frame that people wanted. Our research people believed there were a number of clinical indications for interferon. We do have today a number of applications that are approved both in Europe and the United States, and we are still studying the bloody compound. It just takes time.

Going back to this tolerance for failure and this tolerance for investment over time, that's the same problem again that chemical companies have. If you come out with a product—I guess it was the winter of 1980 when Charles first cloned that first bit of interferon. We got a product on the market probably sometime in 1987. That was <u>fast</u>. That was very fast. Nobody in the financial community appreciated how fast and what an accomplishment that was. All they knew was that in 1984 we had zero. We were spending money at a prodigious rate because we needed a different manufacturing facility, we needed a different containment facility. We had people who were worried that the bug-that-ate-Brooklyn was going to come out of the lab. We had to have levels of containment that were fantastic. We had to build those places, mostly from scratch. We didn't have a clear, specific idea where this was going to go. We knew there were a number of theoretical possibilities it could address.

So we did take a lot of heat in the financial community. We had to get sarcastic articles. By the way, it does work on the common cold. I'm one of the few people that does believe in it. It's not a commercially-viable product because it doesn't cure the cold. I think it works as a prophylaxis. I mean, we did a few studies in Michigan early on. You know, Johnny gets a cold and brings it home. Mom and Dad get infected. Johnny always comes home from school with a cold. If you could have people sitting around with interferon in the nasal form in their medicine chest taking it at just the right time when Johnny comes home, it <u>can</u> work as a prophylaxis. I used it quite a lot. [laughter] But in any event, someone said it was the most expensive medication ever made because it was made for one customer. [laughter]

SLATER: If you divide the investment over the customer base, it's not a good investment. [laughter]

LUCIANO: You know, it led to—we've had a very substantial return on it with interferon. Interferon is still growing in sales. Our own interferon will be over a billion dollars very shortly—not this year, next year. It has been a very successful pharmaceutical agent, but took a lot longer to be so than the financial press and financial analysts wanted. Nowadays they pat themselves on the back if they had the foresight to buy the stock. But that wasn't what they were saying back in 1982 or 1983.

SLATER: You would attribute your own patience, your own faith in that to this ethic of, you know, failure is acceptable?

LUCIANO: It's not only that.

SLATER: Was this something special? I mean, it's just that I wonder about this biotechnology.

LUCIANO: I don't think that biotechnology is special in that regard. All research requires that you have to have the tolerance for failure, yes. But you also have to have the belief that if you acquire enough knowledge, just acquire knowledge, that someplace in that pile of knowledge is a kernel that's going to lead to a product. That's the same reason we made the DNAX investment. The knowledge they were amassing was tremendous. The knowledge base they had was probably unsurpassed. If you have a belief, a commitment to the idea that if you amass enough knowledge as other people, perhaps, make a development, your knowledge base is going to be applicable to that development, and yes, something's going to come of it. You ask me what's going to come of it? I don't know. I'm not even scientifically competent to tell you. But I just believe that if you amass enough first-class, technical knowledge and people to interpret that knowledge and to work with that knowledge, you put yourself in the way of the truck coming down the street. It's going to work. If you don't believe that and you haven't got the tolerance for it, okay. I happen to believe that. It's not a great intellectual process. [laughter]

BROCK: So with the parting of ways between Schering and Biogen, that was a lesson for when you were buying DNAX and bringing it inside, so to speak.

LUCIANO: Yes. We didn't part ways with Biogen before we bought DNAX. But we were gradually drifting. I don't mean to say that critically of anyone. I think that was a natural development that would occur with any group of individuals in probably almost any business

undertaking or scientific undertaking. But coincidentally, I had known Alex [Alejandro] Zaffaroni for a number of years, going back to my days at Ciba. Ciba actually eventually invested in ALZA [Pharmaceuticals] at one point in the late 1970s, after I left Ciba. But I had known Zaffaroni from that period of time. I've forgotten what it was that DNAX had accomplished. I really don't remember. DNAX had a specific accomplishment that was of interest to us. I don't know if it revolved around interferon, which was one of our preoccupations in the early 1980s, or not. But whatever it was, Alex came to see me. I wanted to negotiate with him rights to that development. I really don't remember.

SLATER: Was it early interleuken stuff, maybe?

LUCIANO: No. That came afterwards, I think. That came shortly afterwards. I honestly don't recall what it was. But I wanted to negotiate rights to it, whatever it was. We got to talking. It just seemed that we—DNAX and Schering—had a common view of where we saw the next fruitful research program in biotechnology, how we wanted to pursue it, where we wanted to pursue it. So someplace along the way of those negotiations, I proposed to Alex that we buy DNAX, but only if the Scientific Advisory Board and the people would stay associated with it. And we did. That was also regarded as a folly. I know we paid twenty-eight million dollars for it. At a joint presentation that Alex and I did in New York City at some hotel or other, some wag in the financial community said, "We used to have PE ratios, now we have Ph.D. ratios. You paid a million dollars a Ph.D. Isn't that excessive?" Well, of course, five years later, people were buying companies that weren't half as good for six and seven hundred million dollars. But at the time, people weren't very thrilled with the idea. But twenty-eight million dollars was not a big investment, frankly. It was a very productive investment. Because having access to the minds that that group had collected was just phenomenal for our scientific use. I think it's made a world of difference. Yes, they did come out with the interleukens, one of which is now in phase two or three clinical trials. But just the scientific process and the refreshment that our people got from interacting with these people, I think, was worth the twenty-eight million dollars by itself.

But that's why we made that acquisition. We realized that as long as we could keep the Scientific Advisory Board happy, interested—and we have, to the credit of our people. I mean, we really did it in a collaborative way. Yes, we own it. It's ours. We could pick up our marbles and go home. But what have you got when you do that? We had to make some compromises. They had to make some compromises. But it's been a very, very productive and amiable collaboration, where I think that most of these people now say they're genuine friends.

SLATER: I think nowadays people have knowledge and know-how as intangible assets. The question is how you want to measure those, how you want to assess them, and, you know, do you want to have them on your accounts even. But I think those kinds of ideas that you're talking about there of, "Well, yes, so we did buy twenty-eight Ph.D.'s for twenty-eight million

dollars. What's wrong with that?" It would be much more acceptable in today's financial world than it was then.

LUCIANO: It is. I don't know what changed that. But it became so probably in the late 1980s—around 1990. That's when it became more fashionable to do it. I think probably because there were so many single purpose biotechnology companies that sprang up to capitalize on a specific individual's potentially-commercial idea that really had no chance of succeeding in and of themselves that were then purchased—people could then see some tangible reward or some potentially-tangible reward more clearly. I think that's what made it more acceptable, its proliferation. I mean, this country is absolutely marvelous. One of the things people of Biogen couldn't understand—there was a predominance of European scientists in Biogen. There really was a prejudice that we should have more European commercial investors. And we looked for European commercial investors all over Europe. Americans have a willingness to put venture capital on a scientific project and wait for it to pay. That culture doesn't really exist, at least it didn't exist at the time, in Europe. I honestly don't know whether it does now. But it certainly didn't exist then. That's really what led to this biotechnology revolution in this country. Venture capitalists put money behind ideas. Then those ideas got a little bigger and bigger companies came and gobbled them up. You know, it's a marvelous process. But it really did not exist—well, it didn't exist then to the extent it exists now. And it didn't exist in Europe at all at the time. Cultural differences.

[END OF TAPE, SIDE 2]

SLATER: How did Biogen, DNAX, biotechnology on the outside of the company or at the margins of the company affect how you set up in-house research—whether that's protein chemistry or biotech or stuff inside. How did that shape what R&D was like at Schering-Plough?

LUCIANO: I think our people—I mean, by the time it really had its effect, I was beginning to phase out of that. My successor was chairing the PRB, and so on. But I think it educated our people. It gave us access to and helped to bring us a steady stream of very bright people trained contemporaneously at the university. It simultaneously refreshed our people who had been here for awhile. We have some extraordinarily good people. It brought us new tools. At the beginning, we didn't think in terms of tools. But early on in the early 1980s, we began to talk about the fact that biotechnology was not only going to produce large molecules, maybe even small molecules some day, but it was going to produce research tools. It did produce research tools. Our people again got access to the research tools, whether it was cloning, receptor sites or whatever. They adapted their processes to the new horizon that was put in front of them. I think it paid dividends many fold.

BROCK: I just had some general questions that I could ask.

LUCIANO: Go ahead. We've got about fifteen minutes, I guess.

BROCK: All right. Great. Just in the sort of grand over-arching general question: What do you see as being most important for the future of innovation in pharmaceuticals, in the pharmaceutical industry? What do you think or feel are some of the crucial elements in that?

SLATER: He really knows the answer to this, but he's not going to tell us. [laughter]

LUCIANO: No. I wish I did know the answer. I think basically the more things change, the more they remain alike. I mean if you knew where the science was going, you could answer the question very intelligently. I think, really, you simply have to be alert to what are the precursor developments in the scientific literature and in the scientific arena that are going to lead us to be able to fund scientific programs that will lead to a genuine—cure rather than an amelioration—of the vast collection of diseases that we still haven't touched. There are a whole slew that we have nice treatments to palliate but not cure. As the knowledge base grows, we're going to change. We simply have to have the same patience and funding that would go along with that—intelligence, patience, intelligent funding.

BROCK: Are there developments on the regulatory front that you find encouraging or discouraging?

LUCIANO: I have a jaundiced view of this, which I'm sure people at Schering don't agree with. I don't care whether it's Republicans or Democrats in charge in Washington. The regulatory scene has been <u>modestly</u> improved. I think it's obstructionist, at best. I don't mean in the sense that I think we should dismantle it. I mean, the law is designed to talk about either efficacy or safety of products. But I think they can be administered much, much better than they have been. While that's a very critical statement, I also have an understanding of the box we put the bureaucrat in, where he's rewarded, I guess, for staying out of trouble. He never gets praise. The only thing he gets is criticism. If they were to approve the drug too soon, they're down before a congressional committee. If they don't approve the drug, they're down before a congressional committee. So all they want to do is hide. I can understand that. I don't think it's a constructive process. And I don't think it's changed, regardless of which administration we've had—Republican or Democrat. Because the bureaucrats go on. There have been modest improvements, I guess, of late. But I don't see it as a rapidly changing or evolving era.

SLATER: One could make an argument in the case of Schering that the smaller, mid-size company can be successful in this industry. Certainly trends in the industry are towards economies of scale. Where have we come from, where are we headed? Do you have a thought on that?

LUCIANO: I've really disagreed with the financial community on that. I've been called on by everybody since probably about 1986, 1987, talking about consolidation in the industry and how it was inevitable. I don't believe that at all. If you believe that success in the business is driven by research—and I do—I don't think the large research organization necessarily has an advantage. In fact, you could make a good argument that it has an inherent disadvantage, namely its bureaucracy. A good number of the more recent developments have come from the small, one-man shops. As long as you have enough money to attract the right people to work in an appropriately-selected and limited field, I think you can be successful. If you're a Schering with a research budget that exceeds a billion dollars competing against a Merck with a research budget that exceeds two billion dollars, I don't think that means we can be half as productive as they are. I don't believe that at all. I think if we choose the right target in the programs we can compete well—yes, we can't be doing everything that they're doing, by reason of the fact that they're placing more bets that are going to have more hits. But we can hit. And we can hit big time.

I don't really believe that there's any tactical or strategic reason for consolidation. That is not necessarily the majority view. But I don't really believe there is. I think there's a lot to be said for having a more discreet research program and enterprise. Whether you'll be left alone to do that is an entirely different thing. Although, in a company like ours with an eighty-billion-dollar, seventy-billion-dollar market capitalization, it's pretty hard to do anything unfriendly. But there was always a threat in the late 1980s. There were lots of threats back then, and several aborted takeover attempts. I don't think they would have led to a more productive company from a research standpoint, or from a financial standpoint for the benefit of the shareholder. I just don't see it. I mean, you can argue all you want about the economy as a scale. If you've got a billion-dollar research budget and you can spend it wisely, that's enough scale. I mean, yes, you can do twice as much with two billion, but I don't think it's necessary.

BROCK: Those were all the questions I had. Well, thank you so much.

LUCIANO: I've enjoyed it.

BROCK: Me, too.

SLATER: Thank you.

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