



Photo by Neil A. France, 2007

JUDITH R. GOODSTEIN
(b. 1939)

INTERVIEWED BY
SARA LIPPINCOTT

September – October 2012

ARCHIVES
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California



Subject area

History of science

Abstract

An interview in six sessions, September and October 2012, with Judith R. Goodstein, university archivist emeritus.

Early education in Brooklyn, N.Y., at Erasmus Hall High School and Brooklyn College, where she majored in history and met future husband, David L. Goodstein (Caltech professor of physics and applied physics, emeritus). Both do graduate work at University of Washington; her dissertation on chemist Humphry Davy. David recruited by James Mercereau at Caltech; they leave for Pasadena, 1966.

After six months at Caltech and a year at University of Rome, they return to Caltech; she becomes institute archivist at behest of historian Daniel J. Kevles. Recalls establishment of Caltech Archives under library director Harald Ostvold; early years in basement of Millikan Library; growth of Archives; origins of rare book collection, oral history project; difficulties with library director Glenn Brudvig.

Teaching at Cal State Dominguez Hills and UCLA; dashed hopes for faculty position at Caltech; becomes faculty associate, 1982; co-teaches with Diana Kormos-Buchwald. Her

1989 appointment as Caltech registrar; divides time between Registrar's Office and Archives, which moves the following year from Millikan to new Beckman Institute. Writes *Millikan's School*, published by W. W. Norton.

Her work as registrar; on Freshman Admissions and Convocations committees; resignation as registrar in 2003. Returns full time to Archives; first digitization project in Archives; dealings with Caltech administration. Becomes archivist emeritus, 2009. Comments on current state of Archives, now back under library control. Acquisition of Max Delbrück and R. P. Feynman papers. Friendship with Feynman; her discovery of Feynman lecture on Newton's laws of planetary motion; David Goodstein's reconstruction of proof, published as *Feynman's Lost Lecture*. Her research on Italian mathematics; writing of *The Volterra Chronicles*.

Administrative information

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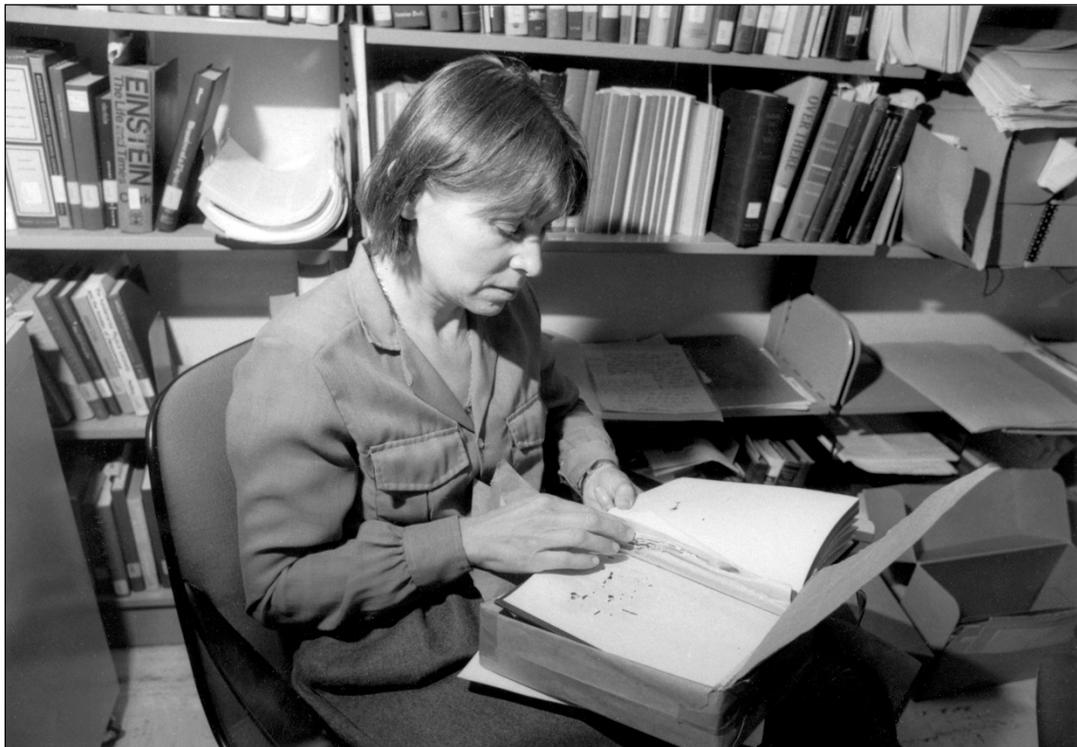
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Historian Daniel Kevles and Judy Goodstein look through a photo album, part of the Robert A. Millikan Papers, shortly after Judy's appointment as Caltech's first archivist. June 1968



Judy Goodstein examining a damaged rare book, 1986

CALIFORNIA INSTITUTE OF TECHNOLOGY ARCHIVES

ORAL HISTORY PROJECT

INTERVIEW WITH JUDITH R. GOODSTEIN

BY SARA LIPPINCOTT

PASADENA, CALIFORNIA

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CALIFORNIA INSTITUTE OF TECHNOLOGY ARCHIVES
ORAL HISTORY PROJECT

Interview with Judith R. Goodstein
Pasadena, California

by Sara Lippincott

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LIPPINCOTT: We're here in the Rare Book Room of the Archives with Judith R. Goodstein, who is the former archivist, and also former registrar, of Caltech. We're going to talk about her history with the institute, because she's got a lot of history with the institute.

Judy, before we get to that, let's talk a little bit about your family background—where you grew up.

GOODSTEIN: I was born and raised in Brooklyn—in Flatbush, on Ocean Parkway, near Prospect Park. I went to public schools, Erasmus Hall High School, and then I went to Brooklyn College.

LIPPINCOTT: And what year was that, if you don't mind saying?

GOODSTEIN: No, no, no. [Laughter] I was born in 1939. First, I went to P.S. 130, which was a couple of blocks from my house. Then I went to Montauk Junior High School, in Borough Park. That was a bus ride away, or a long walk. And then I went to Erasmus Hall, on Flatbush Avenue, which I think is one of the oldest high schools in the country.

LIPPINCOTT: And has a very good reputation.

GOODSTEIN: It had a very good reputation. Famous for people like Barbra Streisand and the chess player—

LIPPINCOTT: Bobby Fischer?

GOODSTEIN: Bobby Fischer. Probably others, too. And then I went to Brooklyn College. I entered Brooklyn College in January of 1956. I became impatient in high school. I made a fateful decision. Most of my friends took chemistry, and for some reason I decided I didn't want to take chemistry. I had to figure out what should I do instead of chemistry, so I took Spanish in my junior year of high school. And then I took a foolish course for me, because I am not artistic. I took ceramics. [Laughter]

LIPPINCOTT: Well, you're a historian of science, but I guess that at that point you weren't interested in the history of science.

GOODSTEIN: No, definitely not. I was only interested in getting out of high school, which I didn't enjoy. Why didn't I enjoy it? Because there were a lot of cliques, and lots of teacher's pets, and a lot of competition to get into the special English class, the special math class, the special history class. At a certain point, I was put into some of the special classes, the more advanced classes. I had a difficult time with plane geometry. This was probably my first math class in high school, and the teacher, whose name was Mrs. Altschul, announced—without any inquiries on our part, she volunteered—that there were tutors for \$5 an hour, \$10 an hour, \$15 an hour, in case we had problems. I had never heard such a speech before. And, remember, we had Regents Exams in New York State.

LIPPINCOTT: And what were those for, to get—?

GOODSTEIN: If you were on the academic track, which I certainly was, I think they were required. You had no choice. And there was a disconnect in my case, for example, between how I did in plane geometry in class, my grade on the report card, and how I did on that particular Regents Exam—in fact, on all the Regents Exams. The point was to cream those exams. You

weren't in good standing with your clique if you didn't get close to 100. So I'm pretty sure I got close to 100 in everything.

LIPPINCOTT: Were your parents academics, or intellectuals?

GOODSTEIN: My parents were both born in New York. Their parents had come from the Old World—on my mother's side, from that portion of Poland and/or Russia where the borders changed a lot. And my father's mother had come from some part of the old Austro-Hungarian Empire.

LIPPINCOTT: What was your maiden name?

GOODSTEIN: My maiden name was Koral, which probably was shortened. My father never really talked about his family, because when he married my mother, his mother, who was divorced, was very unhappy, because he had been living at home and he was one of the principal breadwinners in the family. She was losing a breadwinner. So they locked him out. He eloped with my mother.

LIPPINCOTT: He was living where?

GOODSTEIN: I think my father was living in the Bronx. My mother was living in Brooklyn, in Williamsburg. She was four years older than my father. They met when they were both working for the city. Somebody introduced them. My mother worked for the courts and my father worked for the Sanitation Department.

LIPPINCOTT: And they eloped?

GOODSTEIN: They eloped, yes.

LIPPINCOTT: What did your father do for the Sanitation Department?

GOODSTEIN: He was probably in accounting. He went to City College—CCNY—at night and graduated with a degree in mathematics. My mother went to Brooklyn College. Brooklyn College, when it first started, was on Court Street in downtown Brooklyn. I went to the suburban campus, because in 1938 Brooklyn College moved from downtown Brooklyn to the Midwood district, where it is now.

LIPPINCOTT: So they were both well educated.

GOODSTEIN: They were both well educated—going to college was a given. My mother in particular had very strong views about what her daughters should do. I was the oldest of three girls, each of us separated by six years. And my mother decided I should be a public school teacher, a thought that drove me up the wall.

LIPPINCOTT: I'll bet.

GOODSTEIN: You know, when I was in high school it wasn't articulated all that explicitly—what my future was to be. But anyway, it turned out that I could graduate six months earlier than my friends, so I entered Brooklyn College at sixteen. When I graduated in December four years later, I was twenty, because my twenty-first birthday was July 8th, 1960.

LIPPINCOTT: You didn't know David [Judith's husband, David L. Goodstein, professor of physics and applied physics, emeritus] at this point?

GOODSTEIN: Not when I entered. I met David in Brooklyn College, because both of us were in student government. David was much more into student government than I was. Brooklyn College had lots of clubs, and you met people by joining clubs or house plans. Or, if you were into such things, sororities and fraternities. I was not into a sorority, so I joined a house plan. And I also joined the Bio-Med Society, because a friend of mine belonged—I went to a meeting with her and it looked OK. But I wasn't a biologist, and I didn't plan to major in biology. They found a job for me; they sent me as a representative of the Bio-Med Society to the student government—the student parliament, so to speak. That was in my sophomore year, and I was put on the Awards committee. You couldn't be a senior and be on that committee, because that

was the committee that gave out the awards to the seniors. So I was put on that committee, and one of the other sophomores was David. I think he represented his fraternity—or all the fraternities, I don't remember—because he was in a fraternity. So we met. Several years later, someone who was active in the student government at Brooklyn College told me she had planned it. She figured the two of us would meet and hit it off, so she said. Whether that's true or not, I don't know.

LIPPINCOTT: Now, David was living with his family?

GOODSTEIN: David's family also lived in Brooklyn. He lived, actually, in Midwood, so he could walk to Brooklyn College. I took a bus there, and later my father bought me a car, so I would drive. But David walked. And David's parents—David's mother was born in the U.S.; she was one of many children. And David's father was an only child. David's paternal grandmother died young; he never met her. David's grandfather managed property in Warsaw, Poland, and when David's father was twenty-one, he and his father came to this country—David's father and David's grandfather. And they didn't come steerage; they weren't all that poor. I think David's father had pink-eye and was turned back at Ellis Island, but somebody told him what you do to disguise the fact that you have pink-eye, and they were admitted.

LIPPINCOTT: How did they disguise—?

GOODSTEIN: I don't know. I'll have to check with David. It's a family story.

LIPPINCOTT: We should say, just for the record here, that David Goodstein figures in this oral history because he is a professor of physics and also was Caltech's vice provost for many years [1988-2007]. As a matter of fact, there's an oral history with him.

GOODSTEIN: Yes. So that's the story of David's father. David's father learned to speak English perfectly when he lived in New York, by going to plays and sitting in the first or second row. David's mother had a head for numbers. She did not go to college—I think she worked for a jeweler. David's father was a traveling salesman. He was assisted in getting a start on life in this country by a wealthy family. In acknowledgment of that, David's father and grandfather

took the name Goodstein. The family name is not Goodstein; the family name was Sklar, and they changed it to honor their patron, a family in Pennsylvania.

LIPPINCOTT: OK, now let's get to Brooklyn College. When you were a sophomore, did you have to choose a major?

GOODSTEIN: Oh, yes. But the first six months— You see, I came in January. There were requirements. You know, the usual English and a math requirement, and I had stopped in high school with algebra. So I had to take advanced algebra in Brooklyn College, and I enjoyed it, and I did well.

LIPPINCOTT: What about calculus?

GOODSTEIN: The next course would have been calculus, and I thought, "Gee, if I've done well in advanced algebra, I probably could handle calculus." But I had the summer to think about it, and I got cold feet by the end of the summer. I didn't take any more math. I think, in retrospect, I should have taken the calculus. And I didn't take physics, either, or chemistry, obviously, or biology. We had a choice of sciences, and I took geology.

LIPPINCOTT: That was your science requirement?

GOODSTEIN: That was my science requirement. It was OK, but nothing very thrilling, and it involved a tremendous amount of memorization of rocks. You looked at rocks and you had to remember their names, and after a while all the rocks looked alike to me.

LIPPINCOTT: [Laughter] OK. Well, moving right along.

GOODSTEIN: I chose history as a major because my mother had been a history major. And my mother kept saying, once I was in college, "You will be a teacher. You will be a teacher." I kept turning a deaf ear to all that.

LIPPINCOTT: Didn't you take some physics at Brooklyn College? I think I remember your saying something about that.

GOODSTEIN: In graduate school.

LIPPINCOTT: Oh, in graduate school, OK. How about David? He was a physics major, obviously.

GOODSTEIN: David was a physics major. So by the time I was a senior, it struck me that if we were going to spend the rest of our lives together, it would be good for me to have some way I could approach him intellectually. David seemed to have a low opinion of historians—or history—at that time. I think he was like many physics majors. He wasn't yet a physicist, he was a physics major, but he had the arrogance that many physicists have—that there was nothing better than physics and that's what the smartest people did. And he was definitely smart.

LIPPINCOTT: You were both in the same class?

GOODSTEIN: Well, David was six months behind me. David entered in September of 1956, and I had already been there for six months. I entered in January of '56.

LIPPINCOTT: Right, so you graduated ahead of him?

GOODSTEIN: And, of course, to satisfy my mother, I took eight units of education courses. I crammed them in, and they were a breeze. I got an A in all of them without half trying. There was a desperate need for teachers in the New York City school system in the 1950s, so with eight units you could get an emergency license, if you then agreed to take an education course at night. To do all this, you had to take an exam—a competitive examination to become a teacher. So in my senior year I took the competitive examination to become a junior high school or high school teacher. It was partly written, and then there was an oral exam. You had to go before a board of examiners and they asked you questions: "If you're in a social-studies class, how would you teach about the Mexican-American War?" Very detailed questions. You had to stand there and

answer extemporaneously. Well, I guess I got through it, because I passed. When I graduated, there was no ceremony.

LIPPINCOTT: This would have been in January 1960.

GOODSTEIN: Yes, and one week later I had a job as a teacher in a junior high school—of all things, the same junior high school that I had gone to, Montauk Junior High School.

LIPPINCOTT: Where's that?

GOODSTEIN: In Borough Park, in what is now a very Orthodox Jewish neighborhood. At that time, it wasn't. It had an older Jewish population.

LIPPINCOTT: But not Hasidic?

GOODSTEIN: Not Hasidic, that I remember. It had also a lively Italian community. I did this because I was living at home and there would have been no peace in the family.

LIPPINCOTT: Were you and David engaged by this time?

GOODSTEIN: Yes. We'd become engaged in November of 1959. That was a very practical move on my part as well, since we had at that point agreed that we would each apply to the same set of graduate schools.

LIPPINCOTT: What were those?

GOODSTEIN: Well, to back up for one minute: I decided in my senior year, my last term, that I would take a course in the history of science. It turned out that Brooklyn College had a distinguished historian of mathematics named Carl Boyer. He was a professor of mathematics, and his passion was the history of mathematics. He had written at least one, maybe more, books. He'd written a book called *The Rainbow: From Myth to Mathematics*. And he was offering a graduate course to teachers who taught mathematics in the city schools; they would get in-

service credit for taking such a course. I remember going to him at registration and introducing myself and telling him that I would be interested in taking his course. He said, “Oh, that’s wonderful!” I was the only undergraduate. Most of the other people in the class were teachers already and they were tired, because they used to come at the end of their teaching day—they were exhausted. And here was little me sitting there. Carl would lecture, and you had to write a paper, which I did, and he gave me an A. And he also wrote letters of recommendation for me.

LIPPINCOTT: For graduate school?

GOODSTEIN: For graduate school. So, where did we apply? Well, David was thinking about Purdue University. Places not in New York, that was for sure—we wanted to leave. But not very far away; David wasn’t thinking of very far away.

LIPPINCOTT: Why Purdue for physics?

GOODSTEIN: I have no idea.

LIPPINCOTT: Harvard might have been the place.

GOODSTEIN: I don’t think David thought along those lines. He had good physics professors; maybe one or two of them had suggested Purdue. Purdue is a big engineering school.

LIPPINCOTT: Yes.

GOODSTEIN: I don’t know. There must have been a couple of others.

LIPPINCOTT: Was solid-state physics his concentration?

GOODSTEIN: No. David thought he was going to be a theoretical physicist, because every physicist then thought he was going to be the next Einstein, or something like that. I don’t know if it was said that way, but I do remember David saying to me, “I want to be a theoretical physicist.”

LIPPINCOTT: An elementary-particle physicist?

GOODSTEIN: I don't know. I didn't know any physics then—none.

But I asked Carl Boyer where I should apply, and he told me I should apply to the University of Washington. At the time, the journal of the history of science, *Isis*, was located there, because Harry Woolf was teaching there and he was the editor of *Isis*. So that would be a good place to go. That was good advice.

LIPPINCOTT: This is in Seattle?

GOODSTEIN: Yes, in Seattle. I told David, “I think we should apply to Washington.” So we both applied to Washington, and then I applied to some strange places, like Russell Sage—oh, because David also applied to Rensselaer Polytech, so I applied to Russell Sage. And then we waited to see what kind of money offers we would get, because it was a given that we weren't going to pay tuition. Who could afford tuition? David got offers from every place he applied to. I only got an offer from Russell Sage, and the University of Washington made me an alternate for a teaching assistantship. I don't think I was a spectacular undergrad; I had an ordinary record as an undergraduate. Oh, and at the last moment I got a telegram from Indiana University, from Norwood Russell Hanson, a historian and philosopher of science, who said, “Oh, you must come to Indiana.” So I must have applied to Indiana. And Hanson said, “You must come!” He flew planes, and he later crashed and died [in 1967]. He was very keen to get me there.

Anyway, David said, “Fine, let's go the University of Washington.” That was great with me. It was not great with our parents, who took it personally.

LIPPINCOTT: Well, it's so far away.

GOODSTEIN: Yes. And we got married. I taught until June 30th—that was my last day of teaching—and then we got married. And I had relatives at the wedding who said, “Oh, you're going to Washington, is that DC?” It was fairly uncommon to go across the country in 1960, and Seattle was a hick town then—before the World's Fair.

LIPPINCOTT: .How did you get across the country?

GOODSTEIN: We drove in David's car. David had acquired a car, because he had a job throughout high school selling shoes at National Shoe. His father had ended up as a shoe salesman at National Shoe, in various stores in Brooklyn. So David went to work as a shoe salesman while he was still in high school—Brooklyn Tech. In college he also worked. That's where his spending money came from.

LIPPINCOTT: Did he get a scholarship from the Physics Department at Washington?

GOODSTEIN: He did. He got a teaching assistantship. I only got an alternate. So we went—

LIPPINCOTT: What is an alternate?

GOODSTEIN: If somebody dropped out, I would get it. But no one ever dropped out.

LIPPINCOTT: Were you going for a master's or a doctorate there?

GOODSTEIN: I must have been a doctoral candidate, because I did not sign up for a master's program. A master's program was for one year, and in many cases it was a consolation prize—even at Washington—for those who couldn't pass their exams or didn't do well in graduate school. I didn't want a master's degree.

As soon as we got to Seattle, David went to work at the fancy shoe store in Seattle, Nordstrom's. [Laughter] Because we had time; we got there at the end of July. It took a month to drive across the country, and school didn't start until September.

LIPPINCOTT: A month?

GOODSTEIN: Well, we drove slowly. We stopped at all the national parks—Yellowstone, Glacier.

LIPPINCOTT: The interstates weren't really laid out by then.

GOODSTEIN: No. We ran out of gas once. We ran out of gas because I was collecting Blue Chip Stamps, and I told David to keep driving until we came to a gas station that— OK, I got over things like that. I went to look up the professor, Harry Woolf, and he hired me as a research assistant.

LIPPINCOTT: On *Isis*?

GOODSTEIN: Well, it wasn't clear. He must have had funds, and he asked me to look up various people and give him reports on various people, so that was really my first taste of doing some research. As a history major at Brooklyn, I had had to write many term papers, and I never enjoyed writing those term papers.

LIPPINCOTT: Did you have a favorite period in the history of science?

GOODSTEIN: I had a favorite professor at Brooklyn. I took several courses from John Hope Franklin; he was my favorite professor. Did I have a favorite professor at graduate school? I liked Gordon Griffiths. Harry Woolf didn't last very long for us. He left to go to India the second term we were in Washington, and he never came back. He went to Johns Hopkins, and *Isis* moved along with him. But while Harry was there, he said I should audit Griffiths' undergraduate course in the history of science, which I did. I just sat there and listened.

LIPPINCOTT: That was a survey?

GOODSTEIN: It was a survey course, and he had lecture notes all carefully typed out, with some jokes. He used to just stand there and read his lectures, tell his jokes. It was a big lecture class. The kids seemed to like it—at least, everyone looked up to him.

Griffiths' specialty was the rise of democracy in the Netherlands in the 1500s.

LIPPINCOTT: That's a bit arcane, isn't it?

GOODSTEIN: Well, he did Reformation and Renaissance history.

LIPPINCOTT: Of science?

GOODSTEIN: No. I was a history major, and the history of science was just one part of it. I had to take three or four fields to qualify for a PhD in history. So I took the Renaissance and the Reformation with Griffiths, and I had to take a three-day written exam. I took Tudor England with F. J. Levy—he was a young professor. I took the philosophy of science with a nice fellow, and I also had a three-day exam from him. And the history of science. I think those were all the fields in which I had to take course work and write papers.

LIPPINCOTT: What about your physics course?

GOODSTEIN: I decided to sign up for physics because I felt so guilty—I felt that if I wanted to be a historian of science, I should do something like this. But it was a bad idea, as an entering grad student, in addition to doing all the courses you had to take, like historiography and other courses, which I don't remember.

LIPPINCOTT: Physics 101?

GOODSTEIN: Physics 101. And it came with a lab.

LIPPINCOTT: It was an undergraduate course?

GOODSTEIN: Yes, definitely an undergraduate course. Big lecture hall. I did OK, but it was a lot of work, because it was a totally foreign language to me.

LIPPINCOTT: Also, you didn't have calculus.

GOODSTEIN: Well, this was the non-calculus-based physics course. There was a physics course for physics majors, and that was calculus-based.

LIPPINCOTT: So this was pulleys and ladders?

GOODSTEIN: Yes. There was a whole quarter on light. I loved light. And waves. And particles. I did very well on that. The first quarter, of course, was mechanics. I have no idea what the third quarter was.

LIPPINCOTT: But you didn't have any quantum at all?

GOODSTEIN: I don't think so. No, there was no quantum. A famous physicist taught one of the quarters—Seth Neddermeyer. He was a very befuddled and confused professor, and I learned, years later, why. I think he already had Alzheimer's—something like that. He would walk into class, and he had this big curly mop of white hair, and he would scratch his head. He would have a box there, and he'd push a button, and something would pop out, and he would try to explain to us what it was, why it popped out. I didn't get anything out of the term, but he was a sweet guy. Only years later did I discover, as an archivist, just how important a physicist he was, and that he had been a student here at Caltech—a student of Carl Anderson's. Then I read a lot about Seth Neddermeyer and what he did at Los Alamos, and why he's important. But he was a confused professor.

Some of the other physics professors I had were very good. I don't remember their names, but they were very clear. When they were clear, I did well. When they were not clear, I didn't do well. I don't think I asked David for any help.

LIPPINCOTT: Was David encouraging, or did he regard this as laughable—your getting into physics?

GOODSTEIN: Oh, I think he thought it was a good idea. I don't think David understood how hard it was for someone who was definitely in the humanities, and who had left mathematics and that kind of thinking long ago, to suddenly plunge back into it. They did use trig and logarithms, I'm pretty sure. It was all Greek to me, whereas I had been a whiz at all of those things in high school.

The lab was interesting. The lab was taught by Henry Ho, who couldn't speak a word of English. He thought he was speaking English, but he was not speaking English, he was speaking Korean English. I felt sorry for Henry, because he'd go over and over something, and I would look at him completely befuddled. But on the labs, I would ask David, "What are we really

trying to do in this lab?” and once David explained it to me, then I could go in. I liked taking the equipment and doing what they call the lab analysis, the errors. My errors were sometimes high, and then I would re-do it, and I got it within what’s acceptable, and I wrote little reports. That was fun.

Then I did something even more stupid: I took freshman calculus. That was a big mistake. I had no time for the course, because I was taking graduate work in history. I don’t know what I was thinking. In the first term, I did OK, because I paid attention and went to class. Then I signed up but I didn’t go to class and I didn’t drop the class. I was a bit of a mess about that.

LIPPINCOTT: So you wound up with an F or something?

GOODSTEIN: Yes, I think. Or a C, or a D. I never petitioned to late-drop—all the things I learned when I became registrar at Caltech. Later I had a lot of empathy for the kids who did similar things, because I understood that their heads had been someplace else.

But I did well in graduate school on the history courses. I had many advisors, because they came and they went. After Harry, we had a loser, a real loser. His name was [Peter J.] Vorzimmer, and I knew he was a fake, even though he had a PhD in the history of science.

LIPPINCOTT: How could you tell he was bogus?

GOODSTEIN: I didn’t take any courses from him, but I think I may have been sitting in on one of his classes, I don’t remember the details. I’m sorry; I have blocked a lot of this. He wanted me to be a babysitter for his family. He had a kid or two, and I looked at him like, “Come again?” [Laughter] I was doing research already on my thesis. I must have been writing a paper. Anyway, I was in one of the libraries, and he came into the library room and in front of everybody, at the top of his voice, he says, “You are never going to get a PhD, never! You’re not going to babysit for my kids? I’m going to see to it that you never graduate.”

LIPPINCOTT: Oh, my goodness!

GOODSTEIN: And then he stormed out.

LIPPINCOTT: Was he nuts?

GOODSTEIN: He was probably a male chauvinist pig. I think he thought that because I was a female I was available to babysit.

LIPPINCOTT: What did you do?

GOODSTEIN: I think I went and spoke to somebody. But by then Vorzimmer had already done himself in, because he was teaching a course on television—you know, sunrise lessons on the history of science. And one of the historians in the department watched the program and said, “This guy is a fake.” And they never gave him tenure; they fired him at the end of the year.

LIPPINCOTT: That’s interesting.

GOODSTEIN: It was interesting. The next one was a professor from abroad, named Satish Kapoor. He was a high Brahmin Indian who had been educated in England, a little fellow who spoke beautiful British English. His field was the history of chemistry, and he was married to a wonderful Englishwoman who stood many heads above him. It turned out that they lived in the same apartment house we did. And this is where I started to become a historian of science, under Kapoor. I took graduate work from him, seminars, and David used to come, too. And Kapoor was delighted to have a physics graduate student in his seminar. David wrote papers, too. So that was good.

LIPPINCOTT: Was it Kapoor who suggested your thesis?

GOODSTEIN: Yes. He suggested Sir Humphry Davy.

LIPPINCOTT: But Humphry Davy is hardly obscure.

GOODSTEIN: He’s hardly obscure. But it turns out that it was a very good thesis topic, because it wasn’t a biography, it was intellectual history. Kapoor did intellectual history. He did what they used to call, in those days, history from the neck up. You didn’t think about the rest of the

body—you know, what people's lives were like, their social history. That didn't really exist. This is the time of [Thomas] Kuhn's book, *The Structure of Scientific Revolutions*, and that's really what the historians of science of my generation thought about.

LIPPINCOTT: So you were looking for paradigm shifts?

GOODSTEIN: Yes, but without trying to use that word too much. I wrote a paper, and Kapoor said, "It's terrible." He said, "You've got to go read." There were six published volumes of Humphry Davy's writings, and all of his papers in the *Philosophical Transactions of the Royal Society*. So then I started reading—essentially late-eighteenth, early-nineteenth-century chemistry—and I began to become a historian of that kind of chemistry. If Humphry Davy had resurrected himself, I could have had an interesting conversation with him about why he did certain experiments, and what was he looking to prove, what was he looking for? And I decided what he was looking for, based on the evidence in his papers and in his notes. I was able to get manuscript material on microfilm from the Royal Institution, where he had been a professor; they have a lot of Davy's papers, so I got these reels of microfilm to read. Davy believed not in the atomic theory that John Dalton had proposed; Davy believed that there was some underlying principle that would explain why metals are metals, why acids are acids. It's really the splitting of the atom, if you take it to the end of the nineteenth century.

LIPPINCOTT: That's what Rutherford was doing—

GOODSTEIN: Before that. It's J. J. Thompson, at the end of the nineteenth century, who discovers the electron. I believe that Davy was looking for some element like the electron, a subatomic particle. I float that; that's what my thesis is about. It's an intellectual thesis.

LIPPINCOTT: What was the title, do you remember, just for the record?

GOODSTEIN: The title was "Chemical Theory and the Nature of Matter." I never published it, though.

LIPPINCOTT: When did you get your PhD?

GOODSTEIN: Unfortunately, Kapoor also went off the deep end. He had some mental instability, and I heard at one point that on a trip to New York City he ended up in Bellevue for observation.

LIPPINCOTT: When was this, in relation to your time at Washington?

GOODSTEIN: It was between '63 and '64. I already had a thesis topic, but Kapoor was not there to administer the exam for me in the history of science.

LIPPINCOTT: Because he had mental trouble?

GOODSTEIN: He had mental trouble, and they had let him go. A colleague of mine, a contemporary of mine, in the graduate history-of-science program—nice fellow, by the name of Paul Spitzer—graded my papers in the history of science, and I passed. I passed all my exams, so I had everything but the dissertation by, say, the beginning of 1965. I had written several chapters, but I had no advisor. Then the university hired a young, talented historian of science from Cornell, Thomas Hankins, who became by default my thesis advisor. I was definitely his first PhD student. He saw me through the dissertation.

David and I left Washington in the late summer of 1966. David got his PhD in 1965, I believe, and he stayed on as a postdoc because I was still working on my thesis.

LIPPINCOTT: When you left, you came to Caltech?

GOODSTEIN: We came to Caltech. David had applied for jobs and had three offers. He had an offer from the University of Florida, I believe—or wherever alligators are.

LIPPINCOTT: Well, you know, that's where P. A. M. Dirac ended up. He was in Tallahassee [Florida State University], I think. You never think of Dirac being there, but he apparently enjoyed it very much.

GOODSTEIN: There you go! But all I could think of was alligators or crocodiles. And then David had an offer from Bell Labs. He made the mistake of telling the family, and they kept

saying, “Of course, you’ll take Bell Labs. It’s close.” And David said, “I’m not interested in going to Bell Labs.”

LIPPINCOTT: Was that in New Jersey?

GOODSTEIN: Murray Hill, New Jersey. Bell Labs, which was really flourishing then.

LIPPINCOTT: By this time David was a solid-state physicist?

GOODSTEIN: David tells this story in his oral history, I’m pretty sure—but if he doesn’t, I’ll tell it briefly. When we got to the University of Washington, David met the physicist who would become his advisor. His name was Greg Dash—Jay Gregory Dash. He was fairly new at Washington. He was about ten years older than we were, and he had come from Los Alamos—maybe he was a little older than that.

LIPPINCOTT: Was he at Los Alamos when Oppenheimer—?

GOODSTEIN: No, he was at Los Alamos after the war. He got his PhD at Columbia. He just died, a year or so ago [November 28, 2010—ed.]. He was looking for graduate students, because he was setting up a lab. He hadn’t been at Washington all that long, and he wanted David to be his graduate student, so there must have been some reception for all the incoming graduate students in physics—first-year graduate students, who had teaching assistantships—to meet the professors, and David tells the story about how Greg started talking to him, telling him about low-temperature physics. Because that’s what Greg was, a low-temperature physicist—

LIPPINCOTT: And that’s what they called solid-state in those days?

GOODSTEIN: I don’t know. Today, it’s become condensed-matter physics. Low-temperature physics, David told me many times, was on the way out. It had done everything it needed to do, and it was no longer physics at the frontier. But David’s story is that Greg locked the door and wouldn’t let him out of the office until David agreed to become his graduate student. And so David became an experimentalist.

LIPPINCOTT: Because of this?

GOODSTEIN: Because of this. In Greg's lab. Greg Dash, at a certain point, invited me to give a talk to his group. They had the low-temperature-physics seminar weekly, and that was my first talk. I already understood what you have to do to become a good historian. I wouldn't say I was one yet, but I understood. I went and did my research, and not too much had been done yet in the history of low-temperature physics. So I wrote a very nice paper and I delivered it to the group. They always used to take the speaker out to dinner, and they took me and my spouse out to dinner.

LIPPINCOTT: OK. So, we're getting to Caltech.

GOODSTEIN: Yes, we're getting to Caltech. We left Washington in August of 1966. We drove, and we put our few belongings in the car. Oh, we had Marcia by then. Marcia was born in February—February 27th, 1965. I got pregnant after I took my qualifying exams.

LIPPINCOTT: So you had an infant in the car?

GOODSTEIN: She was eighteen months then. The three of us drove down to Pasadena in the old Studebaker Lark.

LIPPINCOTT: Now, tell me— Well, I guess this is in David's oral history, but—

GOODSTEIN: I'll tell you how he got the job. I don't remember whether he told you.

LIPPINCOTT: Tell me, and then maybe we'll take a break after that.

GOODSTEIN: By the way, it was easy to find jobs in 1965 and '66. Jobs in higher education; it was an expanding universe—lots of opportunities.

LIPPINCOTT: Not the way it is now. In the sciences?

GOODSTEIN: In the history of sciences it was relatively easy to get a job, too.

LIPPINCOTT: Did you have any offers at that point?

GOODSTEIN: No, because I hadn't finished my dissertation. I wrote it under Hankins, but I didn't finish. I was slow. When we left Seattle at the end of August, I had written four chapters, and the rest I was going to complete when we got down here. I was not going to look for a job. I forgot to tell you that Harry Woolf had written a very nice letter of recommendation for me before he left to go to India, and I had a three-year fellowship while I was at the University of Washington—from the NDEA, the National Defense Education Act, which was to encourage people to go into higher education, to become professors. I had a couple of part-time jobs, but basically that was my source of funding. I ended up paying tuition the first year, because I was so keen to vote for John F. Kennedy, who was running in 1960, that I voted, and when the university asked me on a form, "Where did you vote?" I said I voted by absentee ballot in New York State. So they said, "Well, you're not a resident of Washington yet." So I had to pay out-of-state resident fees for the first year. After that, I qualified.

So anyway, Greg Dash got a letter from Jim [James E.] Mercereau, who had just gone to Caltech and was looking for a postdoc. He was a low-temperature physicist, and he did a very important piece of research on something called SQUID [Superconducting Quantum Interference Device]. [Richard P.] Feynman talks about it—Feynman was friends with Jim Mercereau because of the work Mercereau had done on SQUIDs.

Anyway, Greg told David, "Look, I have this letter from Jim Mercereau at Caltech. That might be a good place for you." Greg wrote to Mercereau recommending David, and Mercereau invited David down to give a talk. David went and he also gave a talk at UC San Diego. He practiced at UC San Diego, and then he went to Caltech and gave the talk. Maybe it says something about Caltech at the time—that when David got off the plane at the airport, he was met by Jim Mercereau, and Mercereau said to him, "Would you mind if we go to Dick [Richard P.] Feynman's favorite eatery?"

LIPPINCOTT: I think I've heard this story.

GOODSTEIN: David says, "Sure." So off they went, and it was this topless place in town [Gianonni's, in Altadena—ed.]. David is sitting there, and Feynman is doodling on a napkin. And David is thinking, "They're never going to believe this when I get back to Washington."

After lunch at the topless place, they went to the campus, and David gave his talk, and he got an invitation to come as a postdoc. So that was it. I wouldn't say that our families understood that.

David became a star at Washington in the Physics Department as a result of that invitation. I'm not saying that he hadn't been well thought of—he had been well thought of. Greg thought highly of him. David was a very accomplished speaker, even then. He was a very accomplished writer, even then. All of that. He was very polished and poised. But then he became a star. They had placed one of their students. The Physics Department at Washington was on the rise then, and it's been rising ever since. The History Department was also on the rise. We were invited to all of the faculty parties after that. It was wonderful meeting these people—

LIPPINCOTT: Caltech was considered pretty much the summit?

GOODSTEIN: Yes, it was the be-all and end-all. You'd arrived. This was Nirvana.

LIPPINCOTT: With Feynman and [Murray] Gell-Mann both here.

GOODSTEIN: And David had met Feynman. He knew Feynman!

So we came down here, and, you know, we had this problem, because David had also applied for an NSF [National Science Foundation] postdoc, which you could take anywhere. We had a friend at the University of Washington Physics Department named Bill McCormick who had spent two years in Italy as a postdoc, and he said to us, "Oh, you must go to Rome if you get a postdoc. Put down 'Rome'." So David put down "Rome," and he got the postdoc there. See, everything came up roses at the same time. David said, "Well, we can't go to Rome. We have to go to Caltech," and I said, "No, you can't just give that up. C'mon!" So David wrote to Mercereau and explained the situation, and Mercereau said, "Whatever is good for you is good for Caltech."

LIPPINCOTT: Wow!

GOODSTEIN: Right! That became sort of the mantra in our family—sort of a running joke. So it was agreed that David would come to Caltech for six months as a postdoc and then he would go to Rome for a year.

LIPPINCOTT: The University of Rome?

GOODSTEIN: Yes, to the University of Rome. And it was understood, but it was formalized while we were away, that David would come back as an assistant professor. He would not come back as a postdoc.

LIPPINCOTT: You, of course, would go to Rome, too?

GOODSTEIN: [Laughter] Of course.

So, in Pasadena my job was to finish my thesis. But, remember, I had taught for six months in a junior high school. A postdoc's salary wasn't all that much money, after you paid the rent, so I did substitute work in the junior high schools and high schools of Pasadena. And it turned out that I was a good person for them, because I would accept any assignment Monday through Wednesday, and that would leave me free on Thursday and Friday to do my writing. By substituting three days, I paid for the baby sitter for five days—I brought Marcia to a baby sitter in Pasadena. Only if they had a real emergency would I do Thursday and/or Friday. It worked out very well: I worked for three days and wrote for two days. I would send my chapters to Hankins and he would mark them up and send them back. But I have to say I didn't quite finish. I was supposed to finish it up in Rome. I had it all written; I just had to do the edits. Well, it sat in a drawer in a cupboard in Rome for the whole year, because Rome was too intoxicating.

LIPPINCOTT: I'll bet! This may be a good time to stop. We'll touch a little next time on Rome, and then we'll get to Caltech itself.

GOODSTEIN: OK.

[Recording ends]

JUDITH R. GOODSTEIN**SESSION 2****September 25, 2012**

LIPPINCOTT: We got you to Caltech last time. We were going to speak about Rome first. Let's do that, because David went there after six months at Caltech.

GOODSTEIN: While he was at Caltech, he volunteered—he didn't have to do this—he volunteered to be a TA [teaching assistant] in Physics 2, the sophomore physics course, and Gerry Neugebauer was the lecturer. It was traditionally taught from eleven to twelve, and then they would all go over to the cafeteria. And quite often Feynman would go, because Feynman had reinvented that course and he was interested to see how it was coming along. That's really how David got to know Feynman.

LIPPINCOTT: Feynman had given those lectures in recent years.

GOODSTEIN: That's right. He had given it for a couple of years.

LIPPINCOTT: And they became *The Feynman Lectures on Physics*.¹ So David was a TA in Physics 2 in 201 East Bridge [Norman Bridge Laboratory of Physics], the famous lecture hall.

GOODSTEIN: Now called the Richard Feynman Lecture Hall.

LIPPINCOTT: Oh, is it? And he got to know Richard Feynman in the Greasy at lunch?

GOODSTEIN: Yes, they called it the Greasy, and it truly was greasy then.

During that fall quarter of '66, Feynman got a letter from the University of Chicago inviting him to come and give a public lecture around the time we were due to leave for Rome. He told David, and he said, "I can't think of anything to lecture about." I'm sure David tells this

¹ Richard P. Feynman, Robert B. Leighton, & Matthew Sands, *The Feynman Lectures on Physics* (Reading, MA: Addison Wesley, 1963).

story; it's probably in *Feynman's Lost Lecture*.² I think all these stories are in *Feynman's Lost Lecture*.

LIPPINCOTT: I think it's in David's oral history, but go ahead.

GOODSTEIN: David said, "No, I think you care a lot, passionately, about teaching and education," and Feynman finally said, "OK, OK, I'll do it on one condition—that you come with me." Feynman bought him the airline ticket, which for us was a big deal, because we weren't really very rich. So that meant that David didn't have to spend as much to fly to New York and on to Rome.

I stayed behind. I wasn't invited to Chicago, and I was going to meet David a few days later in New York. I went to say goodbye to David in his office, which at that time was in the basement of [Alfred P.] Sloan [Laboratory of Mathematics and Physics]. It was a miserable office, at the end of a hallway, and you could hear all the motors, or engines, in the building. It was a very noisy office. Feynman was there, all dressed up. I had never seen him dressed up. He looks at me and says, "Don't worry, I'll take good care of your husband. He won't get into any trouble." And I didn't understand, then, what he was talking about. It was only later that I found out that Feynman was a famous womanizer, and then I understood. [Laughter] He wasn't going to take David down the same path.

LIPPINCOTT: So David went to Chicago with Feynman. That's where—

GOODSTEIN: They read the Jim Watson manuscript.

LIPPINCOTT: *The Double Helix*.³

GOODSTEIN: Yes. Jim [James D.] Watson was at this symposium, or whatever it was, going on in Chicago, and Feynman and David had breakfast with him one morning, and at the breakfast he

² David L. Goodstein & Judith R. Goodstein, *Feynman's Lost Lecture: The Motion of Planets Around the Sun* (New York: W. W. Norton, 1996).

³ James D. Watson, *The Double Helix* (New York: Atheneum, 1968).

gave a copy of the manuscript to Feynman and begged him to read it. The original title was *Honest Jim*.

So, Feynman gave his talk. There was a big reception in his honor afterward at the Quadrangle Club, and David went downstairs—probably it was at the cocktail hour. They shared a suite at the Quadrangle Club. There was no Feynman, so David was dispatched to go find Feynman. So David goes back upstairs to their suite, and he finds Feynman reading Watson’s manuscript. Feynman says, “I can’t put it down. I have to read it.” David says, “Come on. You can finish it afterward.” Reluctantly, Feynman puts it down. They go downstairs. Feynman leaves early to finish reading the manuscript, and David goes back upstairs later—much later, around one o’clock in the morning. Feynman’s still up and he says to David, “You have to read this too.” And David says, “Sure, I look forward to it.” “No,” says Feynman, “I mean right now.” And he did.

They were in Chicago for four days, and that’s also when David met Valentine Telegdi. Lia, Val’s wife, was famous for her gourmet cooking, and Val invited Feynman to dinner—they were good friends—so David was invited too. It was stuffed pheasant. Someone had caught the pheasant and Lia had plucked the feathers and prepared it. David told me all about this charming couple, this funny Hungarian who told jokes and Lia, who was a great cook. I thought, Gee, it would be nice someday to meet them. Well, of course, we did get to meet them. They became good friends.

LIPPINCOTT: OK. Let’s get to Rome. David flew to New York from Chicago, and you joined him there and you both flew to Rome.

GOODSTEIN: Yes. In Rome, we were taken in tow by the graduate students of Giorgio Careri, a professor of low-temperature physics at the University of Rome, who had agreed to take David as a postdoc. These graduate students were very simpatico, and they took me around Rome and to the quarter they thought we should live in, to look for a furnished apartment. We knew no Italian. We had taken a few lessons in Pasadena from an Italian couple who assured us that it was simple to learn Italian. You’d hear it, and somehow by magic you could speak it. None of that was true.

We stayed in a *pensione* for a week, and then we moved into our neighborhood, which was a very lovely neighborhood—on Piazza Crati, within walking distance of a huge public park

that used to belong to the King of Italy called Villa Ada. It was an area of Rome that was developed by Mussolini in the 1930s for middle-class families. We lived in a magnificent apartment on the top floor. It was a penthouse, and it had a huge balcony.

Here we were introduced immediately to the Italian customs, by the landlord. There were two contracts. The first contract was for a very modest amount of money. We were to sign that. Then he produced the real contract, which was for 90,000 *lire* a month. He was going to pay tax on the first contract. He wasn't embarrassed by it. [Laughter] I think one of the grad students was with us when we signed both contracts, and he must have explained it to us. His English was pretty good.

One of the first things David had to decide when he went into the lab—they all talked about it—was, “What language shall we use in the lab? Shall we use Italian or English?” They said, “Well, we would prefer Italian”—David says they were lazy. So David started learning Italian. We quickly understood that we needed to take serious lessons. Both of us signed up for courses at Dante Alighieri, in downtown Rome, in Piazza Firenze.

LIPPINCOTT: Is that like a *lycée*, or high school?

GOODSTEIN: It's an organization whose mission is to teach Italian to the barbarians. It was very well done. It still operates there. We signed up for the introductory course, and the common language was Italian. Everyone in the class came from a different part of the world: There was the wife of a Turkish Embassy official; people from South America; young, middle-aged, and old. We bought a little textbook, we had a wonderful instructor, but everything was done in Italian. When there was a coffee break, there was a little place you could go have espresso and cappuccino across the street, if you wanted to talk with someone. We all struggled to say, “My name is..., I live in....” That was fun. I stopped after the first set of lectures. David continued. I should have continued, too.

LIPPINCOTT: But you're pretty fluent now, aren't you?

GOODSTEIN: Now, but that's over many years. David and I developed different language skills in Italian. I learned how to shop for food in Italian, because we lived on a piazza, and every morning there was an open market. You could buy your vegetables and your cheeses and your

meats and your fish on Tuesday and Friday. I had to find out what it meant—the numbers that were written there. Was it by the *etto*, or was it by the kilo? I had to learn all the names of all these food items—which I did. To this day, I probably know all the food items better than David. I had to learn how you ask for something politely. As opposed to saying “I want...,” which is crude, you should say, “I would like....” An educated Italian would say, “I would like....”

LIPPINCOTT: So, you said you put your thesis in a drawer?

GOODSTEIN: But I rented a typewriter. The NSF money was adequate for us. We were paying a lot for our apartment. And we bought a car—we bought a Fiat.

LIPPINCOTT: That was David’s NSF?

GOODSTEIN: Yes, that was David’s NSF, and I think there was a supplement for a wife and child.

LIPPINCOTT: And you bought a Fiat?

GOODSTEIN: We bought a Fiat, of course, which we picked up there. There was some scheme whereby you could buy it in this country and pick it up in Europe and not pay taxes. And then you shipped it back home, which we did. We borrowed the money from the Caltech Credit Union. They never understood why I wouldn’t give them the ownership—the title. The title was part of the Italian license. [Laughter] I couldn’t give it to them. No matter how many letters I wrote, they kept getting angrier and angrier in their letters back. They finally said “We’re never going to do this again!”

Anyway, I used to walk around. I walked around the neighborhoods. We registered Marcia in a Montessori school, which was right around the corner—a very fancy little Montessori school, in a small house, that took kids at two years old, Marcia’s age. But first, they studied her. Before the principal would say that she’d accept Marcia, she watched her interact with the other little kids her age. The principal was a tall woman, and she used to bend down and peer through the keyhole of the classroom to see how Marcia was doing.

LIPPINCOTT: Were these Italian kids?

GOODSTEIN: All Italian. The first week, the principal had me sit in the classroom. The furniture was all child-size, so I was sitting on a chair made for a two- or three-year-old, and the tables were that way, too. After a week, she said, “You leave Marcia and go home, and let’s see how it works out.” Finally, she said yes.

LIPPINCOTT: Was Marcia speaking a little Italian?

GOODSTEIN: No, but she picked up on it pretty quickly. She definitely started speaking some Italian in school, but she never spoke it at home. At home, it was only English. One day, some months later, she said to David, “My hand hurts.” David looked at it, and it turns out that it had been infected, so that was an experience we had with the doctor. But Marcia gets to the school, and they open the door, and we walk in, and Marcia immediately puts out her little hand to the teacher and says, “*Fa male*,” which means “It hurts.” That was when we discovered that she could speak Italian—that she was bilingual.

We had to pay tuition of course. It was about three or four weeks before she became fully matriculated in the Montessori school for two-year-olds. [Laughter] Since I wanted her in there all day, we paid for the morning and the afternoon. There were little cots; they would put them to bed in the afternoon, to take a nap. They served them a full-course Italian lunch with silverware and china. Oh, they trained them well—they were raising them to be proper little Italian children. Marcia never came home with dirty clothes, unlike in this country. And it was winter, so there was a supplement for heat; the principal, who rented the space, had to pay a supplement for heat in the winter. In the summer, she ran a summer camp for one month, so Marcia went off to summer camp as a two-and-a-half-year-old, and David and I went to Venice and Trieste. Yes, that was quite nice.

So David worked in the lab. I went around, had a good time. Met a few people.

LIPPINCOTT: Did you meet the Scaramuzzis on that trip?

GOODSTEIN: Only Franco [Francesco] Scaramuzzi. He was a bachelor then, a dyed-in-the-wool bachelor.

LIPPINCOTT: And a low-temperature physicist.

GOODSTEIN: Yes. But he worked in Frascati, at the National Laboratory.

LIPPINCOTT: Still does, doesn't he?

GOODSTEIN: No, they've retired him. He's eighty-five.

LIPPINCOTT: But he was there for a long time?

GOODSTEIN: Yes. At a certain point, David met Franco, who used to come to the seminars, I guess. Anyway, he and Franco took a liking to each other and they discussed mutually interesting physics problems. Then David decided to do an experiment with Franco, up there in Frascati, with Franco's group. That's the beginning of the friendship. So when Thanksgiving came—it was already almost the end of our stay—I put on a Thanksgiving dinner for us, which was not trivial. I had to go find a turkey. Oh, well, around the corner was a butcher, and he had freshly slaughtered turkey; I ordered my turkey from him. There was one American supermarket, in the Parioli area, which still caters to American expats, and I could get canned cranberry sauce there. Anyway, I made a Thanksgiving, and I invited Franco. He liked Thanksgiving a lot.

Also there were a couple of other times when Franco came to Rome and David brought Franco home, and I was making dinner so we invited Franco to join us. You have to understand, I was experimenting that whole year with Italian cooking. There was a restaurant downstairs in the basement, and once a week we ate in that restaurant, because we could afford to eat in a restaurant once a week. None of the menus were typed; they were all hand-written. We ate there until we felt comfortable ordering in Italian in other restaurants. We were embarrassed to open our mouths and make fools of ourselves.

So I invited Franco to have some sauce I had cooked up. He was very kind. He said it was good—who knows? He laughed. You know why he laughed? The first bottle of olive oil I bought in Rome was about six ounces—a very small bottle, because that's what we were used to in this country. Franco laughed, and said, “Oh, in the lab, we buy it by the liter, five liters at a time.”

We didn't meet the Mrs., his wife-to-be, until we came back two years later. By that time, we had Mark, who was a little terror. And she met us, and I know she looked at little Mark and was probably thinking, "I will never have a child like that." [Laughter]

We made a lot of friends, some of whom are still our friends. There was a couple that had just come back from the States, Andrea and Maria Piera Frova. He came back as a professor of physics at Rome. They're Italian, about our age. They had grown up in the North; I think she graduated from the University of Pavia, and he had, too. We went exploring on weekends with them. They had two little girls, about Marcia's age, and we went all over the Lazio, the region that Rome is in. You can go quite far in the Lazio. We went far, up to Viterbo. We went to all the Etruscan sites. I was fascinated by the Etruscans. We went south. We went to Sabaudia—that's an area that Mussolini reclaimed from the marshes, in the 1930s. We had a lot of fun with them, and we still see them.

It was a very successful year. I registered to be a substitute teacher at the American Overseas School in Rome, which still exists; it's a lovely school, with kids of foreign dignitaries and businessmen.

LIPPINCOTT: Is this a preparatory school?

GOODSTEIN: It's a high school, and probably elementary and junior high. They said they could use me as the year wore on, when teachers got tired. So, ironically, they started calling me a lot toward the end of our stay. And it was very nice, because there were buses that picked up kids from all over Rome and took them to the school, which is on the outskirts, in the suburbs, on the Via Cassia. But the bus in my district of Piazza Crati stopped right at the corner, so I never had to drive there. David had the car, if he was going to go to Frascati, or if he needed it. So I would drop Marcia off at the Montessori school, and then I would hop on the bus to go to the American School, and while they didn't pay a lot, it included lunch, a serious Italian lunch, for all the teachers.

LIPPINCOTT: What did you teach?

GOODSTEIN: Whatever they needed, as a substitute—could have been history, English, math, it didn't matter. They needed a warm body in the classroom. And the kids were very nice. The

teachers were very nice, too. It was a nice environment, very low key, and they didn't expect anything of me. They were sad to see me go.

LIPPINCOTT: Were you feeling nervous about your thesis at all, at this point?

GOODSTEIN: Only David was. [Laughter]

LIPPINCOTT: You had, what, just one chapter to do and to polish up?

GOODSTEIN: Yes, it was polishing and editing. And writing a conclusion. I think that's all I had to do. I was not inspired.

LIPPINCOTT: Had you heard anything from the University of Washington about it? Or were you left to do it on your own?

GOODSTEIN: I was on my own. I heard, somehow, that there was an opening for a historian, maybe a historian of science, at Cal State Fullerton. When you're sitting in Rome and you look at a map of California, Fullerton looks like it's right next to Pasadena. David was very keen for me to write to them. I think I did write to them, eventually. I wasn't so keen on it—I don't remember why. Maybe I was just nervous about writing to them. I think I wrote and they may have said it had been filled—I don't recall. But on the way home we stopped in London, because I wanted to visit the Royal Institution, where Humphry Davy had spent some years and had done many of his experiments. It turns out that an American historian of science who worked on Davy a lot was in residence. His name was Robert Siegfried; he was at the University of Wisconsin. I met him because the people at the Royal Institution said, "Oh, your colleague is here from Wisconsin." I'd never met him before that.

I wasn't a very aggressive graduate student in writing to people who were working in my area. The first time I did it, I wrote to a Professor June Fullmer, at Ohio State. She's now deceased, but she was very active then, and her topic was Davy and his contemporaries. So I wrote an innocent letter saying I was working on a dissertation, this was my approach, my advisors suggested we get in touch. She wrote back six pages—six pages!—telling me why I should not work on Davy and why I should work on somebody else. Somebody named [William

Hyde] Wollaston, who was one of Davy’s contemporaries. I was so put off by this—that she had gone to such lengths to tell me, “Stay out of my backyard”—that I decided not to write to Siegfried.

LIPPINCOTT: Or maybe she thought that Wollaston was underrepresented in academe.

GOODSTEIN: Maybe. I never met her directly.

OK, so I met Bob, and he and his wife were quite charming, and they took us out to dinner. They took us to a very nice restaurant on a boat, on the Thames. He showed me around—he showed me the Faraday cage, *the* Faraday cage.

LIPPINCOTT: What’s that?

GOODSTEIN: A big contraption, used in conducting electricity. Then we flew home to Pasadena. While we were in Rome, David got the letter he was waiting for, saying, as Mercereau had promised, that he had been appointed an assistant professor.

LIPPINCOTT: You arrived back in February ’68?

GOODSTEIN: Yes. Now I got serious about looking for a job. I must have written to the director of the library, Harald Ostvold. He had come to Caltech to be the director of libraries, including Millikan Library.

LIPPINCOTT: The Archives didn’t exist at this point?

GOODSTEIN: No. The Archives, when I came back from Rome in 1968, consisted of a room in the basement of Millikan, unlocked, in which stuff was dumped. That was it. A lot of bundles, brown bags tied with string, and moldy brown-paper shopping bags.

LIPPINCOTT: No one was really in charge of this material?

GOODSTEIN: Not exactly. Dan [Daniel J.] Kevles, who came here as a young assistant professor in I think 1964, had been consulting them even before that, when he was finishing up his thesis—which later became *The Physicists*.⁴ The authorities at Caltech had given him permission to use the [George Ellery] Hale and [Robert A.] Millikan papers.

LIPPINCOTT: And these were now all in this basement?

GOODSTEIN: Yes, unlocked. In April 1966, the Hale papers were organized and cataloged under Dan's direction, after the papers were transferred from the Santa Barbara Street office of the Carnegie Institution. That's because Evelina had died around this time. She lived to be a very old woman, well into her nineties. Hale died in '38; Evelina, his widow, lived on and on. After she died, Hale's heirs placed his personal papers in Caltech's custody. Shelley [Charlotte Erwin, head of the Caltech Archives and Special Collections] will have all that documentation, if it matters. But when I came on the scene, these two collections were sitting in that room, door unlocked, and anyone could waltz in. Anyway, after I was hired, the first thing I did was lock the door.

LIPPINCOTT: You were hired by the library?

GOODSTEIN: I was hired by Kevles.

LIPPINCOTT: To do what?

GOODSTEIN: Well, I had written to Ostvold to ask if he had any jobs for a budding historian of science. He wrote back and said there were none. He was definitely not interested in me. Then I must have made an appointment to see Kevles.

LIPPINCOTT: How did you get to know Dan?

⁴ Daniel J. Kevles, *The Physicists: The History of a Scientific Community in Modern America*. (New York: Alfred J. Knopf, 1978).

GOODSTEIN: I made an appointment to see him. I introduced myself. Back when I first came here, in 1966, I had made some inquiries. But Dan was away that year, doing research, so he was not in residence. At that time, I met Dana Roth, the chemistry librarian. I borrowed all of the volumes of the collected works of Sir Humphry Davy, and some of them were at Santa Barbara Street. I think I borrowed them from there.

LIPPINCOTT: At the Carnegie Institution?

GOODSTEIN: Yes, because Hale was a great book collector in the history of science.

LIPPINCOTT: So these were Hale's books?

GOODSTEIN: I'm not sure. But I met Dana Roth because, on the open shelves of the chemistry library, which at that time was in Gates [Laboratory of Chemistry], there was a very early edition of Lavoisier, which I needed for my thesis. I couldn't believe that a book from the eighteenth century was on the shelf, but it tells you something about Caltech in those days. I introduced myself to Dana. He said, "Sure, you can check it out." I don't think he even asked for an ID.

LIPPINCOTT: Oh, my!

GOODSTEIN: A lot of rare books got stolen in the next decade, because all these books got discovered by people who would wander in. They had no security. Kind of sad.

LIPPINCOTT: Anyway, you wrote to Ostvold and he wasn't interested, and then you applied to Dan?

GOODSTEIN: I also made an appointment to go talk to—shows you how naïve I was about how things work in the academic world—I made an appointment to go speak with the chair of the Humanities and Social Sciences Division, Hallett Smith. I asked him if there were any jobs—just like that.

LIPPINCOTT: Oh, why not?

GOODSTEIN: I know, but that's not how it's done. But I didn't know any better. Anyway, he said, "No." So then I went to Dan. Dan was interested in me, because he had just learned that the [Theodore] von Kármán estate had been settled and the papers of von Kármán, which were in 103 cartons, or something of that magnitude, were coming to Caltech. Dan was appalled, because everyone knew that he had been in charge of organizing the Hale and Millikan papers. He, for sure, was not interested in tackling the von Kármán papers; he had no interest in von Kármán. See, Hale and Millikan were part of his thesis and part of his book—but not von Kármán.

So Dan said to me, "I might have something." Then he described, essentially, an archivist position. Unfortunately, it was to be part of the library; it was not a faculty position. He offered me a sum of money that was so low that I said to him, "No, it's too little. I can't work for that."

LIPPINCOTT: You said that to Dan? Well, good for you.

GOODSTEIN: Well, it didn't get too much better. Dan went through the process. He went to Lee DuBridge [Caltech president 1946-1969], and that's in the DuBridge papers. You can read about Dan talking to him about this young historian of science who was finishing her dissertation on something or other and would be well suited to organize this collection and do other things.

LIPPINCOTT: So did Dan bring up with DuBridge at that point the idea of having an Archives?

GOODSTEIN: Yes. And DuBridge liked the idea. I don't think DuBridge saw it quite the way it's developed. Rodman Paul, a senior professor in the humanities division and a distinguished historian of the west, had his own ideas of what an archivist should do. I only discovered that later, from reading papers in the Archives.

LIPPINCOTT: Do you know whether Rodman Paul had talked to DuBridge about establishing the Archives?

GOODSTEIN: I don't know. It's always possible that DuBridge spoke to Rodman Paul. But it was such a small sum of money, and this was really the end of the DuBridge era.

LIPPINCOTT: He'd be gone in '69.

GOODSTEIN: I think Dan asked him for \$6,000, which is not a lot of money.

LIPPINCOTT: Was that to pay you? And only to pay you, not to—?

GOODSTEIN: There was no talk of anybody else. It was just that—a desk in the basement of Millikan, and it was a staff appointment. Then either Dan or DuBridge informed Harald Ostvold that he was going to have a new member of his staff—me. It all happened very quickly. I started work on April 1st, I believe. April 1st of 1968.

We had come back in February, and I was really working on the dissertation. I found a nursery school for Marcia right across from Poly [Polytechnic School]. I put her in there after one week. That was the end of her Italian, by the way, because when she went to school she started chatting in Italian to these little American kids, who made fun of her. That was the end. She cut it off, just like that.

LIPPINCOTT: Does she speak it now?

GOODSTEIN: Oh, she speaks it beautifully. But, remember, she studied there when she was a junior in college, and we spent every summer in Rome as well.

LIPPINCOTT: So you had this dismal room in the basement of Millikan?

GOODSTEIN: I had the one room where the materials were and a little room next door, where they used to have microfilm. When you wanted to read microfilm, you came to this little room. It was a dim, grungy, grim little room, next to the photocopying. There was a hallway outside. There were no windows.

LIPPINCOTT: That was to be your office?

GOODSTEIN: Yes. I was there for twenty years.

LIPPINCOTT: From '68 to '88?

GOODSTEIN: Yes. When this building [the Beckman Institute, which now houses the Caltech Archives] opened up, I was one of the first tenants.

LIPPINCOTT: Beckman. That would be in the mid-eighties [the Beckman Institute opened in 1989—ed.]. Up until this new, wonderful Archives was built—?

GOODSTEIN: I built the Archives down there. Harald Ostvold was a gentleman, and we hit it off. He had a very low-key way of managing everybody. He was disenchanted with Caltech, because they had promised him the moon. He had come from New York City; he was the chief of the Reference Department at the 42nd Street Library in New York. He was a big deal when he came out here [1963]. In 1967, when Millikan opened, he supervised the move. The physics and math library, I believe, used to be in East Bridge. Millikan Library was supposed to be the big beginning of a great library for Caltech, which had been talked about since the twenties.

[Laughter]

LIPPINCOTT: He was to establish it and direct it?

GOODSTEIN: Yes. He was the director of Millikan Library—well, the director of the institute libraries. I believe that was his official title.

LIPPINCOTT: So his bailiwick included the physics library?

GOODSTEIN: Physics, geology. They were all dispersed. They had many branch libraries when we first came here. But now you had this new edifice—Millikan Library, nine stories. Apparently, Ostvold organized it. People were checking out books the same day they were moving the books from Bridge. It was a big story at the time. I was not part of any of that, I just read about it. It was very successful. And then he became disenchanted, because of a bequest that came through which included a lot of money for the library. Harold Brown, who took over as president of Caltech from DuBridge, said, “Over my dead body will the library get that money.”

LIPPINCOTT: Legally it would be the library's, wouldn't it?

GOODSTEIN: Well, this is a private institution, so you tell me.

LIPPINCOTT: If it's left by someone in their will, didn't that have the force of law?

GOODSTEIN: Apparently not.

LIPPINCOTT: Not where Harold Brown was concerned.

GOODSTEIN: Not where Harold Brown was concerned. I'm sure he's an honorable man—but Ostvold was furious. He left soon after. He quit. It didn't happen immediately, but he took an early retirement.

LIPPINCOTT: Brown just co-opted the money?

GOODSTEIN: Yes. I remember telling this to Johanna Tallman, who succeeded Ostvold [in 1973]. She came from UCLA, from the engineering library. The engineering faculty there could not believe that we had hired her.

LIPPINCOTT: Why?

GOODSTEIN: Because she was not a good librarian. Anyway, Harald Ostvold left—he moved to Sun City [California]. But I had gotten to know him fairly well. He was quite supportive. I sent out a flyer announcing my arrival and announcing the creation of the Institute Archives. It was a mailing that went to all of the faculty. I showed it to Dan first, and Dan may have made a suggestion or two, I don't remember. It was short—two pages. That's how people learned about me and about the Archives. But mostly it was about the Archives; I didn't figure prominently in it.

LIPPINCOTT: The contents of the Archives at this point were the Hale papers, the Millikan papers—

GOODSTEIN: And von Kármán.

LIPPINCOTT: And von Kármán, which you were to sort out. Anything else, or were those the only collections?

GOODSTEIN: There were these things tied up in string, which over the years I would discover [laughter] and look over. There were photographs, some paintings. It was really a mish-mosh.

LIPPINCOTT: About the founding of Caltech?

GOODSTEIN: About everything having to do with Throop and Caltech. There was a little collection of [Arthur Amos] Noyes' papers, a very small amount, and a very small amount of Thomas Hunt Morgan. Whenever they wanted to clean out an office someplace on campus, they'd send it to the library. There was an earlier librarian, named Roger Stanton, who preceded Harald Ostvold. Roger Stanton was also a professor of English, so this was like his secondary job, to be the head librarian—which tells you something about the status of libraries at Caltech. And Roger took some interest in an archive. He would write to people; there's correspondence from him asking people to save things for the Archives.

LIPPINCOTT: Did he refer to it as “the Archives” then?

GOODSTEIN: No. This stuff was all in that room, though. That's an interesting point: Where was all this stuff before Millikan was built? It must have been stored in East Bridge someplace. East Bridge has four floors and a basement and a sub-basement; they must have had stuff stashed away in the basement. And the Millikan papers had been stored in the basement of the Arms Laboratory of the Geological Sciences.

LIPPINCOTT: But it was all thought of as an archive at that point?

GOODSTEIN: Under Roger Stanton it was thought of as unofficial. I think it's fair to say that the Caltech Archives was established in 1968, when I became the institute archivist. I think that's a fair statement. That was the formal establishment, and it had a very well-defined mission. I

spelled out, in this two-page document, what the Archives was going to do. It was going to collect the papers of the faculty and the administration. Because science was a driving force in the twentieth century. Historians and other scholars wanted to know the origins and the connections between science and government. All of those nice things.

LIPPINCOTT: Very important.

GOODSTEIN: Very important. And then I realized that I needed—and Harald Ostvold right away gave me—a budget. I'm sure the institute gave it to him. In those days, you had your own budget sheets—all of that has changed. But I was introduced to budget sheets. They were long: I don't remember how much I was given in the beginning, but I had a modest budget to buy equipment and buy books.

LIPPINCOTT: And shelves?

GOODSTEIN: I only had one room, and it had shelving, so I didn't have to worry about shelves.

LIPPINCOTT: How big was this room, roughly?

GOODSTEIN: Well, about the size of the office where Shelley now sits. It had shelves.

LIPPINCOTT: It had, at that point, no desks for researchers?

GOODSTEIN: No. It embarrasses me to say that when researchers started to come— And they started to come rather quickly, because we also advertised the existence of the Archives. The American Institute of Physics had a newsletter, and they wrote about it.

LIPPINCOTT: Did you advertise it in *Isis*?

GOODSTEIN: That I don't remember.

LIPPINCOTT: But journals and things like that. You announced it to the world?

GOODSTEIN: We announced it to the world, and they came. The only room I had for them was in the hall. So I got a desk for the hall, without any supervision, and I know that stuff got taken. Some people were honest, but a few were not. There were a few bad eggs.

LIPPINCOTT: Meanwhile, Dan was working with the papers?

GOODSTEIN: He was largely finished with the Hale and Millikan papers. That's why he did not want to have anything to do with the von Kármán papers. In the beginning, the first months, I would write up a little report to Dan at the end of the month. And then I stopped. It seemed to me that if I continued to write them, he would feel he had a right to supervise me. It was a delicate—

LIPPINCOTT: I understand that.

GOODSTEIN: I looked to Ostvold, really, as my savior. I think my position was resented by the professionals in the library, because I was not a librarian. I was a person who was getting a PhD and I was not a librarian. And that persisted for twenty years. I was discriminated against when salary raises were given out. They always had a reason why I was exempt.

LIPPINCOTT: So your \$6,000 a year —

GOODSTEIN: Oh, it went up, because there were raises from the library. But over the years, whenever the librarians as a group petitioned for higher salaries and they got evaluated—

LIPPINCOTT: They left you out of it?

GOODSTEIN: Yes, and they always had a wonderful reason. In the end, when it really came to blows— This is many years down the road, after Glenn Brudvig had succeeded Johanna Tallman as library director. He came [1983] as the guru of technology and automating libraries, which was not true. It turned out that he had systematically been raising the salaries of the librarians but not me. I went over to Human Resources to complain.

LIPPINCOTT: Because he was your boss?

GOODSTEIN: He was my boss. And he was not friendly. He didn't like that I was independent. And, yes, I was independent. But he took away the budget sheets from everybody. Now, before that, each librarian—the librarian of chemistry, of physics, of humanities, geology—they all felt that they had some independence. They didn't need to ask anyone, "Can I buy this book? Can I buy these supplies?" So far as I know, the system worked. Well, Brudvig decided he wanted all of that money in one pot, and it was up to him. The administration did not challenge him. I said, "No, I can't run the Archives if you take away my money." By then, I had a thriving Archives, and I had several different budgets. I bought rare books, because by that time I was running the rare books collection. I bought computers. The Archives was the first department in the library to have a computer. You know, Caltech lagged when it came to computers; we were sophisticated in everything else but not in computers. When I first found out about computers and what they could do for us, and what it could do for Loma [Karklins, assistant archivist]—she wouldn't have to type things over and over; you could just— IBM had a machine, so I bought a computer for me and I bought a computer for Loma.

LIPPINCOTT: Were these PCs?

GOODSTEIN: No, these were big IBM machines. They were glorified typewriters, but they came with printers. They were the first generation of computers, and IBM made a very good product. That took money. I bought those.

LIPPINCOTT: Loma Karklins was working with you at that point?

GOODSTEIN: Loma came to me very early.

LIPPINCOTT: Do you remember about when?

GOODSTEIN: Loma can tell you [December 1978]. Just to finish this, because it's the money: I also sold Einstein posters, before we were told to desist.

LIPPINCOTT: This is the one of him on the bike?

GOODSTEIN: On the bike, yes. I'll tell you later how I got into the poster business. And I also had research grants, and those were on separate accounts. I had the oral history budget; that had been started, and I had built it up. So I had six or seven different budgets. Each one of them had a small pot of money. I could use it to hire occasional students, expand the oral history program, start various pilot projects, even go to professional meetings and the occasional research trip.

LIPPINCOTT: So you wouldn't let Mr. Brudvig get his hands—?

GOODSTEIN: No. I said to him, "You can't have this money. It's not right." And he said, "I don't see why I can't take it away. I've taken everybody else's away." And then, you know the expression: The clouds part and the *deus ex machina* drops in. That night, I went home, really depressed, and David said to me, "They've asked me if I'd like to be vice provost." And, you know, the library reported to the vice provost. And that was the end of that. I never heard from Glenn Brudvig again, and I kept all of my research grants, all of my budgets. But then, when I went over to Human Resources—

LIPPINCOTT: David had already become vice provost?

GOODSTEIN: It was around that time. David became vice provost in 1988, and at that point, I have to admit, I was already thinking of leaving Caltech. I had a lot of problems.

LIPPINCOTT: Leaving it to go where?

GOODSTEIN: I don't know. I was just going to go look for an academic job. I had enough credentials to get an academic job.

LIPPINCOTT: You had finally finished your dissertation? [Laughter] You had your PhD?

GOODSTEIN: I had already been teaching.

LIPPINCOTT: We'll get into that.

GOODSTEIN: Yes, but I just want to finish this part of the story. I don't know if I'll get it right—but I was sitting over in HR, and I complained.

LIPPINCOTT: About not getting a raise?

GOODSTEIN: I said, "There's really something very wrong, all these years I've been here." The guy said, "Let's look at the budget sheets of the library." He studies the sheets, and he says, "It's very odd. Brudvig never put you up for a raise, because you were a faculty associate." I had become a faculty associate along the way [1982]. He said, "Because you were a faculty associate, you were on a different sheet, and he neglected—" We're talking years in which I never got any of those extra raises.

OK, so what do you do? You could go out and sue for back pay. Caltech does not like to be on the front pages; they would have made some settlement. However, by now David was vice provost, and I didn't think that would be good form.

LIPPINCOTT: I think you're right.

GOODSTEIN: It wasn't good form. So what this personnel fellow said to me was—he was in charge of compensation, and I had known him for many years—he said to me, "I'm going to call Glenn Brudvig and talk to him about this, and we'll work something out. We'll give you a raise right now." I had just become registrar, all around the same time.

LIPPINCOTT: This is now the late eighties.

GOODSTEIN: Yes. I became registrar in 1989, after David became vice provost—some months later. I can tell you how that happened, too, when we get to it. Anyway, Glenn Brudvig would not return the HR man's phone call for three days. He refused to acknowledge that he had done anything wrong. After three days, Brudvig said, "OK, we'll give her a raise, because she's become the registrar, so it's only fair that we should give her a raise." So I got a one-time raise.

What I lost out on was the compounding of my salary. Every year as it grows, more goes into your pension plan—it's not just to buy an extra dinner.

LIPPINCOTT: That's annoying.

GOODSTEIN: It was annoying.

LIPPINCOTT: I want to clear something up. When you told Brudvig that you wouldn't relinquish control over your own Archives budgets—that was before this meeting with Human Resources?

GOODSTEIN: Yes.

LIPPINCOTT: He probably looked at you with a jaundiced eye by that point.

GOODSTEIN: He was planning to take the budgets away. He used to use the back staircase of Millikan to come down and poke his head into the Archives to make sure I was there.

That was the most amazing thing. I knew my budgets were going to be taken away the next day. I mean, I had fought it off for so long that I'd run out of reasons. If I had thought he was a decent human being, I would have said, "Sure." We're talking a fair amount of money.

LIPPINCOTT: But he never took your budgets away?

GOODSTEIN: No, because that night David came home and told me, not knowing anything about my conversation with Brudvig, "I've been asked if I would like to be vice provost." There hadn't been a vice provost for a while, because the previous person had died. But David had already been told what his responsibilities would be, and one of his responsibilities would be the library.

LIPPINCOTT: So he would be controlling the library budget?

GOODSTEIN: Yes, and Brudvig would be reporting to David.

LIPPINCOTT: Now, let's talk about the early years of the Archives. You had the three big collections there, and you were working on it.

GOODSTEIN: I was working on it, and at night I used to work on my thesis. I finished it, and I defended it in November of 1968. David and I and Marcia flew up to Seattle and I defended it. I had a good committee; there was someone from the Chemistry Department, and anyone else who wanted to hear it. I stepped outside in the hall, and five minutes later they came out and said, "Congratulations, Dr. Goodstein." My advisor, Tom Hankins, was very happy. But the chemist who was on my committee—he was a well-known chemist, George D. Halsey. He was a tough guy, I was told. He told me afterwards that I did a good job with the chemistry—that I could have been a chemist of the early nineteenth century. I could have read their papers, because I knew what they were talking about. You see, in that respect I had grown to become a historian. There is a major difference between being a history major and being a historian—just as there's a difference between being a physics major and being a physicist.

LIPPINCOTT: Now you're going to get the Archives going. One of the things you might have had to do was hire an assistant?

GOODSTEIN: I did. That was the first thing I did when I went to Harald Ostvold. I said, "I can't do this by myself, I need an assistant." He groaned, but he said OK. I had no real experience hiring anybody, either. I decided to hire a young woman who had no history background, but she was Hungarian by birth and I thought it would be helpful, since here was a collection of a Hungarian-American aerodynamicist [Theodore von Kármán —ed.], and, especially in the personal sections of the collection, there was a lot of correspondence in Hungarian. I thought it would be useful.

LIPPINCOTT: Was she a Caltech—?

GOODSTEIN: No. She was a friend of the secretary who worked for Jim Mercereau and later became Mrs. Mercereau.

LIPPINCOTT: The secretary did, not the Hungarian?

GOODSTEIN: Yes. But the secretary was also Hungarian-American, and this was her friend, Annamarie Keene. She was a charming young woman. And it was a mistake, because Annamarie didn't have a clue. The one area where she could have helped me, she didn't. You know why? I didn't want her to actually translate. I just wanted her to describe this batch of family letters—"This one deals with the following subjects," and so on. She would read the letters and giggle, and I would say, "What's funny?" "Oh, I really can't tell you. It's so funny!" Or she would say, "I think there was something odd about the relationship between von Kármán and his sister, Josephine." "Well, what do you mean?" "I can't tell you." So in the end, I got nothing. Nothing! Let's back up: She answered the phone, and when I did have researchers come, she helped the researchers. She was well groomed and certainly honest, and that's an important characteristic that you need to look for in an archivist.

LIPPINCOTT: Because there's valuable—

GOODSTEIN: There's really a lot of valuable stuff.

LIPPINCOTT: And you said they had put a lock on the door by now?

GOODSTEIN: Yes, the door was locked. She had a key and I had a key. She worked part-time. She may have lasted maybe a year, I don't remember exactly.

LIPPINCOTT: Did you have to fire her?

GOODSTEIN: No, no. She moved away. I guess she helped, in her way. She was limited by the fact that she wasn't terribly well educated. I don't know how much university she had. I'm sure she had some, in Hungary. She certainly didn't grasp what I wanted—or she didn't want to tell me.

LIPPINCOTT: That's counterproductive. So, did you have to get someone new?

GOODSTEIN: Yes. Whom did I get next? Loma never did archival work, Loma did secretarial work. She was wonderful! Loma had graduated from college and was a substitute teacher

hoping to get a permanent position. She worked in development at Caltech, and I advertised the position—for someone to do all sorts of things, be a Johnny-of-all-trades, be the transcriber for the oral history project. Loma came, and we hit it off from the interview, and I knew right away she was good. She could type, and she also had a head on her shoulders. She was college-educated. She had an international background, too, because her parents, I believe, were from Latvia. The Archives is international—there's correspondence from people from all over the world. Sometimes you can hire someone but they're parochial in their outlook. Loma was not parochial at all. I had to find space for Loma, so I began to take up more space in the basement—like an octopus. There was an area in the back. Well, I asked Ostvold if I could have it, and we put a gate up. We gated it in. We carved out a little desk with a typewriter. Loma started with an IBM Selectric, which is still in the Archives. It's a historical artifact now.

LIPPINCOTT: And would she take care of arranging appointments with the visiting researchers?

GOODSTEIN: No, Loma kept the files. As soon as I started as archivist, there was correspondence to file. She worked after hours; she used to work in the afternoon. And she started to work on Saturdays. I paid her to work on Saturdays. I was not paid for it, but I would do work on Saturdays too. I used to work on Saturday mornings. I don't think Loma was doing any organizing of collections at that point.

LIPPINCOTT: Was that just you?

GOODSTEIN: Just me, in the beginning. Just me and Annamarie Keene. Then people who came afterward started organizing with me. If you look in the acknowledgments in the little guide to the von Kármán papers—because I started publishing guides, too. I acknowledge everybody who worked in the Archives, because they all worked on that collection.

LIPPINCOTT: When you say you started publishing guides, these are guides to the separate collections?

GOODSTEIN: Yes. Loma would type the guides.

LIPPINCOTT: OK. Were these documents that stayed in the Archives or were they distributed?

GOODSTEIN: No, no. If somebody wanted a copy of the guide, we would make them a copy of the guide. At first, they were just in-house. You'd put them in a loose-leaf notebook.

LIPPINCOTT: To let researchers know what was there and where it was?

GOODSTEIN: Correct. If researchers wrote, and if we had typed up a guide, we would, for some modest cost, send them the guide. Otherwise you can't do research from a distance.

LIPPINCOTT: Did you have visitors at that time?

GOODSTEIN: Yes, they started coming almost immediately. One of the visitors I had was Charles Weiner.

LIPPINCOTT: And who's he?

GOODSTEIN: He was the head of the AIP's [American Institute of Physics] history section. He died at the beginning of this year. He had a PhD in the history of science and technology.

LIPPINCOTT: What was he researching?

GOODSTEIN: Charlie did oral histories. He did hundreds of oral histories, including one with Richard Feynman, which is the backbone for the Gleick biography,⁵ which has just been put online after all these decades. That's how I met Charlie, because he would come around to interview and schmooze with Feynman. Feynman was his special friend. Charlie also was interested in my starting up the Archives here. He took a great interest in it. He also had things to say about me, which he went back and told Dan Kevles, which kind of irritated me.

LIPPINCOTT: What things?

⁵ James Gleick, *Genius: The Life and Science of Richard Feynman* (New York: Pantheon, 1992).

GOODSTEIN: Once when he was here, there was a little lounge in the basement of Millikan, and I was in there talking to somebody. Now, the lounge was really only for people who worked in the library, OK? A place to have coffee and smoke—people used to smoke then. I don't know whom I was talking to, maybe one of the researchers, and I was saying something about the von Kármán collection, because I realized, early on, that von Kármán had had correspondence with Albert Einstein. But it was missing. How did I know that? Because the folders were empty. There were several folders on which one of von Kármán's secretaries—he had several—had written the name "Albert Einstein." There was nothing in them. And they hadn't left a photocopy, either.

LIPPINCOTT: So people walked off with it?

GOODSTEIN: Even before it came to the Caltech Archives. Who knows? A secretary? Who knows?

LIPPINCOTT: With Albert Einstein's signature?

GOODSTEIN: That's correct. I would have been interested in what Einstein had to say to von Kármán—in the content, not the signature. I was probably telling the researcher about this. To me, it was, "How about that!" Charlie Weiner was probably having a cup of coffee in there. He didn't say anything to me at the time, and later he went to Dan and said, "Judy is very indiscreet. She was telling a researcher about what was missing from the collection. That's not appropriate." Actually, Weiner told me that, too—"You shouldn't really talk about it in public."

LIPPINCOTT: Well, at least he confronted you. Did you hear about it from Dan?

GOODSTEIN: Yes.

LIPPINCOTT: Was he upset?

GOODSTEIN: He must have felt obliged to say something. Dan and I had sometimes a tense relationship.

LIPPINCOTT: But you're friends?

GOODSTEIN: But we're friends.

I nursed the idea for a long time that if I really did well in the Archives, they would reward me—they, the administration—and make me a member of the faculty.

LIPPINCOTT: So that you could teach, or have an assistant professorship or something.

GOODSTEIN: That's right. Well, because I was already teaching.

LIPPINCOTT: When did you start teaching?

GOODSTEIN: I started teaching within months of getting the Archives job.

LIPPINCOTT: But not here at Caltech?

GOODSTEIN: No, no. There was a job opening at Cal State Dominguez Hills, and I applied for it. It was a part-time position, one course, and I got the job right away. I was interviewed, and I got the job. Cal State Dominguez Hills was a new school then.

LIPPINCOTT: Was it a course in the history of science?

GOODSTEIN: Yes. I taught an introductory course—Intro to History of Science. I had wonderful classes. I liked the kids, the kids liked me. It was a great experience. I had never done teaching at that level. I didn't have to chase the kids. They all sat there, took notes. I enjoyed the ride down. I used to think about what I was going to say. It was an easy commute in those days. You went right down the Pasadena Freeway, you kept going on the Harbor Freeway, and almost toward the end you got off, turned left, and there you were on the campus. There wasn't much traffic. And of course I told Ostvold that I had a teaching job. Now, for [Caltech] faculty, they always allow you one day off for consulting, no questions asked. And they don't dock your salary. But they docked my salary.

LIPPINCOTT: You were doing this only one day a week?

GOODSTEIN: I taught for an hour and forty minutes, twice a week. I was so energetic: I would come in to the Archives for a couple of hours, then get in my car, go teach at twelve o'clock, come back to the Archives. And they docked me.

LIPPINCOTT: Not nice.

GOODSTEIN: No, it's not nice. It's petty. It's mean-spirited. So there you go. I taught at Dominguez Hills for several years [1969-1973]. They actually asked me if I wanted a job, because it went from part-time to full-time. I decided I was better off staying at Caltech, because I still nursed this idea—this wrongheaded idea—that something good was going to come of Caltech. I'm sure I spoke to Dan about it. He must have looked at me like I was someone from Mars. "What are you talking about? It's not going to happen." Or something.

LIPPINCOTT: There weren't that many historians of science in the humanities division.

GOODSTEIN: I think Dan was insecure in those days. He was insecure for years. I'm told that the division held up his promotion to full professor until his first book [*The Physicists*] came out; and his book came out years after he told them it would. I don't know, maybe he saw me as a threat.

LIPPINCOTT: He might have seen you as competition?

GOODSTEIN: He might have seen me as competition—although we didn't work in the same area, particularly. OK, so I gave up Dominguez Hills, and then I went and taught for a while at UCLA. They offered me a job at UCLA.

LIPPINCOTT: Was that the Extension or the—?

GOODSTEIN: I did both. I taught during the day. They always made me a schedule that was good for the traffic. I could get there and back—

LIPPINCOTT: It probably took longer to get to UCLA than to Dominguez Hills.

GOODSTEIN: It did, but I figured it out; I learned the route; I learned where to park. It was good.

LIPPINCOTT: What did you teach at UCLA?

GOODSTEIN: The same thing—history of science, introduction. Another historian of science did the initial hire. His name was John Burke, and he was a senior historian of science—and by then he may have been the dean of the college. Anyway, Burke hired me. In fact, Burke came to my first class—I think just to make sure. He stood alongside the wall for about five minutes and left and I never saw him again. I enjoyed teaching at UCLA, too, and I taught there for several years. I had big classes, because it was a required course. So they were lecture classes. And I had a TA—they allowed me to pick my own TA. By then I had a wonderful person working at Caltech for me in the Archives. Her name was Carolyn Harding, later Carolyn Kopp. I think she came after Annamarie Keene. She was the wife of a graduate student in chemistry, and she had graduated from Swarthmore. She was bright and hardworking and we were on the same wavelength. Some of my former assistants have gone on to become bona-fide archivists in their own right after the training I gave them. Carolyn, I believe, still works as the archivist at TIAA-CREF in New York.

LIPPINCOTT: Oh, I think I've seen the name "Carolyn Harding" on some oral histories. She probably conducted some of those.

GOODSTEIN: She did Max Delbrück, because she went to UCLA to get a PhD in the history of science. She didn't finish, but she interviewed Max. It's a very good interview, because she was going to write her dissertation on Max. So Carolyn became my TA. She was a good TA.

LIPPINCOTT: She was your TA at UCLA and she was your helper in the Archives?

GOODSTEIN: Correct. Oh, and then I was also teaching a UCLA Extension course for a while, at night—I'd go to the Archives and then I'd teach at night, and I would get home at ten o'clock, all wired up from teaching, and it would take a couple of hours to calm down.

Anyway, one day my UCLA colleague Bob Westman called me up—he’s now a professor of the history of science at UC San Diego. Westman said that they were going to turn my job into a full-time assistant professorship, and if I wanted it, they wouldn’t advertise.

LIPPINCOTT: You mean you could have gotten onto the UCLA faculty? That must have been tempting to you.

GOODSTEIN: Well, it was. I’ll tell you, I made a mistake. That was a mistake. Mark was two years old, I remember. I didn’t get good advice from the professor at home, my husband. What I should have done, in retrospect, is gone to the people at Caltech and said I would like to take a leave of absence and try out this assistant professorship.

LIPPINCOTT: I’m sure they would have let you.

GOODSTEIN: I’m sure they would have. But I didn’t, because, you see, I still thought—

LIPPINCOTT: That you’d get something here?

GOODSTEIN: And I never got it. I actually had a discussion with Robert Christy [Institute Professor of Theoretical Physics, d. Oct. 3, 2012] sometime after he became provost. Christy came down to the Archives, and he said to me, “This is not going to happen, and you should take the job at UCLA.”

LIPPINCOTT: That was kind of him.

GOODSTEIN: In retrospect, I understand that it was kind; at the time, I didn’t think so.

LIPPINCOTT: Your offer from UCLA would have meant, essentially, that you would have had to abandon the Archives. And didn’t that figure into your decision?

GOODSTEIN: Yes, it figured into it. But what I should have done is what many academics do: They take a leave of absence and they try a teaching position someplace else.

LIPPINCOTT: So your husband, David, did not advise you to take a leave of absence, and it probably was not in the back of your mind. And that's when Christy came down and said you might as well take that job at UCLA?

GOODSTEIN: He probably said something like, "If you want to advance in the academic world, you stand a better chance at UCLA." He said words to that effect.

LIPPINCOTT: How did that sit with you?

GOODSTEIN: I was angry at the time. I'll tell you also, another factor: Within a few years of my coming here, the librarian of the Biology Division, a mediocre fellow by the name of Randy [Edward Randolph] Moser— Well, maybe he wasn't mediocre when he came here, but he was definitely mediocre by the time I arrived. I'll tell you why. He had a covey of staffers, who worked part-time shelving books, who all were going to the Fuller Seminary, and they used to talk about the Bible in the basement.

LIPPINCOTT: In Millikan?

GOODSTEIN: Yes, in Millikan. He and these young men used to talk about the Bible and what the Bible says, what Jesus said.

LIPPINCOTT: Are you saying they were Fundamentalists?

GOODSTEIN: I think Evangelicals. And it drove me up the wall. I could not stand it. Remember, it's a small basement. My door was open. I couldn't close the door—I had no windows, no air. And they're all talking. That was Randy. He would come around and poke his head in my door. When Harald Ostvold resigned, Randy Moser was put in charge of the library, on a temporary basis. So he was checking on me.

LIPPINCOTT: Well, it was part of his job, maybe.

GOODSTEIN: Once he had the nerve to walk into my office and say, “What do you think about Israel?” I looked at him. “What do I think about Israel? I don’t know.”

LIPPINCOTT: Evangelicals are very interested in Israel.

GOODSTEIN: But I wasn’t, particularly. I resented the question, and I resented the insinuation that because I happened to be Jewish, I should have an opinion about Israel. I would not give him the time of day after that.

Anyway, Randy Moser was made a member of the faculty. That’s really all I wanted, Sara. It was by acclaim. Ray Owen, who was the biologist who had the most to do with the library, proposed that Randy Moser deserved to be a member of the faculty.

LIPPINCOTT: By virtue of being the head of the—?

GOODSTEIN: Biology library. Correct. He was not a scholar. He did not publish. You know, the faculty went along with it. The faculty never questions things like that.

LIPPINCOTT: Well, was he a teacher?

GOODSTEIN: No, he just got on the faculty salary ladder. In those days, the staff was on Prudential and the faculty was on TIAA-CREF.

LIPPINCOTT: The staff was on what?

GOODSTEIN: It was called a defined-benefit pension.

LIPPINCOTT: Well, those are good.

GOODSTEIN: It depends; during inflation, they’re not good.

LIPPINCOTT: Did you speak to anyone besides Dan Kevles about this?

GOODSTEIN: I don't know if I spoke to Dan about it. I was naïve. But I grew up over time. I went and spoke to a friend who was a member of the Faculty Board at the time.

LIPPINCOTT: Who was that?

GOODSTEIN: Donald Cohen, the applied mathematician. I don't know why, but I went and asked him. He looked at me and said, "My wife has a PhD and she's not being put on the faculty." His wife, Natalie Cohen, was then working for one of the biology professors. She worked for [Cornelis] Wiersma, and after he retired [1976] she went to USC. I kind of crawled back into my shell. So it was a combination of things, but partly because Randy Moser got on the faculty and he was no academic, no scholar, whereas I was, by that time. I had a publication list.

However, I also had young kids, and I wasn't convinced that David was going to be around if they fell, or broke their arm, or whatever. Who was going to take them to the emergency room? I don't remember whether David had tenure yet [David Goodstein received tenure in 1971—ed.], but that may have been a factor also. I also thought about that daily commute. It was one thing to go over there twice a week; I had been teaching there twice a week for an hour and a half.

LIPPINCOTT: And if you took the UCLA faculty position, you would have to give up the Archives.

GOODSTEIN: Yes, basically. I wasn't ready to do that yet. So—for all those reasons.

LIPPINCOTT: Those were good reasons not to do it. And Christy warned you? He didn't have to do that.

GOODSTEIN: He didn't want the Archives, either, particularly. In 1973, wasn't there a big crisis, a financial crisis? And the institute had to retrench a bit.

LIPPINCOTT: Well, there was that oil crisis in '73.

GOODSTEIN: In '73. So there were no raises for a couple of years at Caltech, and the library budget was cut. Whenever there's a crisis, what do they do? They cut the budget of the library. So what did Christy do? Johanna Tallman, the new director, left the Archives budget intact, she told me, and Christy drew a line through it.

LIPPINCOTT: You mean, to get rid of it altogether?

GOODSTEIN: No, to make it smaller. And Johanna Tallman said to me, "Judy, if you want to maintain the activities and programs you're doing, you're going to have to bring in money." That's when I started writing grant proposals big-time. I said, "OK, I'll write grant proposals. Let's see what's out there." And I really got into writing grant proposals, especially when I was successful. Success breeds success; you get one and then you get another. But I had a short-term problem, which was how to make up the difference between what our budget was and what Christy had taken away.

LIPPINCOTT: What proportion of your budget did he take away? A third? Half?

GOODSTEIN: I don't remember, but it was enough so that I knew I had to do something quickly.

LIPPINCOTT: Is that when you got the idea of the Einstein poster?

GOODSTEIN: Yes. Because it was quick. I found a printer somewhere off Huntington Drive. He was a gregarious fellow. I explained my idea, and he said, "Sure, we can make a poster." So we designed this poster.

LIPPINCOTT: You had this photo of Einstein on the bike.

GOODSTEIN: Yes. I found it in the Archives. It was not taken in Pasadena; it was taken at one of the large houses on the Hope Ranch, up in Santa Barbara. The Hope Ranch was a new development at that time, for the *nouveau riche*. It may also have been where Jewish families were welcome; there may have been places in Santa Barbara where they weren't. This was at the

home of Ben Meyer. Ben Meyer was the president of the Union Bank & Trust Company. And he was a trustee of Caltech. He was the Jewish trustee.

LIPPINCOTT: You say “the Jewish trustee.”

GOODSTEIN: I think he was then the only one.

LIPPINCOTT: Was he considered a token?

GOODSTEIN: Probably.

LIPPINCOTT: This would have been '33 or '34?

GOODSTEIN: The winter of '33. Einstein came here in the winter of '31, the winter of '32, the winter of '33. He was a guest of Ben Meyer, in Santa Barbara. While he was up there, he got on the bike, and the picture was taken. I saw it hanging in the office of the rabbi [Edgar F. Magnin] of the Reform Temple on Wilshire Boulevard. I visited there some years ago, and I was in the rabbi's office, and I saw the picture, and he's the one who told me how it came to be taken.

LIPPINCOTT: But when you found the picture in the Archives, this was in the seventies—

GOODSTEIN: I found it much earlier than that.

LIPPINCOTT: But in the seventies you decided to use it as the basis of the poster?

GOODSTEIN: Yes. I may have found it a year after I came, because one of the things I found in the Archives were lots of pictures that had just been dumped in boxes or envelopes, and I took them out of the envelopes and sorted them, and I found the Einstein picture.

LIPPINCOTT: Well, how did the rabbi get—?

GOODSTEIN: Oh, no, no. This picture was widely shared when it was taken.

LIPPINCOTT: Oh, I see. So he had one, and you had one?

GOODSTEIN: Yes, because I think the chief Reform rabbi of Los Angeles was also invited up to Santa Barbara for the weekend when Einstein went to Ben Meyer's place.

I found out how the picture came to Caltech. That's an interesting story; it's in the DuBridge papers. There's a letter from Evelina Hale, who tells the story of the picture that I just told you. She said to DuBridge, "I'm sending you the picture as a gift."

LIPPINCOTT: How nice!

GOODSTEIN: And DuBridge obviously turned it over to somebody, and it found its way into the Archives before I came. That's the story.

LIPPINCOTT: So you are really responsible for that poster?

GOODSTEIN: Oh, yes. I'm responsible.

LIPPINCOTT: Which is all over the world.

GOODSTEIN: All over the world and copied. And abused, and used in commercial publications. Yes. It was a big success.

LIPPINCOTT: Did it bring money in?

GOODSTEIN: Absolutely. I used that money to make up the difference.

LIPPINCOTT: Between what Bob Christy took and—?

GOODSTEIN: Correct. And then it became more than that. I used it for the oral history project, because that budget had very little money in it. I used it to buy equipment. I used it to support the activities of the Archives.

LIPPINCOTT: Was this the sole poster?

GOODSTEIN: No. In 1979, a painting was stolen from David's office in Sloan—a portrait of Isaac Newton that had been given to Caltech in the 1930s. One of the things I had done was to assemble portraits and other oil paintings that were gathering dust in closets on campus.

LIPPINCOTT: For instance, underneath the Athenaeum?

GOODSTEIN: Underneath the Athenaeum. Because I became interested not just in papers but also in maps and pictures. I set out to build a special collection that was worthy of Caltech. If you go to the University of Chicago, which is certainly a peer institution of Caltech, they have a magnificent special collection and rare book collection. They have maps and they have artifacts. They have all those things. I went around to look at all those places, and so I learned.

LIPPINCOTT: What about the portrait of Isaac Newton?

GOODSTEIN: It hung in David's office for a long time. One morning, David came to work and it was missing. It was a very strange story, because I couldn't get Caltech's campus police to investigate it. I thought it was an inside job. David had locked his office in Sloan at midnight the night before, and we also knew how long one of his graduate students had been working nearby in the lab in Sloan, so we had a time period. It was between two and six in the morning, when nobody was in the building or on that floor. The door was not jimmed and there was nothing touched in David's office except the portrait. Nobody saw anything. I was on jury duty that day. I didn't find out until the end of the day, when I came home. David was quite upset. So I called the head of security. And they said, "Oh, well, it was probably a student prank. It'll come back in a few days."

LIPPINCOTT: Ridiculous!

GOODSTEIN: They would not involve the Pasadena police. They would not involve the FBI. They did nothing. After about seventy-two hours, because I kept calling them, they very grudgingly notified the Pasadena Police Department. The trail had gotten cold, way cold. That's when I began to think it was an inside job and the thieves had cooperation. This is when a lot of thefts were taking place on the campus. Silver was stolen, statues on campus were melted down

for their copper; carpets were stolen from the Athenaeum. It was a wide-open campus, and security was miserable. Security has gotten much better. I was beside myself. Then I got the idea, “Doggone it, we’ll make a poster, a wanted poster, of Isaac Newton.” That’s what I did.

LIPPINCOTT: You had a photograph of the stolen portrait, so you could use that for the poster?

GOODSTEIN: Yes. And I had a legend at the bottom of the poster, describing the portrait, who the artist was, precisely why this poster was made, and when it was stolen.

LIPPINCOTT: Did this result in retrieving the portrait?

GOODSTEIN: No, it’s never come back. I think a collector wanted it. I think it was somebody who had the cash to pay someone to steal it and make the trail go cold. In other words, it wasn’t a casual theft, it was a request.

LIPPINCOTT: Do you think the campus police at the time were in collusion with the thieves?

GOODSTEIN: I think they were certainly a party to covering it up. They refused to take me seriously—well, maybe because I was a woman.

LIPPINCOTT: Yes, but it was stolen from David’s office—his physics department office in Sloan. He didn’t have enough weight himself?

GOODSTEIN: Quite right.

LIPPINCOTT: How did he come by that portrait?

GOODSTEIN: He asked if he could hang it in his office, and the archivist said yes.

LIPPINCOTT: And that was you?

GOODSTEIN: That was me. I had dug it out of the Athenaeum’s basement. I didn’t have very good places to store these portraits. The Millikan basement would often flood, which meant that

the Archives got flooded. I used to have many discussions with Christy about the flooding. Finally Christy said to me, “Go into the pump room, take a wrench, and you can close the water off.”

LIPPINCOTT: Is that what he said? How British Columbian of him.

GOODSTEIN: Yes. So the proceeds from the Einstein poster paid to print several thousand copies of the Newton poster, which I tried to distribute, but Newton’s face was not as attractive as Einstein. But there’s one more thing: With Shelley’s help, we did list the missing portrait. There is a worldwide registry of stolen art. We paid to have it listed.

LIPPINCOTT: Who painted the portrait?

GOODSTEIN: It’s by John Vanderbank [1694-1739].

LIPPINCOTT: Was it done from life?

GOODSTEIN: Yes, and that’s what makes it important—that Newton sat there for forty-five minutes or more while it was painted. That’s what makes it valuable. It’s not that he looks good—he’s ugly. But it’s painted from life.

LIPPINCOTT: I hope you find it.

GOODSTEIN: I always hope so, but it’s getting on. I was on good terms with the chief financial officer of the institute, David Morrisroe—we’ll come back to him—and I said, “David, I need some money to back up getting the portrait back. If we could offer a reward, maybe we’d get it.” This was pretty soon after the theft. And Morrisroe said, “How much, Judy?” I said maybe \$5,000, and Morrisroe said, “OK, I’ll put \$5,000 into your budget.” Which he did.

LIPPINCOTT: And did you offer that sum on the poster?

GOODSTEIN: No, not on the poster, but we advertised it. I ran an ad.

LIPPINCOTT: Where?

GOODSTEIN: I ran an ad, probably in the *Pasadena Star-News* and the *LA Times*. We certainly offered it, probably on the worldwide site of the stolen-art registry. I may have advertised it in the student newspaper.

LIPPINCOTT: Did you get any response?

GOODSTEIN: No. Not enough money.

LIPPINCOTT: Well, that's a sad story. OK, we'll wrap this up. I want to start next time talking about the oral history program, which began around this time.

GOODSTEIN: Yes. I'll tell you the genesis of that.

[Recording ends]

JUDITH R. GOODSTEIN**SESSION 3****October 1, 2012**

LIPPINCOTT: Before we get to the Archives' oral history project, I'd like you to talk a little bit about the rare book collection—what its origins were and how you managed to accumulate some of the more prestigious acquisitions.

GOODSTEIN: The nucleus of the present rare book collection was already here. In fact, when I knew David and I were going to Caltech, a friend at the University of Washington told me about a book where I could look up special collections and libraries in the U.S., and I looked up Caltech's library, and sure enough I found out that its distinguishing feature was its rare book collection.

LIPPINCOTT: Really!

GOODSTEIN: Really. It gave a glowing summary of the rare book collection. But when we came for those first six months, I wasn't involved in working for Caltech, so I never checked it out.

LIPPINCOTT: But after Rome?

GOODSTEIN: After Rome, and after I was hired, I asked about it. And Harald Ostvold told me that there was a very modest budget for it—a couple of thousand dollars. By the way, even then, a couple of thousand dollars would not have bought a Newton's *Principia*.

The collection was housed on the first floor of Millikan, in a small room facing north. It had no special security, just a locked door. But the door was made of glass, and there were windows, so you could certainly look in from the outside and see books behind glass doors. Anyway, Ostvold showed me the collection. It was 202 volumes acquired in 1955, plus some other volumes acquired before and since.

So, let me tell you how Caltech came by this 1955 collection. Earnest Watson had been brought to Caltech by Robert Millikan around 1920, to supervise the building of the Norman Bridge Laboratory of Physics—which is the building that persuaded Millikan to come here and head up Caltech. He sent Watson, who had been his graduate student at Chicago, out here. Watson never got a PhD, but he became very important in the development of Caltech, as the man behind the scenes—he certainly had Millikan’s ear. He rose to a high administrative post at Caltech. He was also in charge of the rocket project during World War II. And he wrote a landmark textbook in physics in the 1930s that was widely used.⁶ I don’t remember if it was calculus-based or not, but it was widely used, which makes me think it may have been for non-calculus-based physics courses. He wrote it with Millikan and Duane Roller, and it went through several editions.

LIPPINCOTT: Was it used at Caltech?

GOODSTEIN: Good question—I don’t remember. This is all pre-Feynman, pre-World War II. We would have to look in the catalog; in the early days, the catalog would tell you what textbooks were used in freshman physics. Watson’s passion was the history of physics. He was a bachelor at the time, and he sank his extra money into buying rare books for himself. And in the 1920s and 1930s you could buy rare books for a song, because they weren’t collectibles yet.

LIPPINCOTT: What books, typically, are you referring to?

GOODSTEIN: He might have bought, for example, a later edition of Newton’s *Principia*. Not the first edition, but maybe a third edition.

LIPPINCOTT: How old would that be—eighteenth, nineteenth century?

GOODSTEIN: Late eighteenth century. He bought books on the history of chemistry. He bought, for example, John Dalton’s *A New System of Chemical Philosophy*, which is the early nineteenth century. Books like that, which command a great deal of money today, did not command a great

⁶ R. A. Millikan, Duane Roller, & E. C. Watson, *Mechanics, Molecular Physics, Heat, and Sound* (Boston: Ginn & Company, 1937).

deal then. Watson had a group of rare book dealers—in England, mainly, but also a few in Italy—who would send him book lists, things to buy. They knew his budget, they knew what he was interested in. In 1955, this book dealer in Florence sent him a letter saying that a Count Giampaolo Rocco was going to dispose of his Galileo collection. It was, I think, 202 volumes. There was a bibliography which came with the collection, because Rocco had his own librarian, and the librarian's name was Mr. Cinti. Here's the bibliography [pulls a book from a shelf]: *Biblioteca Galileiana Raccolta del Principe Giampaolo Rocco di Torrepadula*. I think Rocco needed money, and he was asking \$25,000 for these books—this is 1955.

So Watson asked Lee DuBridgE to buy the collection for Caltech because, he said, it was a priceless collection, which it is. The Rocco collection also included a first edition of Copernicus' *De revolutionibus orbium coelestium*, the 1543 edition, and the second edition [1566], both of which were published in a Protestant country—no doubt to avoid offending the Church. It had mostly all of Galileo, from start to finish. It had a few manuscripts. It had all of Kepler. And it finished with Newton.

LIPPINCOTT: It had a *Principia*?

GOODSTEIN: Oh, yes. A first edition of *Principia*. The history of how Caltech obtained the Rocco collection is contained in the Watson papers; I haven't looked at it in a long time, but it's all there, the whole story. So DuBridgE, because he respected Watson and what Watson had done for the institute for many decades, went to one of the trustees, Harry Bauer, and asked Bauer if he would provide the funds to buy the collection. And Bauer said yes.

LIPPINCOTT: So that was here when you arrived?

GOODSTEIN: Yes, and that's what Harald Ostvold showed me, and what I had read about before I came to Caltech. This was the priceless rare book collection. The trouble is that if you advertise widely a "priceless" book collection, you invite thieves.

OK, so if you read the correspondence in the Watson papers, you'll discover that not everything that Rocco promised came; a few things were missing. Caltech had a volunteer rare book librarian by the name of Alexander Pogo, who in the 1920s or 1930s had been brought to work for the Carnegie Institution, at Santa Barbara Street. Pogo actually had a degree—I forget

if it was in astronomy from Columbia or in the history of science. Pogo was from the generation of George Sarton, who founded the History of Science Society in 1924.

LIPPINCOTT: Pogo was a librarian by training?

GOODSTEIN: Probably. And his principal job was buying books in the history of science, mainly in the history of astronomy and physics, for the Hale Observatories Library—because George Ellery Hale was also a collector and very interested in the history of science. That collection, by the way, is now in the Huntington Library.

LIPPINCOTT: This is Hale's collection, but it was kept at the Carnegie Institution?

GOODSTEIN: That's an interesting point. I think Hale bought books with his own money and gave them to the Carnegie Institution.

LIPPINCOTT: Why there and not to Caltech?

GOODSTEIN: That's a good question. I can't answer that question.

LIPPINCOTT: He might have thought that the facilities were better over at Carnegie? [Hale was the Director of the Mount Wilson Observatory, funded by the Carnegie Institution, and the library was at the Observatory headquarters on Santa Barbara Street. –Ed.]

GOODSTEIN: Well, there was not much of a library here in the thirties. As we talked about, the libraries were dispersed, and physics was housed in East Bridge. That was it. So maybe he felt that the Carnegie's library was more appropriate, more dignified. And then other astronomers connected with the Carnegie Institution, like Edwin Hubble and Ira Bowen, also bought books in the history of astronomy, so it was a nice collection. And they had books in the history of chemistry, too. Pogo was in charge of all that. I think they paid him a modest amount of money; he was a lifelong bachelor, and he lived very simply. When I came, he had become a volunteer librarian of rare books at Caltech. He didn't drive a car, and he used to walk several times a

week between Santa Barbara Street, just off Lake Avenue, north of the freeway, down to Caltech. And so pretty soon I met Dr. Pogo.

LIPPINCOTT: What did he do with the Caltech books, specifically?

GOODSTEIN: Well, he made very detailed bibliographic notes, which we still have, on three-by-five cards. He used an old Underwood typewriter, and he did what traditional, old-fashioned rare book curators do even to this day. They will tell you the folios, how the book is stitched together, whether a page was inserted after the book was published—all of those arcane things that define rare book collectors. Pogo handled every book in the Rocco collection. He turned the pages of each book, one by one, and as he noticed things of bibliographic interest he put them down on his three-by-five cards. It's a treasure trove of information that truly scholarly historians find interesting, rare book collectors find interesting.

LIPPINCOTT: But not too many other people?

GOODSTEIN: No, not too many other people. Sad to say—or maybe not. That's the way the world is. But in fact once upon a time even librarians were trained in some of this as part of their education. That's no longer true.

OK. So pretty soon I got to know the people—the staff and the librarian—in charge of buying books for the Caltech libraries. All of the book buying was done by a department on the second floor of Millikan—that, too, is long gone. The librarian in charge was a nice young man named Roy Lieberman. We had both grown up in the same part of the world, New York, and it turned out that we had a friend in common. He told me that Dr. Pogo would read all the rare book catalogs that came in. These were the days before faxes, before computers, and the booksellers would send out their rare book catalogs at book rate, which meant they came by ship. Pogo would go through and mark the books he would like the library to buy out of his modest budget, and he'd give the orders to Roy. Roy would type them up and send them off, and the reply would come back, "Sorry, sold." Because Pogo never used the phone. Roy told me that Pogo got very disenchanted because he never got anything. Then Roy said to me, "Would you like to try your hand?" I said, "Well, I have to ask Dr. Pogo."

LIPPINCOTT: How old was Dr. Pogo?

GOODSTEIN: He seemed like a hundred when I met him, but he wasn't quite that old. Dr. Pogo died in his nineties, and he was in his seventies when I met him. But, you know, I was twenty-eight, so he looked pretty old to me. I was introduced to Dr. Pogo, who looked at me very suspiciously. He asked me some questions about myself, and I said, "Would you mind if I occasionally suggested a book for the library? I'll certainly show you the book before we try and get it." He said, "That's fine." So then Roy started sending me the rare book catalogs, and I tried my hand at it. Dr. Pogo and I would sit down and discuss my choices. It was educational. He would tell me why one of the books I picked was better than another one. He would go through why we should pick one over the other. He would explain to me the history of the book or the author. I learned a fair amount just by listening to him. Of course, I wasn't too much more successful than he had been, but occasionally I got a book and occasionally Dr. Pogo got a book. And the library would not catalog these books. Now, why not? I don't know. The rare books that Pogo bought and that I bought were not cataloged. Nor was the Rocco collection cataloged. It was not in the old-fashioned card catalog that we all used.

LIPPINCOTT: Was it in some sort of separate—?

GOODSTEIN: Just in this bibliography.

LIPPINCOTT: But then how would additions to the collection be cataloged?

GOODSTEIN: Well, first of all, you wouldn't want to even try and buy a book without checking Dr. Pogo's card catalog.

LIPPINCOTT: Oh, he had a card catalog?

GOODSTEIN: Yes, he made a card catalog.

LIPPINCOTT: Well, then, the books were cataloged?

GOODSTEIN: You're right. They were cataloged for the Rare Book Room, but not for anybody else. But there were a few scholars in the world who knew about the Rocco collection. They would write letters. Pretty soon Harald Ostvold asked me to answer those letters. That was when I became more familiar with the collection, because I needed to borrow the key to get into the room to look at the book that some scholar wanted to know something about.

LIPPINCOTT: Did any Caltech professors use this rare book collection, to your knowledge, for research purposes?

GOODSTEIN: I'll tell you who used it. Professor Goodstein, when he was teaching Physics 1.

LIPPINCOTT: Your husband?

GOODSTEIN: My husband asked me if he could borrow—because I had told him about the collection—if he could show some of these great books to the students. It became a tradition that we would—one of us, myself or one of the staff—take the rare book and put it in a special box, put in a pair of white gloves for the professor to use, because you really shouldn't touch the pages without gloves, and then we brought extra gloves if the students wanted to look at a page closely. We'd bring it over, and at the end of the lecture—the lecture was always at eleven o'clock—at twelve o'clock one of us would go over and bring the book back to the Archives. We sent them the Copernicus first edition, we sent Kepler's *Rudolphine Tables*, and the first edition of Newton's *Principia*, and several others that Professor Goodstein asked for.

LIPPINCOTT: Do you think the kids were as impressed as maybe you and I would be?

GOODSTEIN: Yes. I know that the kids said—or their parents said, because the parents heard about it, too—that years later they would remember looking at the rare book but they wouldn't remember a thing about Physics 1.

LIPPINCOTT: How funny!

GOODSTEIN: And I think that's true, because over the years students have come back and commented. They remember those rare books. When David did *The Mechanical Universe* [52-part telecourse, filmed at Caltech], you see those books again.

So David used the rare book collection. I told other faculty that they were welcome to use the books, too, and they said, "Oh, no, that's because David has a special in with you, with the Archives." I said, "No, not at all. We serve the community."

I once gave a lecture for Peter Fay's class. Peter Fay was a historian, and he asked me to give a lecture on the Scientific Revolution. For that lecture, I brought several of the rare books over to his classroom, and I showed them when I gave the lecture. It was a big hit. Later on, when I offered a course in the history of science, I also brought the books over.

LIPPINCOTT: You kind of eased into running the rare books collection?

GOODSTEIN: Yes, because Pogo got older, and he became ill. When he became ill—Harald Ostvold was already gone—Johanna Tallman had taken his place; this was sometime in the early 1970s. So I told Johanna that I was the *de-facto* head of the rare books collection and I thought perhaps the time had come to be recognized for that. Probably also told her that I thought it deserved a raise, that I had assumed additional responsibilities. By then I was buying the books, and I had already learned a little bit about how to buy them and how to get them quickly; how to find out whether they existed and we could buy them. I also had begun to buy books from book dealers in this country. So that's how I became the curator of the rare books, and in time I asked the library to catalog the collections, to put it into their system.

LIPPINCOTT: Did they?

GOODSTEIN: Yes. It took a long time, and then, when we moved here to the sub-basement of the Beckman Institute and we had a proper, armed, security-wise Rare Book Room—

LIPPINCOTT: Where we're sitting now.

GOODSTEIN: Where we're sitting now, with proper shelving, they already had computerized the library system and it was put into the Library of Congress system. I think they did Dewey cataloging in the beginning. Now it's all LC.

LIPPINCOTT: I don't know what that is.

GOODSTEIN: Library of Congress cataloging. It's universal. That means if you go anyplace in the country, they use the system that started with the Library of Congress.

LIPPINCOTT: That will identify where a particular book is?

GOODSTEIN: Yes.

LIPPINCOTT: Well, this is a beautiful room, and you've got a ton of wonderful books here.

GOODSTEIN: And you notice that none of the cataloging is on the spine. It's all done on rare book slips that are tucked into the book. That was all done, and the library could go only so far, because of the languages demanded in cataloging this collection. You needed to know Latin, French, Italian, German. Sometimes the librarians were stumped. They couldn't read a book's title page to figure out how to catalog it.

LIPPINCOTT: You could, couldn't you?

GOODSTEIN: No, I couldn't. I could read a title page in Italian sometimes, but I can't read Latin. But Shelley Erwin got the idea that we should use— A new generation of librarians has come into Millikan, and one of them was trained as a rare book librarian. She had come from England, and she had very good training. She wasn't working in rare books at Millikan, but we essentially co-opted her. Shelley did—it was really Shelley.

LIPPINCOTT: What was her name?

GOODSTEIN: Alison Gunson. Shelley used to keep in touch with her. And while she worked here, she cataloged all of our mystery volumes.

LIPPINCOTT: Mystery volumes? Why would you buy something that you didn't—?

GOODSTEIN: We didn't buy them, we found them. We found a few books in the rare book collection we weren't sure about—we didn't understand why they were there. Or we had taken books from Clinton Judy's collection. Clinton Judy was a professor of English, the first professor of English at Caltech. His hobby was buying books, and Caltech bought many of his books after he died. Some of the rare items came to the Archives, and some of them were mystery books—they had no title page.

LIPPINCOTT: Were they necessarily about science?

GOODSTEIN: No, they weren't. We broadened our mandate.

LIPPINCOTT: In this room, do you have books that have to do with the humanities?

GOODSTEIN: A few, because Earnest Watson collected a few interesting books in the humanities, like Lewis Carroll first editions.

LIPPINCOTT: How about Darwin?

GOODSTEIN: We have Darwin, yes. I don't remember if Darwin— That was obviously not part of the Rocco collection. And I don't remember if it was a book I found in the rare book collection. Probably it was there.

LIPPINCOTT: The *Origin of Species*?

GOODSTEIN: The *Origin of Species*, correct. It has a very ordinary, faded green cloth cover [pointing out the book].

LIPPINCOTT: Is that a first edition?

GOODSTEIN: Yes. You'll notice, if you look through the shelves here, that some of the books have library bindings and call numbers, because they were rare books that were sitting on the libraries' open shelves. And over the years, I removed them and brought them into the Archives. And a few times we had gifts, over the decades.

LIPPINCOTT: From alums?

GOODSTEIN: From alums and Caltech Associates.

LIPPINCOTT: Did this become part of the Archives budget, the budget for buying rare books?

GOODSTEIN: Yes. Over the years, I had many budgets. Eventually we just rolled the rare books budget into the Archives budget, the master Archives budget, because it was silly. It was only \$2,000 a year, and I started spending more. I bought more expensive books.

LIPPINCOTT: Oh, I was going to ask you about Einstein. Or is that all in the Einstein papers that Diana Kormos-Buchwald [director, Einstein Papers Project]—?

GOODSTEIN: The library suffered a lot of losses in the 1970s. Sometime after the end of the Vietnam War, there was a period when people stole silver, people stole copper, it was a widespread problem in the U.S., and books went missing from the open shelves of Millikan. There were certainly a fair number of Einstein works, mostly reprints.

LIPPINCOTT: Well, I'm thinking, of course, of the 1905 *Annalen der Physik*.

GOODSTEIN: That was in physics.

LIPPINCOTT: They had those?

GOODSTEIN: They had those. I have no idea what they've done with them. You know, they're getting rid of all their journals.

LIPPINCOTT: But my goodness, those are —

GOODSTEIN: I don't know what they've done with them.

LIPPINCOTT: There were four or five papers, I think—in 1905.

GOODSTEIN: Good question. We should ask Shelley.

LIPPINCOTT: Yes. But they're not in here?

GOODSTEIN: No, they're not in here.

LIPPINCOTT: Gee, that's the beginning of relativity.

GOODSTEIN: That's right.

LIPPINCOTT: And how about—while we're on that subject, if you don't mind—Bohr and Heisenberg?

GOODSTEIN: Well, that's what I want to tell you. Over the years, I expanded the charge of the rare book collection to include landmark books in the history of physics—and mathematics and biology and chemistry. A lot of those books were sitting on the open shelves in Millikan. So we now have a fairly large landmark collection of books in the history of science, but not in the Rare Book Room, just in the stacks in the Archives.

LIPPINCOTT: In the stacks of the Archives?

GOODSTEIN: Yes, back where we keep all of our research materials. And those books are all cataloged. They're all in the library system. **[Recording paused and resumed.]**

LIPPINCOTT: OK, well, we're back on the air again. I think that that pretty much covers the rare book collection.

GOODSTEIN: There's one more thing. Shelley is not allowed to buy rare books. That's a big change. I was buying rare books up to the time I retired.

LIPPINCOTT: Which was 2009.

GOODSTEIN: Yes. But now, the librarian will not allow it. It's not encouraged. It's not part of the vision of the twenty-first-century library at Caltech. And that's for the record. I left Shelley a lot of money in the budget to buy rare books. I left her well endowed to go on and do creative things, and the provost made a big point of telling me, a year before I retired, that it wasn't my money, that it wasn't the Archives' money, it was the institute's money.

LIPPINCOTT: This provost being—?

GOODSTEIN: Stolper. Ed [Edward M.] Stolper [William E. Leonhard Professor of Geology]. Now, I never thought of it as my personal money. No, it was to make the Caltech Archives one of the leaders in the world. Which it is, among science archives.

LIPPINCOTT: Yes. That's very interesting.

GOODSTEIN: I believe Shelley has been allowed to buy one book since I retired, and that was to commemorate [former Archives office administrator] Bonnie Ludt, and it was basically with donations, people who sent in money.

LIPPINCOTT: In memory of Bonnie?

GOODSTEIN: In memory of Bonnie.

LIPPINCOTT: OK. Well, let's move on now to the oral history project. You were telling me that Kay Walker was the genesis of this. I remember Kay. She was at *E&S* [*Engineering & Science*] before Jane Dietrich.

GOODSTEIN: Yes, a long time ago. She worked for Ed Hutchings [former longtime editor of *Engineering & Science*].

LIPPINCOTT: I liked Kay very much—she was terrific!

GOODSTEIN: Wonderful. She had a good sense of humor.

LIPPINCOTT: And very smart, intellectually inclined.

GOODSTEIN: So apparently she decided that the institute needed to start an oral history program.

LIPPINCOTT: When was this, roughly?

GOODSTEIN: Well, in the mid-seventies. And she wrote a check for \$300 and gave it, or sent it, to Neal [Cornelius J.] Pings, who was then vice provost.

LIPPINCOTT: Was this \$300 of her own money?

GOODSTEIN: Yes. And she told him she wanted him to use the money to start an oral history program.

LIPPINCOTT: Well, good for her!

GOODSTEIN: Because the library reported to Neal Pings. So Neal Pings came down to see me, in the basement. I knew him. I knew him socially, and I couldn't imagine why he was coming to see me. And he said to me, "Well, we've been given a gift. It's an anonymous gift, and it's to start an oral history program. And I'd like you to start it." I have to admit that already I had a lot on my plate, and I was not particularly looking forward to starting another project. But you don't say no to the vice provost. So I said, "I will do so."

LIPPINCOTT: Was this about interviewing the faculty of Caltech?

GOODSTEIN: It was implied that it should be concerned with the faculty, yes.

LIPPINCOTT: That is, their recollections of Caltech?

GOODSTEIN: Correct. I don't remember how much Neal told me. Perhaps Kay Walker didn't tell him that much, who's to know? But that would seem logical. I took it that that was the charge. I had no idea how far \$300 would go, either.

LIPPINCOTT: I guess it would be used to hire an interviewer or get some equipment, a tape recorder?

GOODSTEIN: A tape recorder and someone to do the interviews.

LIPPINCOTT: And someone to do the transcribing.

GOODSTEIN: Yes, all of that.

LIPPINCOTT: That's not very much money.

GOODSTEIN: It's not; it's a pittance. But look what she did! She seeded the project. And how many histories have we now done? Well over a hundred. Many of them are now on the Web. People use them all the time. Even Caltech people use them.

LIPPINCOTT: Even before they started to go up on the Web, you'd get people in here. You had them as bound copies.

GOODSTEIN: It's been a very successful program, thanks to Kay Walker.

LIPPINCOTT: What was the first thing you did to get this project going, do you remember?

GOODSTEIN: Well, I had to figure out whom should we interview first.

LIPPINCOTT: Was Lee DuBridg e gone by this time?

GOODSTEIN: Yes, he was gone. He went off to Washington in 1969 to be Nixon's science advisor. But I eventually interviewed DuBridg e [1981]. When he stepped down as Nixon's

science advisor [1970], he returned to Southern California and lived in Laguna Hills. After his wife, Doris, died [1973], he moved back to Pasadena.

Around the same time that Kay Walker gave the money, a young woman by the name of Mary Terrall showed up in my office. She probably wrote me a note and said that she had just moved to Pasadena from MIT's oral history program, and that Charlie Weiner had suggested that she speak to me. She had done oral histories for Charlie Weiner. I thought, "Wow, what a stroke of good luck!" And so I spoke to Mary, and in fact Mary and I decided together how we'd pick interviewees. I picked Henry Borsook, a biochemist. What I wanted was somebody who went back almost to the beginning, and Borsook had come in the late 1920s—certainly from the Millikan era. I thought we should start with people from the Millikan era. He didn't live in Pasadena anymore. Mary was willing to go up to Santa Barbara, where he lived.

LIPPINCOTT: He was retired?

GOODSTEIN: Yes. It was a wonderful interview. She was very good. Now, who did the transcribing? Well, Loma may have transcribed it. Or Mary may have done the transcribing; she certainly did the editing. In the beginning, she did everything. She's a good editor, too.

LIPPINCOTT: About how many of those interviews did Mary do?

GOODSTEIN: She did a fair number, until she decided to go to graduate school at UCLA, in the history of science, and now she's a professor there in the history of science. There is a story, though, because that \$300 barely covered paying for Mary. I asked Mary what the going price was. Mary told me what she expected.

LIPPINCOTT: So much per hour?

GOODSTEIN: It was probably by the hour—it was all occasional work.

LIPPINCOTT: So you had to get more money for this project?

GOODSTEIN: Yes, and that's a story. One day, David Morrisroe, who was the treasurer and had his office in Millikan Library— Because when Harold Brown became president, he kicked the library off the third floor of Millikan and used it for his and various other people's offices.

LIPPINCOTT: Harold Brown?

GOODSTEIN: Yes, because there was a big earthquake—

LIPPINCOTT: Oh, right. The Sylmar earthquake, 1971.

GOODSTEIN: It made Throop Hall uninhabitable. And so they decided Millikan was a good place. That was the beginning of the end of the integrity of Millikan Library. It never got back any of that space; they just took more and more, for other purposes.

So David Morrisroe came down. He just dropped in. People used to just casually drop into the Archives. He said, "Judy, how's your oral history project doing?" And in the back of my mind, I'm wondering, "How does he know about my oral history project?" We'd maybe done one interview, or two.

Back up one minute. When I ran out of the \$300, I was talking to somebody in the library—a woman named Laurie Mushrush—and I was bemoaning to Laurie, What was I going to do? She was a very quirky lady. I said, "You know, I have this great program, but I don't have any money." She said, "How much do you need?" I said, "I don't know, but I need more. I started with \$300, and I'm going to need several times \$300 just to do another interview or so." She said, "Well, I just came back from a trip, and I have some cash. I'll give you the cash." She gave me \$1,000—ten \$100 bills. I promptly went and deposited it for the Archives. She never wanted a receipt. She didn't want anything. She said, "Here's a thousand dollars."

LIPPINCOTT: Oh, my goodness.

GOODSTEIN: She said, "I don't want any thank-you. No acknowledgment."

LIPPINCOTT: Well, how nice!

GOODSTEIN: How nice! I went to the cashier's office, gave him the cash. So then I had \$1,000, and we could go on a little bit. David Morrisroe comes along next, asking about my oral history project. I said, "Here's the problem, David. It's really great. I have Mary Terrall, she's very good." And he says, "Yes. Mary, I've met her. She's married to David Politzer [professor of theoretical physics]."

LIPPINCOTT: Oh, was she?

GOODSTEIN: Was. I said, "That's right." Then bells went off in my head, and David Morrisroe said, "How much do you think you'll need to put it on a steady basis? Why don't you work up a budget?" I said, "I will." So I worked up a budget, I gave it to David Morrisroe. It had nothing to do with the library.

LIPPINCOTT: So the bells ringing were that they wanted something for David Politzer's wife to do. Were they trying to get David Politzer to come here?

GOODSTEIN: He was here already. But apparently—you know, it's a small community and David Morrisroe was very good at getting to know the faculty, unlike administrative people today. David mingled with the faculty. He saw them socially. Politzer was a rising professor of physics. It was well known that he was going to get the Nobel Prize one day. [He would receive the Nobel Prize in physics in 2004.—ed.]

LIPPINCOTT: Oh, was that already—?

GOODSTEIN: That was already known when they hired him [1976]. And they also knew, don't ask me how, that Mary Terrall did not like Southern California.

LIPPINCOTT: So they wanted to keep him, so they wanted to give her something to do. I see. Wonderful!

GOODSTEIN: And I was more than willing. She was terrific. And so I got my budget, whatever I asked for. I wasn't greedy. But the point is, it was now part of the annual budgeting cycle.

Every year, a fresh amount of money would be put in for oral histories. It was terrific! I never ran out of money again. Over the years, budgets change; they're taken away, consolidated. I had enough money in the Archives' sundry donors account—per Mr. Stolper, in the *institute's* sundry donors account—that I could use that money to pay for oral histories. Because, to me, all that money in the Archives' accounts was fungible. I used it wherever it was needed, to do what was best to build the Archives. So I never had a money problem again for oral histories. Which is how you came to work for the Archives.

LIPPINCOTT: Oh, I can remember something about that. I remember when I came to Caltech—it was '94, I guess when I started to teach here—and I met you. And I was down here one time, looking through the oral history bound issues, just glancing through them. And I saw “angstrom”—A-N-S-T-R-O-M—because I'm an editor and I pick up on these things. And I said, “Gee, Judy, this should be ‘angstrom.’ Don't you have an editor looking at these?”

GOODSTEIN: By then Mary was gone. Mary had gone off to UCLA.

LIPPINCOTT: Yes. And by that time, Shirley [Cohen] was doing a lot of the interviewing, is that right?

GOODSTEIN: What happened is that Shirley and I walk every Saturday, and during one of these walks, after she had retired from teaching chemistry and mathematics at [John] Muir High School, she said to me, “Judy, what am I going to do? I still have a lot of energy.” I think she just wanted to know what I thought—what kind of possibilities were there, not necessarily in the Archives. I said, “Gee, let me think about that, Shirley.”

So then I came back and said to Shirley, on my next walk with her, “Shirley, I've been thinking you might enjoy trying your hand at interviewing some of the people at Caltech.”

LIPPINCOTT: Of course, being a faculty wife [wife of Marshall Cohen, professor of astronomy, emeritus], she knew scientists, and then she also knew her chemistry, for one thing.

GOODSTEIN: But I had to remind her that just because she knew these people socially, that you have to ask certain questions. You may know the answers, because you're a friend, but you can't

not ask the questions, because your reader doesn't know the answer to the questions. So Shirley said she'd try, and she turned out to be a very successful interviewer. Because she's gregarious—she's interested in other people. That's an important component.

LIPPINCOTT: She's a good listener.

GOODSTEIN: She's a good listener. So Shirley did a lot of interviews. And from time to time I did an interview.

LIPPINCOTT: Whom did you interview that you remember particularly?

GOODSTEIN: I interviewed DuBridge. That was funny.

LIPPINCOTT: Talk about that.

GOODSTEIN: DuBridge had come back to Pasadena. He was retired, and he had moved back to Pasadena, and I interviewed him. It was a two-part interview. He came to the Archives, over in the basement of Millikan. I gave him an outline. I think he had already decided what he was going to say and what he wasn't going to talk about.

LIPPINCOTT: How old was DuBridge by this time?

GOODSTEIN: He was eighty, and he was in pretty good shape. Walked here by himself from his house—he lived very close to the campus.

LIPPINCOTT: Still hale and hearty?

GOODSTEIN: He was hale and hearty. I heard from others that he went over to the Athenaeum after he finished doing the interview with me and had lunch at one of the round tables. And while he was at the round table, he told everyone about the interview and said something to the effect, that "Wow, she thought she was going to find out certain things from me. I didn't tell her certain things." He probably told the people at the round table those things. [Laughter]

LIPPINCOTT: What wouldn't he talk about?

GOODSTEIN: I asked him about his dealings with Millikan [DuBridge's predecessor as head of Caltech]. Because Millikan stayed on, even though he was no longer the head of the institute and DuBridge was the first official president.

LIPPINCOTT: This was right after the war?

GOODSTEIN: Right. DuBridge comes in in 1946. Millikan had an office, and I've heard many people tell me that Millikan would come to campus every day even though he wasn't totally with it anymore. Well, he was not so young anymore, Dr. Millikan. Some people told us in interviews that Millikan thought he was still running the place.

LIPPINCOTT: So was DuBridge willing to talk about him?

GOODSTEIN: Oh, up to a point. He was careful in what he said. I think he didn't want to say anything that cast Millikan in a bad light. But it must have been exceedingly difficult for DuBridge to come here and have his predecessor looking over his shoulder.

LIPPINCOTT: Yes, I suppose.

GOODSTEIN: And he was very diplomatic in talking to me about it. But he was a good sport about doing the interviews. When I gave one of my Watson lectures, he introduced me. He gave me a very graceful introduction. Then, when I published *Millikan's School*,⁷ Ed [Edwin] Barber, the editor at Norton, asked me to ask the presidents who succeeded him each to write something as a foreword. And I groaned, but I did it, and they all complied. But DuBridge asked me to come over to his house. I went over to his house, and I brought a tape recorder, and he said to me, "OK, you have to warm me up, so let's talk for a while. Let's just talk." So we talked for a while—maybe about the book. Then he said, "OK, I'm ready, turn on the tape recorder." And

⁷ Judith R. Goodstein, *Millikan's School: A History of the California Institute of Technology* (New York: W. W. Norton, 1991).

he dictated a perfect foreword—almost perfect. I edited it slightly; he said I should. And I sent it to him, and he was happy with it. It didn't need much editing.

LIPPINCOTT: Do you think this is a good place to talk about *Millikan's School*, your first book, which I do want to talk about? How you got the idea and what its impact was. What was the genesis of that book, and when did you start working on it? Was it in the eighties?

GOODSTEIN: I didn't go back to my thesis. Most historians will write a dissertation and then turn it into their first book. When I came here, I was trained in nineteenth-century chemistry, early nineteenth-century chemistry, late eighteenth-century. I decided that I should learn something about twentieth-century science, since I was starting up a twentieth-century archive of science. So I never looked back. I immersed myself in twentieth-century science. It was a conscious decision not to go back and turn the thesis into a book. Sometime in the seventies, I understood that I had to start publishing, if I wanted to call myself a self-respecting historian of science. It wasn't a matter of publish or perish, it was "This is what I need to do."

LIPPINCOTT: Not particularly because you wanted to get tenure?

GOODSTEIN: No. It was something internal to me. I began by writing encyclopedia articles about scientists at Caltech. The very first one I wrote about was Richard Chace Tolman [1974]. The invitation to write it had come to Dan [Kevles]. But Dan said, "Why don't you write it?"

LIPPINCOTT: Was that for the *Dictionary of Scientific Biography*?

GOODSTEIN: Yes, right. And that was my first effort at writing about a twentieth-century person. Even though it was only, I don't know, 750 words, a lot of research went into it.

LIPPINCOTT: He was a seminal figure at Caltech.

GOODSTEIN: And I think that's what launched me. Also I discovered I liked it. I liked writing about people. Then I got more invitations to write more encyclopedia entries about people.

LIPPINCOTT: When you say “encyclopedia entries”—?

GOODSTEIN: Like the *Dictionary of Scientific Biography*. I did a number of them, not always for the DSB. Scribner’s got into the business of publishing biographies, and then there was another—I think Oxford published a multivolume set. I started doing a lot. Then I decided that it was very time-consuming—some of them were bigger, some of them were 1,500 words. And they weren’t all physics; I wrote bios for George Beadle and for Seymour Benzer. I was getting into areas where I had to learn the vocabulary first. When I wrote about those people, I always sent the articles to somebody at Caltech to read, to make sure that what I had said was accurate. Because when you write about something scientific, you have to use very precise language. Historians sometimes use mushy language, which doesn’t matter if it’s just social history. But it matters in science to get it correct. I knew lots of people on the faculty, especially older people on the faculty, who were willing to read because they also enjoyed reading about these people, whom they knew.

LIPPINCOTT: Like Norman Horowitz? [Professor of Biology —ed.]

GOODSTEIN: Norman Horowitz read all my pieces on biology, yes.

LIPPINCOTT: He read on Beadle, I’m sure.

GOODSTEIN: He read on Beadle. He also read my chapter on Thomas Hunt Morgan, and he disagreed with something I wrote, and he and I went back and forth on it.

LIPPINCOTT: Norman was a wonderful, wonderful guy. But he was very opinionated.

GOODSTEIN: He was. He had come here as a graduate student in 1936, when Morgan was the chairman of the Division of Biology, and Morgan was very kind to him. I wrote, and I had the documentation to back it up, that Morgan exhibited certain anti-Semitic traits characteristic of the era. No worse, no better, but certainly characteristic, and probably didn’t consider himself anti-Semitic, either. It just went with the territory.

LIPPINCOTT: A little bit like T. S. Eliot?

GOODSTEIN: Yes.

LIPPINCOTT: And Norman wasn't put off by that at all?

GOODSTEIN: No. In fact Norman said, "You can't say that about Morgan. He was not anti-Semitic. Look at me. Look how he treated me." I said, "Norman, let me send you the documentation," and he said, "Fine." I photocopied all the documentation that I had and I sent it to him. And he read it and he sent it back, and he sent me an article by H. L. Mencken.⁸

LIPPINCOTT: About Morgan?

GOODSTEIN: No, about Jews. I forget what it was supposed to show me. [Laughter] It's been a long time. I don't know if I still have the article. But with regard to what I said about Morgan's anti-Semitism, Norman said, "OK, but personally, I think you could leave it out."

LIPPINCOTT: He was sensitive about it?

GOODSTEIN: He was sensitive about it. But I said, "It tells you something about how they picked professors at Caltech."

LIPPINCOTT: At that time.

GOODSTEIN: At that time. And that's important. The very first biochemist was Jewish, by the way—Henry Borsook, whom Mary Terrall interviewed. And Norman said, "You see? He hired Henry Borsook."

LIPPINCOTT: Norman loved Caltech, and he didn't want to have any shadow over anybody at Caltech.

⁸ Sheldon L. Richman, "Mr. Mencken and the Jews," *The American Scholar*, September 1990, pp. 407-11.

GOODSTEIN: That's a very good point. But he accepted what I did. He was a terrific fellow.

LIPPINCOTT: Yes, he was.

GOODSTEIN: I miss him.

LIPPINCOTT: OK. Now, where were we? *Millikan's School*. What gave you the idea to embark on this book?

GOODSTEIN: I started thinking, "Well, you're writing about these people. What kind of a history could you write?" I should say that a number of historians of science of my generation were coming to the Archives to use the Millikan collection, the Hale collection, the Delbrück collection, and they would ask me questions about the collections. I knew the collections, and I would tell them, "If you're interested in this subject, you should look here," or else "You should look there." And then we'd go to lunch. They essentially picked my brain, to put it crudely. I realized, when I saw what they wrote, that I would get this nice thank-you in the acknowledgments but they were the authors of the books.

LIPPINCOTT: The books? Or the journal articles?

GOODSTEIN: The books, journal articles. In particular, I remember, I had a colleague named Robert Kargon, who's at Johns Hopkins. Kargon and I were good colleagues. I used to always see him at meetings, and he came here to write a biography of Millikan. And he wrote it, and we talked for many hours about it—about what was in the collection, and what did I think of Millikan. I told him what I thought of Millikan. I had gotten to know the collection well.

LIPPINCOTT: You mean Millikan's papers, his correspondence.

GOODSTEIN: That's right, his correspondence—his correspondence dealing with the institute. It's a very rich collection. But also I had gotten to know a lot about Caltech's history and about Millikan from looking at the Hale papers. And in all the various collections you might find references to Millikan, because he wrote to various people who then ended up coming to

Caltech. So you get to see different facets of Millikan. Millikan as the man who is trying to persuade someone to come to Caltech. Millikan as the fund-raiser. Millikan trying to put fires out. Millikan dealing with faculty who want raises. All kinds of things. Millikan on his views about politics, the Republican Party, about religion. I remember talking to Kargon at length about all these things, and Kargon thanked me. He was generous in his acknowledgments, but it was Kargon's book on Millikan.⁹ I think at that moment I understood—

LIPPINCOTT: Did it come out?

GOODSTEIN: Oh, it came out. It was published by Cornell. I said to myself, "Judy, are you going to gripe about not getting more recognition? Stop griping and write a book yourself." That's really the origin of the book.

LIPPINCOTT: That makes perfect sense.

GOODSTEIN: It drove me. I had to get funding for it.

LIPPINCOTT: Did you approach publishers first on your own? For instance, Norton?

GOODSTEIN: No. You know, I had also done some articles for Caltech publications, like *Caltech News*—little vignettes about early Caltech history. You have no idea how much time it took me to write these little things. Also, it was my first effort at interesting narrative writing—not dissertation writing. That's when I found out how wonderful it is to meet editors, to meet people who can edit you and make you look better and enjoy doing that. They didn't want to do the research or write the article, but they enjoyed playing with the text, so I enjoyed that, too. I did some of those, but I realized, "Well, they may go into a book, but how do I organize the book?" Well, I was already getting grants for the Archives; I was pretty successful at that. So I decided that I should go after a grant for a Caltech history, because I understood that the administration was not going to give me any release time to write this book. So I went to Susan Pearce, a woman who was in the Development Office at that time, to talk to her about sources—

⁹ Robert H. Kargon, *The Rise of Robert Millikan: Portrait of a Life in American Science* (Ithaca, NY: Cornell University Press, 1982).

what kind of foundation I should apply to, with their help. Because if you were to go to the NSF, you wouldn't go through Development, but if you went to a foundation, it would go through Development. My proposal would come out under the Caltech letterhead. That's how it works.

LIPPINCOTT: Susan Pearce was a grant writer?

GOODSTEIN: No, not a grant writer. She was in charge of foundation relations. She suggested the foundation that I ultimately got funding from. It's a local foundation—the [John Randolph and Dora] Haynes Foundation.

LIPPINCOTT: What about the Alfred Sloan Foundation? They funded a lot of books on the history of science.

GOODSTEIN: They did. I didn't go to them. I went to Haynes. I wrote a proposal up. I had to work at it. And that's really when I started thinking, "What kind of a book am I going to write?" I remember taking a walk with David and saying, "This book I'm going to write, here's how I think I would write such a book." My idea was to write a book in which I took each of the major subjects of Caltech, the divisions—because you know we're divided not by departments but by divisions, which was Millikan's idea, I think. So I said I would like to write about how physics grew, then how biology grew, chemistry, aeronautics, geology—but in geology I decided to pick a theme, to write about seismology.

LIPPINCOTT: Did you bother with the Humanities and Social Sciences Division?

GOODSTEIN: No, I didn't. I left out humanities and I left out mathematics.

LIPPINCOTT: Well, mathematics would have been in the physics division.

GOODSTEIN: The mathematicians, when the book came out, made some comments, and they're right. They're right, you know. That's why I'm writing this paper on E. T. Bell now, because I feel guilty. I ignored mathematics. I included Harry Bateman, because Harry Bateman came in

the beginning to teach math, but he also taught mathematical physics and aeronautics. I ignored mathematics.

LIPPINCOTT: What did David say to your plan?

GOODSTEIN: He thought that was a good plan. OK, so that's how I wrote it. And I also decided that I wasn't writing a book for the alumni. I did not write about alumni. I got criticized for that, too.

LIPPINCOTT: Really!

GOODSTEIN: I only wrote about those alumni who became professors, because that was part of the history of the institute. The institute would pick from among the best and brightest students and try to keep them at Caltech and not share them with their rivals at MIT and Berkeley and Stanford and Harvard. No, they kept them for themselves. They had educated them, and now they wanted them. If you look at what Caltech did in the 1920s and '30s, they kept their own men.

LIPPINCOTT: It's not that way now.

GOODSTEIN: No. Now it's considered kind of parochial.

LIPPINCOTT: At what point did you start looking for a publisher. How did that work?

GOODSTEIN: I also did some lobbying. One evening, I was sitting at a dinner with the trustees. We were invited because David was chairman of the faculty at that point [1979-1981]. There was a trustees' dinner, to which the chairman of the faculty was invited to represent the faculty, and I was there as the spouse. And I was seated next to Stan [R. Stanton] Avery, who was then chairman of the trustees. You know, making conversation. I made sure to tell him that I ran the Archives and that I was looking to write a history of Caltech and that I had applied to the Haynes Foundation. I had done my homework and I happened to know that he was on the Haynes board. He said, "That's interesting."

LIPPINCOTT: So you got the grant?

GOODSTEIN: I got the grant. Susan Pearce had been a little skeptical when we applied. She said, "Let's see what happens. We'll see if it flies." We got it in on time for the next board meeting of the Haynes. She called me and said, "You know, they liked it. This is good." At that point, I understood I was going to get it. I got the money in 1980, and I was very happy. I found out about it just before we went to Italy in the summer of 1980. I asked for a postdoc, because Caltech would not allow me to take off time from the Archives. I could do the book, but on my own time—after dinner, on weekends.

LIPPINCOTT: So the Haynes money went to pay for the postdoc?

GOODSTEIN: Yes. That's what it did. Research funds—travel funds to go to various archives, to do research. There was that. It was a three-year grant. I had asked for three years' funding. It turned out that I needed more time, and the foundation gave me more time. They were wonderful. Wonderful! I used to write quarterly reports.

LIPPINCOTT: Whom did you hire as a postdoc?

GOODSTEIN: That summer I hired a historian of mathematics who had just gotten his PhD from the University of Wisconsin. His name was John Greenberg. I had advertised for a postdoc and interviewed people. John Greenberg was in Switzerland at the time, and he wrote to me. He came to see me in Grottaferrata. I interviewed him at Franco Scaramuzzi's house. We spent a couple of hours talking, and when I came back to Pasadena, I asked him to be my postdoc.

LIPPINCOTT: What did you want the postdoc to do, specifically?

GOODSTEIN: I wanted the postdoc to help me with the research. For each of the subjects, we would divide up the work.

LIPPINCOTT: Greenberg would do fact-checking, in essence?

GOODSTEIN: He would do more than that—actually look in archives, and figure out what the narrative is, and gather all the documents, and give me a draft.

LIPPINCOTT: And then you did the writing?

GOODSTEIN: And then I did the writing. John's forte— John became a better writer. I helped him with his writing.

LIPPINCOTT: He did a couple of oral histories, too.

GOODSTEIN: John did oral histories, too, because he became very interested in Willy [William A.] Fowler and nuclear physics, the rise of nuclear physics, and that was a chapter—called “Nuclear Reactions.” While I had nailed down certain topics, the fine-tuning came when John came. And John liked it so much, I let him run with nuclear physics. He probably did enough research to write a monograph, to write a book. And in the process, he interviewed Fowler, and Fowler won the Nobel Prize [1983] while John was interviewing him. It was very exciting.

LIPPINCOTT: Did you do any interviewing of faculty at Caltech yourself? I don't mean for oral histories, I mean for the book per se. Or were you just writing it at night?

GOODSTEIN: I was writing it up and also doing my own research. Because John didn't do anything on seismology or anything on biology; he didn't do anything on the early chapters at all. He didn't do anything on Millikan. He worked on the nuclear physics, and on background on some of the others. I sent him to the Library of Congress for the mathematics. He worked on the mathematics.

LIPPINCOTT: Which you didn't use?

GOODSTEIN: Which I didn't use. So I'm making amends now.

LIPPINCOTT: How are you making amends?

GOODSTEIN: By using some of John’s material; and by reading everything he wrote.

LIPPINCOTT: You’re writing a paper—

GOODSTEIN: On E. T. Bell and the rise of mathematics at Caltech.¹⁰

I had a problem. I had to finish the book by 1991, because that was the centennial. Caltech began as Throop University in 1891. They decided to celebrate the centennial in 1991. It was a fund-raising opportunity. They had a big campaign.

LIPPINCOTT: So your book had to be out by then.

GOODSTEIN: Oh, yes. What happened was, John was with me for four years and then he left. I had a lot of notes, a lot of drafts, but no real chapters. After John left, I got busy. In 1985, maybe ’86—around then—I said, “This is serious. I better start writing chapters.” And at some point, Ed Barber walked into my office.

LIPPINCOTT: Without your approaching him?

GOODSTEIN: Absolutely. Ed Barber viewed Caltech as source material for books.

LIPPINCOTT: Well, he did [Feynman Professor of Theoretical Physics] Kip Thorne’s book.¹¹

GOODSTEIN: And [Caltech Professor of Planetary Science, d. Aug. 29, 2013] Bruce Murray’s.¹²

LIPPINCOTT: Ed Barber, we should say, is one of the big macho honchos.

GOODSTEIN: He was a senior editor.

¹⁰ “E. T. Bell and Mathematics at Caltech Between the Wars,” with Donald Babbitt, *Notices Amer. Math. Soc.*, 60: 686-98 (2013).

¹¹ Kip S. Thorne, *Black Holes and Time Warps: Einstein’s Outrageous Legacy* (New York: W. W. Norton, 1994).

¹² Bruce Murray, *Journey into Space: The First Thirty Years of Space Exploration* (New York: W. W. Norton, 1989).

LIPPINCOTT: At W. W. Norton, in New York. And he had probably already been at Caltech to talk to Kip Thorne and Bruce Murray.

GOODSTEIN: He had probably gone to see Dan Kevles, too, and perhaps Dan told him to come see me. Someone said, "You should go see Judy."

LIPPINCOTT: Did they say that because they knew you were writing this book?

GOODSTEIN: It's possible, yes.

LIPPINCOTT: OK, so he approached you.

GOODSTEIN: He came to me. And he was very debonair and very charming.

LIPPINCOTT: Of course.

GOODSTEIN: He definitely seduced me with his words. And Norton is the book company you want.

LIPPINCOTT: Oh, yes, it's wonderful.

GOODSTEIN: And I said, "OK." That's all.

LIPPINCOTT: So that was simple.

GOODSTEIN: That was really simple.

LIPPINCOTT: And of course he was happy to hear about the coincidence of Caltech's centennial coming up.

GOODSTEIN: Oh, yes! And then he started writing me notes, "Well, how are the chapters coming? Please send them on to me." Then I really got into it.

LIPPINCOTT: This is in the late eighties.

GOODSTEIN: The late eighties. I was working very hard getting them out. I would write a couple of chapters, and I'd send them to Ed. He'd mark them up in pencil, sometimes with a red pen, to indicate where something should go, with comments.

LIPPINCOTT: Just a very good line edit?

GOODSTEIN: What a line editor! He told me I had too much in the beginning. We had to cut out material. By now I was sitting in the Registrar's Office.

LIPPINCOTT: You'd become the registrar.

GOODSTEIN: In 1989, I'd become the registrar, and I was under the gun to get the book out. And the president of Caltech, Tom [Thomas E.] Everhart [Caltech president 1987-1997], had the nerve to come up to me at some meeting and whisper in my ear, "How's the book? We need the book."

LIPPINCOTT: Oh, that's nice.

GOODSTEIN: You think it's nice? It's ironic. He didn't give me any money. He didn't give me any free time. But he said, "Where's the book?" As if suddenly this was part of—

LIPPINCOTT: He might have been fairly unconscious as to what was involved in putting a book out.

GOODSTEIN: Maybe. Maybe, but I didn't appreciate it. I felt really under the gun at that point from the administration. They kept asking me, "Where's the book? How's it coming?" They all knew I was writing it.

LIPPINCOTT: Meanwhile, you had to be the registrar and the archivist.

GOODSTEIN: But sometimes I really had dead time in the Registrar's Office. There would be periods when you could work twenty-four/seven, and other times when it was quiet. I had a staff of four, and they were running the show, doing the mechanical things, and they didn't want me interfering. I would sit in my office.

LIPPINCOTT: Would you write some of the book?

GOODSTEIN: I wouldn't write, but I looked at those chapters that Ed said I had to cut, and I cut them. I remember sitting there. It was quiet. Everything was fine. I was going to sit there until five o'clock, until the office closed, and I just did it. And I did a good job. [Laughter] I thought, "It's difficult to kill off your swans, but you know, some are geese, and it's time to let them go." I got into quite a routine with Ed. It flowed back and forth, and by the end there was much less line editing. I learned a lot from Ed.

LIPPINCOTT: Yes, I'm sure you did.

GOODSTEIN: They gave me a contract, they gave me an advance, and at the very end Ed said—and here we're going to press—Ed said, "Judy, we would like it if Caltech would order a few copies of the book." I said, "Really?" Oh, yes.

LIPPINCOTT: Well, wouldn't Caltech do that? I mean, Everhart was interested in it, and the centennial's coming. They have the bookstore.

GOODSTEIN: But Norton wasn't going to ask; they wanted me to ask. So I went to the vice president for institute relations, Tom [Thomas W.] Anderson, wonderful fellow, and I said, "Norton has asked me if you would buy some copies of the book. Would you like to see the manuscript?" I had a complete manuscript; it was all edited; it was clean. And Tom said, "Yes, of course." I gave it to him. About a week later, maybe even less, he said, "You bet. We'll order two hundred copies."

LIPPINCOTT: Terrific. And then they put them up in the bookstore.

GOODSTEIN: Or they used them to give out to donors—prospective donors. I understood why, it was a useful book for them. And it was sold in the bookstore. And it's in paperback now. But you know what Tom Anderson told me? He never read it. He gave it to his wife, whose name was Rosalie, and Rosalie told her husband, "It's a wonderful book." That was good.

LIPPINCOTT: When you were writing it, did you have any of it vetted by anybody on the faculty or the administration, or did you just depend on John Greenberg and your own research?

GOODSTEIN: I sent the nuclear physics chapter to Willy Fowler to read, and he liked it. He said the physics was good. I sent the Pauling chapter to Linus Pauling.

LIPPINCOTT: Well, that was good of you.

GOODSTEIN: And he liked it, too. He wrote something for the back jacket of the book.

LIPPINCOTT: So there weren't any objections?

GOODSTEIN: No. And then the seismology chapter I sent to Hiroo Kanamori [Smits Professor of Geophysics, emeritus], and he approved it. I thought, to go into print about a school like Caltech you don't want to find out afterward that you've made a silly mistake. And David read all the chapters, too. So I knew that my basic physics was in good shape.

LIPPINCOTT: How about aeronautics? Because there's quite a bit in the book about that.

GOODSTEIN: Aeronautics—that's a good question. You know, I think I must have felt pretty comfortable about it, because I can't think of anybody in aero that I showed it to.

LIPPINCOTT: The rocket project was pretty well documented.

GOODSTEIN: That's correct.

LIPPINCOTT: Maybe this would be a good time to quit? What do you think?

GOODSTEIN: I think so. Thank you.

[Recording ends.]

JUDITH R. GOODSTEIN

SESSION 4

October 3, 2012

LIPPINCOTT: We're going to talk today about the establishment of the Beckman Institute and the decision to move the Caltech Archives from the basement of Millikan Library over to Beckman. What can you tell us about that?

GOODSTEIN: Well, by 1989 I had run out of space in the basement of Millikan. I had so many collections that I didn't know where to put them all, plus I had all these books we had accumulated, which the library was throwing out and which I thought would make a very good landmark collection of books in the history of science. And I had also accumulated by now a lot of laboratory apparatus from the beginning of the twentieth century—

LIPPINCOTT: Scientific instruments—

GOODSTEIN: Scientific instruments that had been used at Caltech going back to the very earliest days and had been replaced by more modern instruments and had been tucked away in closets. We had, over time, been cleaning out those closets and finding wonderful instruments.

LIPPINCOTT: Can you give me one or two examples?

GOODSTEIN: I think at one point I had Millikan's oil-drop apparatus. When Millikan came to Caltech from Chicago, he built a new oil-drop apparatus, and in his lab they used it to refine the measurement of the charge on the electron.

LIPPINCOTT: When you say "they," you mean Millikan—

GOODSTEIN: And his graduate students. So I had that; that was a big piece of equipment. Then I had a long black tube that had been used for another one of his experiments. Ultimately we just gave up on it. It was part of the experimental set-up, and it didn't seem to have too much

significance by itself. It weighed a ton, and there was no place to put it. In fact, things had gotten so bad that I remember complaining to Ed [Edward C.] Stone, who was then chairman [1983-1988] of the Division of Physics, Mathematics, and Astronomy, that I was probably going to look for another job, because I had no cooperation, no sympathy, from the library, and no space. My request to the administration for additional space had fallen on deaf ears.

LIPPINCOTT: This isn't unusual, by the way, is it?

GOODSTEIN: No, it's not. Nevertheless, I thought we had wonderful stuff, and I was getting more, and I didn't know what to do with it all.

LIPPINCOTT: What did Stone say?

GOODSTEIN: First he said, "Hmmm, let me think about it." And then he came back and said, "You know, we have space we are not currently using. We will use it, but at the moment we're not. It's in a room underneath East Bridge, and you can't access it from the building proper. You have to walk outside the building and down a flight of stairs. It used to be a storeroom. Would you like to look at it?" I said, "Of course!" I looked at it. It was dirty, it didn't have proper lighting, and it was full of junk. He said, "OK, I'll have it cleaned out, if you'll pay for the shelving." I said, "That's fine, because I have money in my various budgets for shelving."

LIPPINCOTT: Would this be for the instruments?

GOODSTEIN: It was for anything I wanted. I didn't put paper there—I thought it might be a little damp. But I thought I could use it for instruments and perhaps some paperwork that didn't have as high a research value. It took maybe a couple of weeks, with Ed getting Physical Plant to do the cleanup, and then we had to buy the shelving, basic utility shelving, and we had some new lighting put in, and it was wonderful! So all the excess went over there—that was a short-term solution. Around this time, David became vice provost, and the administration always had meetings before the start of an academic year—that is, the president, the provost, the vice provost, and their spouses would meet someplace off campus—and during the day the

administration would take up agendas, presumably to do with the running of the institute for the year. And then in the evening it was socializing. There would be a cocktail hour, and then dinner.

LIPPINCOTT: This would be not in Pasadena?

GOODSTEIN: Not in Pasadena, at least not then. And this particular meeting was my first meeting where I met the administration as the spouse of David in his new capacity as vice provost. It's true that I knew almost everybody already from my dealings with them as archivist. It was in La Jolla. The dinner was in a restaurant overlooking the ocean. I was seated next to Barclay Kamb—because Barclay Kamb was the first provost that David served as vice provost. I'm not sure if I'd ever spoken to Barclay before. But we sit down, and Barclay says, "So how's the Archives?" I said, "Well, as you might know, I think I have written you a memo." And we both laughed. "I'm out of space and I need some help." He must have said, "Yes, I've read your memo. I was thinking there's something I might be able to do for the Archives." Then he told me there were plans for the Beckman Institute. He explained that the funding had come from Arnold Beckman but that, as it turned out, Beckman's funds were going to cover ninety percent of the cost of the Beckman Institute and ten percent was being footed by Caltech. And he, as provost, had control of the ten percent of the space, as a consequence. And he thought he could find space for the Archives in the Beckman Institute. I said that would be wonderful. He said, "Well, let's see how it works out." And sure enough, it worked out. And that's how Barclay's ten percent translated into space for the Archives. This is a space of two thousand square feet, in the sub-basement of Beckman. And then Barclay also gave the library itself two thousand square feet, and that space is contiguous with ours.

LIPPINCOTT: The library. You mean—

GOODSTEIN: Millikan. Well, Millikan and essentially all the branch libraries. Millikan had also been running out of space over the years.

LIPPINCOTT: And is that down here, too?

GOODSTEIN: Yes, it's right next door.

LIPPINCOTT: I guess they moved some of their collections over here.

GOODSTEIN: The old runs of journals that were not used very much. Gift books that would come in. For a long time, the [Clinton K.] Judy collection languished next door, too. It had been in [Donald E.] Baxter [Hall of the Humanities and Social Sciences], but then they took the space in Baxter and turned it into office space.

LIPPINCOTT: OK. So you got two thousand square feet in the sub-basement.

GOODSTEIN: Yes, and then—

LIPPINCOTT: And its state-of-the-art shelving?

GOODSTEIN: Well, that was the next issue—how to finance the installation. You had to design the space, and then you needed state-of-the-art security, especially for the rare books. And then there was the question of what kind of shelving.

LIPPINCOTT: What you have back there now are those compact movable—

GOODSTEIN: Yes, those are movable bookshelves.

LIPPINCOTT: A human being could be crushed to death.

GOODSTEIN: No, no—there's a safety bar at the bottom—which we've all tried. It works. You cannot get turned into a pancake.

LIPPINCOTT: It's to provide lots and lots of room for the shelves?

GOODSTEIN: Yes. It's the size of a football field—or it feels like the size of a football field—with the compact shelving. I remember that the president of Caltech at the time, Tom Everhart, thought— Actually, that was my first contact with Everhart, these administration meetings. Everhart inserted himself to say, “Oh, no, why spend all the extra money on electric compact shelving”—where you push a button and it opens by itself automatically. “We should get the kind with wheels, and move them manually.” That was such a crazy idea, because these shelves are so long that it would take amazons to move them, and it would take forever. We, physically, were not up for that. It didn't make sense. And he's an engineer by training; he should have thought of that. Anyway, wiser heads prevailed. But then there was another player in this story as to why the Archives looks as good as it looks. I asked the assistant archivist, a woman by the name of Paula Hurwitz, who had been working with me for several years, if she would take on, as a project, how to move the stuff over from Millikan and where to put it.

LIPPINCOTT: The logistics.

GOODSTEIN: The logistics. It's nontrivial. Where the collections should be, and how to color-code the boxes. I was told that Pink's [Transfer, Moving, & Storage] would do all the moving. We wouldn't have to move anything ourselves, but we needed to give them the battle plan. We had about a year to work on it. But Paula was very unhappy with the assignment. She had always wanted more authority in the Archives, and I thought this was a wonderful task, which gave her a lot of authority. I was not going to micromanage it, because I became registrar around this time and I had a lot on my plate, plus I had to finish writing *Millikan's School*. There were personal things going on in her family, and she came in one day and said to me, “I'm quitting.”

LIPPINCOTT: In the middle of the project?

GOODSTEIN: In the middle of everything. So Paula never got to see the place with her— Because she had already mostly finished the battle plan, the logistical plan, when she left. That's when Shelley came [as assistant archivist].

LIPPINCOTT: And you were moving over to the Registrar's Office?

GOODSTEIN: I was half-time at the Archives at that point and half-time in the Registrar's Office. The Registrar's Office gets busy in the afternoon, because the students sleep in in the morning. [Laughter] And so, unless it's a crisis, students do not come to see you early in the morning. Except in their senior year, when they're going to graduate, and they have to go over their program, their academic transcript, with the registrar to make sure they've done everything they should have done to graduate—so then some of them come in the morning. But mainly the students come in the afternoon. So I would be in the Archives in the morning.

LIPPINCOTT: OK. Let's talk a little bit about the registrar's job now. Now we're in the very late eighties, when David becomes vice provost and you become the registrar. Tell me how your appointment as registrar happened. Did you want something like that to happen?

GOODSTEIN: Yes. By 1989 I had already spoken to a colleague about becoming a dean at one of the state colleges—at Cal State LA—because I was really looking to do something else.

LIPPINCOTT: In administration?

GOODSTEIN: Yes. Whatever it took. A colleague had called me up I think a year before and inquired if I would be interested in coming to Harvard, on a temporary basis, for a year as a visiting professor. I liked that idea very much, and we had this conversation, and then a second conversation. She gave me time to think about it and then called me back. I *had* thought about it. David said he would come—he would take a leave of absence. She said, "I forgot to ask you one important question: How old are you?" She should not have asked that question. It's against the law.

LIPPINCOTT: Oh, yes, I think it is.

GOODSTEIN: I told her how old I was, and she said—

LIPPINCOTT: Which was what, then?

GOODSTEIN: I was born in '39, and if this was 1988, I was almost fifty. I just missed what Harvard considered its cut-off for inviting someone to come as a visiting professor. Or maybe they had something else in mind, I don't know, but she said to me, "We can't invite you." It had to do with the age, that's all I can tell you. So I was disappointed. I had gotten several inquiry letters from colleagues at places like Irvine, because there was already a lot of affirmative action, and they were looking to recruit women—in the history of science, anyway. So I was exploring. And then David came home one night and said he had heard, probably at one of his meetings that involved the division chairs and the vice presidents, that the registrar, Lyman Bonner, who had been on the job for many, many years and was over seventy— That there was some grumbling that he had become—well, to put it not too delicately—too old for the job. And he was resisting all hints that maybe he should retire.

LIPPINCOTT: Let's say, at this point, what the registrar does. Let's just lay that out. What are the duties?

GOODSTEIN: The duties are to make sure that the institute is in compliance with its rules for its undergraduate and graduate students. That is, the catalog says what courses a student needs to take in every field in order to graduate, and it tells you how many terms you have to be in residence if you have transferred from another college. If, for example, you're majoring in physics it tells you what the requirements are. The registrar has to know the requirements for each of the options, whether it's a major or a minor. What are the requirements for the PhD students? Have they been in residence enough terms? Have they satisfied all of the requirements? And above all, the registrar has to be like Caesar's wife—above the suspicion that a student has offered a bribe to get out of Caltech with a degree. I mean, it's possible, especially when I came in. I thought it was all loosey-goosey, some of the things. The professors tended to lean on the registrar if they hadn't turned in their grades yet, to give them more time. But if a student needs to graduate, and you don't have a grade—in a silly course like ceramics, or one of the three-unit courses students take, something light, something recreational, or even a PE [physical education] course—if you don't have the grade, the registrar can't put in a grade. You need the grade. Sometimes if a grade hasn't come in, a student's GPA [grade point average] will

be below the minimum to remain in good standing in the institute. The registrar has to take care of all of that.

LIPPINCOTT: And when you arrived, you felt there was this kind of loose attitude?

GOODSTEIN: Well, I'll tell you, the day after the announcement that I had been made registrar appeared in the student newspaper [the *California Tech*, April 7, 1989], with a nice picture of me and a nice story, professors I knew came up to me and said, "Oh, Judy, I'll get my grades in." I had no idea what they were talking about. One of them was Barclay Kamb, who used to go off to Antarctica to do his research on ice and glaciers and was slow in getting grades in for the graduate students. In the beginning, it doesn't really matter if you don't have a grade for a graduate student, assuming that he or she is in good standing, but when it comes time to graduate, you need the grade.

LIPPINCOTT: To get the PhD?

GOODSTEIN: Yes, to get the PhD. Also just compiling the list of students who are not in good standing, as opposed to the students who are, is an emotionally volatile issue. And there were several committees that the registrar automatically served on, *ex officio*, because they involved students and their grade point averages. One was UASH, the Undergraduate Academic Standards and Honors committee. All the kids who are deficient in their grade points, or below one-point-nine, have to petition to remain at the institute, and—

LIPPINCOTT: Is one-point-nine the cutoff?

GOODSTEIN: It used to be; I'm assuming it still is. And the registrar would come to these meetings at the beginning of each quarter, and in the beginning, until almost the very end, I would take notes, because Lyman used to take the notes at these meetings. It's painful. The kids come. Sometimes they cry. They weep. There's always a box of tissues. The first reinstatement used to be automatic; the deans would give it. But then after that, a second or third reinstatement had to go before the UASH committee, and the chair of the committee would work

with the registrar. I worked with some very good chairs.

LIPPINCOTT: For instance? Do you remember?

GOODSTEIN: Harvey Newman [professor of physics] was one of the chairs.

LIPPINCOTT: And he did a good job?

GOODSTEIN: He did a good job. He was very fair-minded. When I first came onboard, there were a few emotional members of that committee, and I clashed with them, because I spoke my mind. Then I realized that Lyman had probably never said a word—Lyman just sat there. I clashed with the physicist Ricardo Gomez.

LIPPINCOTT: In what way did you and he disagree?

GOODSTEIN: I may have said—well, look, I'm guessing—that if the record says the student has been reinstated three times, maybe it makes sense to send the student away.

LIPPINCOTT: Send them away?

GOODSTEIN: Tell them they can't register, that they don't meet the minimum standards.

LIPPINCOTT: That they'll have to leave?

GOODSTEIN: Leave. And then they'll try and get into a community college, or maybe hold down a job for the first time in their life and get up on time. Well, that's very important. Because it's not that the students can't do the work. The students get into trouble academically because they don't go to class. In high school, some of these students were so good, so smart, that they had learned how to game the system and score very well on the SATs. And so they were admitted to Caltech and then they fell apart, because they didn't have discipline. They slept until noon, and they would stay up all night playing computer games.

LIPPINCOTT: Oh, not doing physics problems.

GOODSTEIN: Not doing physics problems. And in fact, to relieve the pressure, back in the eighties the faculty had instituted a no-grades policy for the freshman year. So in a sense, it was even easier, because it took an awful lot to get an F in your freshman year, because it was pass-fail.

LIPPINCOTT: So there was a great deal of leeway for the freshmen.

GOODSTEIN: For the freshmen. Then came the sophomore year, and suddenly, *boom!* Some of them simply didn't know how to cope. Either they slept and didn't go to class, or they became very involved in activities. They really went the whole nine yards with student affairs, became president of their house, got onto committees, and worked so hard on their committees that they forgot the real reason why they were at Caltech.

LIPPINCOTT: So Gomez was inclined to give such people a break. Is that it?

GOODSTEIN: Possibly, I don't quite remember. But I do remember that he complained to somebody on the faculty about me. Sunney Chan [Hoag Professor of Biophysical Chemistry, emeritus], who was chair of the faculty [1987-1989] at the time, came and spoke to the UASH committee and told them what their responsibilities were.

LIPPINCOTT: More or less in line with the way you—?

GOODSTEIN: More or less. I thought Sunney Chan came to back me up, and it had the desired effect—the committee was too loose. I thought my job was to be the enforcer of Caltech's rules and regulations as stated in the catalog. I remember speaking to Jim [James J.] Morgan [Goldberger Professor of Environmental Engineering Science, emeritus], the vice president for student affairs at the time, because he was the person I reported to. And perhaps Morgan said, "Well, you have to be very diplomatic. These are the faculty, they do not like to be—"

LIPPINCOTT: Contravened?

GOODSTEIN: Contravened. So that was the only one real issue. But I was registrar for fourteen-and-a-half years; there were some UASH committees that were better than others. It's hard. Your emotions— Some of the faculty were strict constructionists, and they resigned from the committee, or they spent one year on the committee and then they got off, because they didn't approve of the committee's being lenient with students. I remember one engineer who had been a Caltech graduate and was now on the faculty, and I remember saying to him, "You went off the committee. I enjoyed your presence. You were a voice of reason. Why did you get off it?" He said, "Because I couldn't stand it. I worked hard when I was at Caltech, and I have no patience with students who don't." OK. So that was the UASH committee. Another faculty committee dealt with awards and honors and I attended those meetings because I brought the GPAs of the students, their transcripts.

LIPPINCOTT: These are awards that are given out—

GOODSTEIN: At commencement. And I don't think I had much to say there. I used to listen. I was *ex officio*—or maybe I was a standing member, I don't remember. And then I was on one other committee, *ex officio* at that time—the committee on Convocations.

LIPPINCOTT: On what?

GOODSTEIN: Convocations. Graduation. You know, selecting the speaker and selecting the marshals. You know, at graduation there's always somebody at the head of each group—at the head of the trustees, of the faculty, of the graduate students, walking in front of each of these groups of people. Those are the marshals.

LIPPINCOTT: So the procession is not chaotic.

GOODSTEIN: That's correct. And then all the students. So I was on that, and I ultimately served

as the chair of Convocations for a couple of years.

LIPPINCOTT: And this would all have been under Everhart?

GOODSTEIN: Yes, this was under Everhart and then [David] Baltimore [Caltech president 1997-2006]. There was always a rehearsal the afternoon before graduation, and I came, just reminding people where they were all supposed to stand. Then my other function as registrar was on graduation day: I stood up when the diplomas were to be handed out. At Caltech, we hand out an individualized diploma. My office was also responsible for that—ordering diplomas, having the names written on all the diplomas, putting the diplomas in order so that when John James or Mary James comes up, the president hands them the right diploma.

LIPPINCOTT: Yes, I remember you standing beside the president.

GOODSTEIN: That's right, and I used to hand the diploma to him in an envelope with the person's name on it, and he would then hand it to the student and give him, or her, an embrace. Sometimes the students had things in their hands to give the president, and he would quickly give them to me, and I was supposed to throw them away—like Teddy bears, chewing gum, Silly Putty, all kinds of things. We handed out all the diplomas, and then somebody—usually one of my colleagues in student affairs—would hand me, or would hand the president, the hood.

LIPPINCOTT: For the PhDs?

GOODSTEIN: That's right, for the PhDs. We had to also hand out the hoods. So those were some of my tasks as registrar. You know, in the early years the Convocations committee really did pick the speaker. They made the nominations and it went to the president. During the years I was there, the president accepted the nominations. Students had a lot to say, because they're going to listen to the speaker. Caltech's commencement speaker does not receive an honorarium or an honorary degree. Which limits —

LIPPINCOTT: Well, I know Caltech doesn't give honorary degrees to anybody.

GOODSTEIN: And no honorarium to the speaker.

LIPPINCOTT: They don't? Why?

GOODSTEIN: I don't know. I have no idea. I always thought that the best commencement speakers were the faculty people the students requested. Feynman spoke one year, and Harry Gray [Beckman Professor of Chemistry] spoke another year, and Max Delbrück spoke another year. They were all terrific, and I think the students enjoyed them tremendously. I see nothing wrong with having the faculty serve in that capacity if asked to. Toward the end of my tenure as Convocations chair —

LIPPINCOTT: What year?

GOODSTEIN: It was under Everhart. I suggested to the committee, did they think perhaps we should have as speaker one of our trustees, Jewel Plummer Cobb? She had been the president of Cal State Fullerton. But it was just one of many names. I thought we should send the president a short list, so he had some choice in the matter, and so her name went forward, but with other names. But I had a cantankerous Convocations committee that year. Chris [Christopher E.] Brennen [Hayman Professor of Mechanical Engineering, emeritus] was on it, and he had very strong ideas that the president of Ireland, who was also a woman, should be the speaker. She was a very dynamic speaker, as I remember, but—

LIPPINCOTT: But she was in Ireland!

GOODSTEIN: And she was Irish, and Chris Brennen—

LIPPINCOTT: Is Irish.

GOODSTEIN: And Everhart came back and said, "I want the trustee." And I had to tell this to the Convocations committee. "What do you mean? *We* make the decision, not the president. We

don't like his choice." I said, "Well, the president has said this is the person he wants." So I got in Dutch with the committee. Perhaps if I had been more polished as a negotiator between faculty members who thought it was their right and students who thought it was their right and the president who thought it was his right—

LIPPINCOTT: It was impossible.

GOODSTEIN: It was impossible. I bring this up because this year, 2012, a notice has come out—the first time I have ever seen such a notice—from Hall Daily, who's the head of government relations at Caltech, in which he writes that the president has the authority to pick the convocation speaker. The faculty can make suggestions, and the students can make suggestions, and they will listen to the students, because, after all, it's they who are graduating, but it's the president who has the authority, and please bear in mind that it should be someone Caltech would respect. Then Hall lists a whole bunch of criteria, and I thought to myself, "How far we've come, how much we've changed." What it tells you is that Convocations is now a committee in name only. It had real authority when I was the chair.

LIPPINCOTT: How about that particular year, what happened? Was the female trustee selected finally?

GOODSTEIN: Yes, she was, and it was a very poor speech. She obviously hadn't written it. She read it, and she droned on, and she lost her way from time to time. It was sad. It should have been cut, and she should have realized that. She may have been a very effective president of Cal State Fullerton, but she was not very effective by the time she gave the speech.

LIPPINCOTT: All right. Anything else you'd like to say about the registrar's job? Did you have any particularly spectacular successes?

GOODSTEIN: Well, yes, in that it ran smoothly. You always get some complaints. Morgan said to me that if you don't get any complaints, you're not doing your job.

LIPPINCOTT: Some of the students must have been hard on you—when they come in toward the end of the year and weep.

GOODSTEIN: The registrar can figure out ways for a student to petition, how to write a petition.

LIPPINCOTT: Or to make up for some—?

GOODSTEIN: How to make up. And then I would often have consultations with the deans. The registrar and the deans would often put their heads together: “What can we do, within the law, to help this student?” I had various successes—things that I felt good about when I put my head down on the pillow at night.

You had a certain number of students who dropped out of Caltech, usually for academic reasons. They just went away.

LIPPINCOTT: This is undergraduates?

GOODSTEIN: Undergraduates, not graduate students.

LIPPINCOTT: Did you have a lot to do with the graduate students also?

GOODSTEIN: Only to the extent that when I took over, the graduate students were very lax about registering, and we had graduate students who were in classes for several terms and never bothered to register. And that’s because there were no teeth in the rules. If you want them to register, you have to impose a penalty and make it stick.

LIPPINCOTT: Did they know they were supposed to register?

GOODSTEIN: Of course they knew it. We sent them letters. Lots of mailings go out. And when I imposed the fine, the penalty, for late registration, I took it up with Faculty Board—probably the vice president for student affairs took it up on my behalf—and it passed. Once, I had to go before the Faculty Board to make a case myself. I can’t remember what the issue was, but I had

to do it. So I prepared my words beforehand—they were brief. No one likes to listen to a long disputation. I said my piece and sat down and, much to my surprise, I had very friendly questions. And whatever it was that I asked the Faculty Board for, they approved unanimously. I was expecting some objections.

LIPPINCOTT: Was this in regard to a particular student?

GOODSTEIN: No, it was about a policy, and I don't remember what the policy was.

LIPPINCOTT: By that time, were you still a half-time registrar?

GOODSTEIN: I always remained, until the end, half and half.

LIPPINCOTT: Half registrar, half archivist?

GOODSTEIN: Right. And of course during the spring I worked much more as the registrar than as the archivist. In the beginning, Morgan had asked me, "What percentage of your time do you want as registrar?" and I said, "Fifty-fifty." But it was probably more accurate to say that at times it was seventy-five/twenty-five. During the summer, on the other hand, it was very quiet in the Registrar's Office, so it evened out, I suppose. Maybe it evened out over the year.

LIPPINCOTT: And Shelley was your second in command at the Archives?

GOODSTEIN: Yes. So, back to the penalty for late registration; it was fifty dollars, and we enforced it. And by the way, after we enforced it, we got ninety-five percent registered. But I had a few graduate students who came to see me and said they couldn't afford the fifty dollars, and what was I doing taking food out of the mouths of their children? I think in a few cases I said, "Yes, yes, OK. You promise me on your child's head that you will always register? OK." But at least in one case I looked at the record, and after we had given a warning and the student still hadn't registered, I said, "I have to make it stick." He was not happy.

LIPPINCOTT: Well, fifty dollars—that's not tremendous.

GOODSTEIN: To a graduate student it probably is. They live from paycheck to paycheck. When they have children, everything's more expensive. But it worked.

LIPPINCOTT: How much help did you have in the Registrar's Office?

GOODSTEIN: I had Linda King, my second in command, who was wonderful. And then we had a woman at the undergraduate desk and a woman at the graduate desk, and one other woman who did a lot of data entry tasks. Occasionally we brought in undergraduate students, student help, at graduation time.

LIPPINCOTT: Was that clerical help?

GOODSTEIN: Mostly clerical. The staff, of course, also had access to the permanent record cards. In the beginning, they also entered the grades online. By the time I left, the faculty could enter the grades themselves online.

LIPPINCOTT: Did you ever have any problems with students breaking in and trying to change their grades, or anything like that?

GOODSTEIN: No, but I did have an issue with an undergraduate who changed her grades.

LIPPINCOTT: How did she do that?

GOODSTEIN: Very simple. You see, we're on the honor system at Caltech. You trust your fellow students. You trust the faculty not to do anything wrong. This young woman brought in a note to the Registrar's Office, which she handed to my staff, which said please change the grade of so-and-so because she did additional work, or showed me her exam, and I gave her additional points. So please change it from, let's say, B-plus to A. Under the grade-point system at Caltech, you get extra fractions of points for pluses and minuses, so A-plus is worth more than

an A. This happened several times, same student. I didn't realize that students could do this, could just bring a note in.

LIPPINCOTT: Did she forge her professor's signature?

GOODSTEIN: Yes. Yes. I was deeply offended.

LIPPINCOTT: How did you find out?

GOODSTEIN: Linda came to me and said, "Look, this is the second time." I said, "Linda, you accept such notes?"

LIPPINCOTT: Without calling?

GOODSTEIN: "Without calling the professor? Without the note coming by mail in a sealed envelope. How do you check?" So, it turned out that that was a gap in the registrar's internal security system. As I say, we're on the honor system, so you don't expect things like that to happen.

LIPPINCOTT: This one student may be the only one? Or one of the very few?

GOODSTEIN: Let's hope so. By the way, we reported it to the dean. It went to the BOC, the Board of Control, see, because the faculty doesn't have charge of such misdeeds. If it's a student misdeed, it goes to the BOC. They deal with student "crimes," in quotation marks. It's made up of students. That's why some students get into trouble academically; they get onto the Board of Control and they take their job very seriously. It's like the Supreme Court. They can spend hours, to the detriment of their own academic programs.

LIPPINCOTT: So they're scrupulous?

GOODSTEIN: They are scrupulous.

LIPPINCOTT: They're good citizens of Caltech.

GOODSTEIN: Right—maybe too good at times. If it means that their own academic success is harmed, I think that's not good. Their own academic success is more important. The students decided that this young woman should leave the institute, but the institute took her back in the following year. That shocked me; I spoke to the dean of students about that. The dean of students reinstated her. She came back after one term out, and I said, "You know, there are schools where, when a student is caught cheating like this, they throw them out. They do not take them back."

LIPPINCOTT: She was suspended; she wasn't expelled?

GOODSTEIN: That's right. I thought she should have been expelled. The dean disagreed with me. The dean at the time was Jean-Paul Revel, a biologist. I said, "She's going to become a doctor; that was her excuse for changing the grades. She needed good grades to get into medical school. Just think of this: Someday she'll be a doctor and she will have cheated in medical school, too, I'm sure of it. She's done it once. I might end up being her patient." He said to me, "Oh, there's a former student of mine who's a doctor. I never want to have a problem in Chicago, because he practices in Chicago." [Laughter] I mean, I felt that was a miscarriage of justice. It didn't speak well for Caltech's reputation.

LIPPINCOTT: No, but that's an interesting process, and it's interesting to know that at least it didn't happen very often.

GOODSTEIN: I don't think it did. Not to my knowledge.

The students who dropped out of Caltech because of poor academic performance would often come back years later. They've now matured—years later. They would like to come back to Caltech and complete their degree. Some of these students were in their thirties and forties.

LIPPINCOTT: Were these undergraduates?

GOODSTEIN: Undergraduates. And they would first come to see me. I presume that before my time they came to see Lyman. They'd make an appointment, and I'd give them as much time as they needed. A lot of them were heartbreaking stories—or heartwarming stories. They'd learned discipline. They'd gotten married and had families. But there was something that bothered them. They wanted to get their Caltech degree. So then they would petition UASH. Sometimes UASH asked to see the student. UASH meets before each of the academic terms. Sometimes the committee would say, “Yes, we will allow you to come back again.” Sometimes it was successful, and sometimes it was unsuccessful. It was sad if it was unsuccessful, because they wanted so badly—

LIPPINCOTT: Why would they be turned away, in those circumstances? Because the UASH committee thought maybe they couldn't do the work?

GOODSTEIN: That's right. The committee thought that too much time had elapsed, and the former student probably wouldn't remember calculus, or all of the basic courses you need to take advanced courses.

LIPPINCOTT: Science marches on?

GOODSTEIN: Science marches on, and they thought too much time had gone by, and the student didn't have a good record to begin with, so why should we waste more time and money on them? I didn't vote on UASH; it was the committee's call. Some former students presented themselves better than other students.

In general, UASH members are mostly male, because this is predominantly a male school. I remember that when I was registrar, there were very, very few women professors, and they weren't likely to be put on UASH if they were young assistant professors.

LIPPINCOTT: We're talking now about—

GOODSTEIN: Now I'm talking about regular undergraduates—undergraduates in residence who

have not met the minimum requirements and need to go before UASH. I remember there was one young woman in particular, from geology. In those days, geology was considered an easy major, and many students—

LIPPINCOTT: You say “in those days”?

GOODSTEIN: When I was registrar, 1989 to 2003. In my fourteen-plus years, several of the students who came up repeatedly were geology majors. They had once been math majors or chemistry majors, and they had flunked out of those majors, so they would change their major and become a geology major. There was one woman in particular who came in, and she was svelte, and she knew how to dress, and she had a certain *savoir faire* about her, and she’d sit there and cross her legs, and here you have all these middle-aged men on the committee, and they were always persuaded. And I told them once—I said, “You guys—”

LIPPINCOTT: “Legs have nothing to do with it!”

GOODSTEIN: That’s right. “And if a young man came in with exactly the same problem, you would throw him out, and you keep readmitting her.”

LIPPINCOTT: She was petitioning to take a geology option?

GOODSTEIN: No, to *remain* in the geology option. Even in the geology option, she was having problems. But she graduated. She may have had a one-point-nine GPA, but you can graduate. On your diploma, it doesn’t say what your GPA is. A diploma is a diploma. I used to say, “It’s Gresham’s law that bad money drives out good.”

LIPPINCOTT: What do you mean by that?

GOODSTEIN: The institute has a reputation, a sterling reputation, and it stands behind its students. That diploma says something about the education they’ve received here. If you start to water down the requirements for some students, and let them sort of slide by, allow them to drop

a course that they got an F in, or better yet, allow them to change the grade by doing more work, retaking the final, getting the exam re-graded—these are all things that happen that no one ever discusses in public. And it happens only to a very small fraction of students. But if you let those students through, over time—

LIPPINCOTT: It lessens the value of the degree?

GOODSTEIN: It lessens the value of the degree for everybody. Everybody's degree gets cheapened a little bit, in my opinion. So I used to say this from time to time. I'd deliver my little speech before the members of UASH before the students came in. Some people agreed with me and others didn't. [Laughter]

One of the people who came back to see me was a former student, certainly in his late thirties, early forties, who sold used cars. He was a car salesman. I looked at his transcript from many years ago.

LIPPINCOTT: What was his option?

GOODSTEIN: Gee, I don't remember, but it was not in the humanities. I said, "Well, you don't have too many courses left to take before you graduate." He wasn't so sure that the committee would accept him. I said, "Here's how you might consider writing your petition. If I were you, I'd emphasize these things in your career since dropping out of Caltech—what you've done, and how that might inform the courses you're taking." So he did. He did everything I told him. I asked him, "Are you going to march?" He said, "No." I said, "Why not?" "No, I'm too old."

LIPPINCOTT: You mean he got readmitted and he graduated?

GOODSTEIN: Right. And he said he wasn't going to march at commencement. I said, "You should, because even though it's not known officially, George Bush is going to be the commencement speaker." He said, "Really!" I said, "Think about it."

LIPPINCOTT: Are you talking about George W. or the father?

GOODSTEIN: The father, not the son.

LIPPINCOTT: George H. W. Was he then president?

GOODSTEIN: Yes. That's why he spoke. Everybody wore broccoli; the undergraduates wore broccoli.

LIPPINCOTT: Oh. Broccoli was something George H. W. didn't like.

GOODSTEIN: So I saw this man march. Not only that, but his little kid came, too. Anyway, I was pleased, because he had achieved a milestone that was important to him. I think Lyman, my predecessor, gave very short shrift to these people, and I thought they deserved, after they'd gone away, they deserved a shot at the prize. So I worked hard with these former students. Some of them made it and some didn't. I also had another job as registrar, to evaluate the transcripts of transfer students, and that's important. There's a lot of, I guess you could say, subjective judgment.

LIPPINCOTT: A lot of transfers were from Pasadena City College, I would guess.

GOODSTEIN: A few from PCC. They always did very well at Caltech, because it's a very good community college. They did all their basic math and basic science courses there and came in here and did very well. But then there were transfers from other schools.

LIPPINCOTT: Mostly community colleges, were they?

GOODSTEIN: Mostly, yes. You'd look at some of the courses—

LIPPINCOTT: So did they come in as juniors?

GOODSTEIN: Well, that was the question. If they came as transfer students, they would like to

get as much credit as possible. But it wasn't really up to me. I would look at the transcript and then send them— Each of the divisions here has a representative, and before classes start, the transfer students go around and talk to professors and tell them what the course was that they want credit for. It's a good system. So it wasn't up to me, but I would sort of look it over and say, "OK, for these courses, it's clear I can give you the credit. You don't need to necessarily get—" But basically they went around and accumulated letters from the Caltech professors in their option that said, "Yes," "No," or so much credit here, so much credit there. It was time-consuming.

Then, when Caltech started a program for students going abroad, that was a new program, and I worked very closely with Lauren Stolper, who was in charge of the fellowships office, who oversees that program, to figure out how we give credit for courses that the students take abroad. That worked out, too. And then when I came in, we were still in the Dark Ages as far as digital recordkeeping goes. I started digital recordkeeping—registering for courses online, online diplomas. That was a big project too.

The registrar's job is multifaceted. You need someone, as I said, who is like Caesar's wife, above suspicion, and so you're going to make enemies. Sooner or later, you make your enemies. I made a few.

LIPPINCOTT: Do you want to save that for next time?

GOODSTEIN: Yes.

[Recording ends.]

JUDITH R. GOODSTEIN

SESSION 5

October 8, 2012

LIPPINCOTT: Before we get started on talking about your eventually leaving the Registrar's Office, we didn't mention your earlier work on admissions, which probably had something to do with your selection as registrar. What did that consist of?

GOODSTEIN: I was a member of the Freshman Admissions Committee.

LIPPINCOTT: Was this in the eighties?

GOODSTEIN: Correct. I served for four years, 1985-1989.

LIPPINCOTT: What did you do?

GOODSTEIN: Well, it was a lot of work, because in those days the members of that committee were each assigned a district in the U.S., plus Hawaii and Alaska. You could request a district, and then you went to that area and interviewed students and their advisors, the college counselor, and their physics teacher or their chemistry teacher.

LIPPINCOTT: And this would be seniors in high school?

GOODSTEIN: Seniors in high school, private and public. So that when we started our work, we all dispersed to different places in the U.S., in the break between the end of the winter quarter and the beginning of the spring quarter. So it was probably March. Now, if you had Southern California, that was easy so far as weather goes. But I always had New York, and that was not so good in March, because I often got caught in a snowstorm.

LIPPINCOTT: Did you want New York?

GOODSTEIN: I did, because it was a way for me to see my family while I was doing the city schools. I had New Jersey, Long Island, and New York.

LIPPINCOTT: How many days would you spend in the break?

GOODSTEIN: Probably a full week. You had to figure this all out ahead of time, because then the Undergraduate Admissions Office would write to the schools and tell them that someone from the committee was coming.

LIPPINCOTT: These are schools like Bronx [High School of] Science?

GOODSTEIN: I always went to Bronx Science. I always went to Stuyvesant [High School], when it was still on Second Avenue. I went to a UN school. I went to Horace Mann one year, in Riverdale. And then, let's see, I have to back up. I was given all of the folders of the kids who had applied to Caltech who came from New Jersey, New York, and Long Island. A big stack of folders. And then I'd sit down and read them. I guess everybody had their own technique for reading folders, because that's the first cut. You had to decide who was so good, so exceptional, who stood out from all the other exceptional students, that probably it was unnecessary to interview them because they would get in anyway. There was also the early decision, and I think that was part of my assignment, too. Sometimes you would call and have a chat with the student for early decision. "Early decision" means that if you're accepted, you promise not to wait for Yale to offer you a slot, or Stanford. You say that you truly will come to Caltech—that Caltech is your first choice.

LIPPINCOTT: First and only?

GOODSTEIN: First and only. If you're picked—and that really is for the cream of the cream—then you're expected to come. I don't remember if it always worked the way it's supposed to work. It's basically on the honor system—you don't know where else they're applying. But then you have all of the regular applicants.

So now I've ranked them—that is, I've decided which ones I'm going to go see. By the way, it's all changed—nobody goes out on the road anymore. I forget how many of us were on the committee. It was a lively group of people. I was new to the game.

LIPPINCOTT: You were on it because you were a faculty associate?

GOODSTEIN: I volunteered.

LIPPINCOTT: Did you enjoy the work?

GOODSTEIN: I enjoyed it very much. You probably found out more about the students from talking to their teachers than you did from talking to the students themselves. Some were very shy. You spoke to the students and then you had to remember—I probably had six or seven schools to go to in one day, all over the place. There were big distances to drive in New Jersey, and there was no GPS system, and I got lost quite often. And I found out that people in New Jersey didn't know where anything was.

LIPPINCOTT: Did you talk to women students? Because by that time women had been admitted to Caltech.

GOODSTEIN: That's a good question. You know, I don't remember talking to any women. But what I do remember was that at some point there were students who could ask to go along with you on these trips—students from Caltech to help you with the interview and meet the students with you.

LIPPINCOTT: That's interesting.

GOODSTEIN: That was interesting. I didn't always find it positive, but it was interesting.

LIPPINCOTT: So you took some along?

GOODSTEIN: One of them I had for two years. I think for two years running I had an undergraduate from Caltech, a woman, ask me if she could do some of the interviewing with me. I always said yes; I didn't think it was appropriate to say no.

They were much more vocal. Right away, "Oh, I like him." Or "I don't like him." Then I'd try and find out, "What is there about that student that you don't like?" or "What is there that makes you think he will fit in and would partake of the Caltech culture and would be able to survive? Do you think he has the right drive and the right discipline?" It's a bit of a crapshoot. They were all good students. They were all very good test-takers, especially on SATs. But some of them had slacked off in their senior year and forgotten how to study. Probably some of them never learned how to study, because they absorbed the material so quickly that they didn't have to study. Those students did not, as a rule, do well at Caltech, because they forgot what it was like.

LIPPINCOTT: The ones who had to work hard to get into Caltech did better?

GOODSTEIN: Probably did better overall, yes. But it was a good experience, and then when I came back from the trip, everybody assembled. All the people on the committee would meet for several days, all day, and you'd rank your group of students. For those who were very good, you would stand up and present your first five students as a group, and I would give their names and what schools they were from, and I'd say, "They are outstanding. There is no reason for us to waste time on them, because there are many more students that we really need to spend time on." This I learned from the people on the committee who had been doing this for ten years. And that was easy. So we all had our first five, say. Then you'd go to the next group, and we would go around the room and present each student individually and say what was good about them, what they had done, what some of their instructors had to say about them. And then sometimes you'd say something about the school, because in those days I also had, as it were, a cheat sheet about each of the schools, and colleagues at Caltech who had gone to the school in the past would write a line or two about the school—that it had produced good students, which teachers were really the ones to speak to, who could really tell you something cogent that made sense and weren't just rubber-stamping all the students. And I contributed my two cents also. Then we came to what's known as the fight cases. That's the last group of students each of us had—a group of students

who didn't quite make it but there was something about them, something appealing, that suggested they might work out just fine at Caltech. But we had to say why. Those were the fight cases. Now there, it turns out, it depends on how good a lawyer you are, because you are defending your client. Your client is the student who really wants to come to Caltech but perhaps didn't do so well on some of the AP exams, or didn't do so well on the English SAT. Now that's important, because especially if they were international students—but many were born in the U.S.—they had miserable English scores. Then the question is, Do you fight for them? Well, I think it's important for scientists to communicate, to know how to write, to know how to use the English language. They're going to write papers and grant proposals, and they're going to teach. So it's important. OK, so the fight cases were always interesting. I don't think I ever lost a fight case.

LIPPINCOTT: Well, then there were probably students who weren't up to snuff and you just ignored them?

GOODSTEIN: That's right.

LIPPINCOTT: Here you're talking about people who are being considered for admission.

GOODSTEIN: Yes. It was always a pleasure to go to Stuyvesant.

LIPPINCOTT: How about Bronx Science?

GOODSTEIN: I had very few from Bronx Science.

LIPPINCOTT: Now, that's surprising, because a lot of good scientists—

GOODSTEIN: Well, there are. But they may have had their eyes set on MIT.

LIPPINCOTT: Really?

GOODSTEIN: Really. Could be. MIT is a university, and Caltech isn't. MIT offers everything. And if you're not quite sure— You're a good student in high school, the math and science comes easily, but you enjoy your humanities courses, and maybe you enjoy debating, and maybe you enjoy creative writing, and you look at the course offerings at Caltech and compare them to the course offerings at MIT and MIT wins hands down. There was another consideration. If you're not sure you're really cut out to be a scientist or an engineer, perhaps it's better to go to MIT, because no one looks askance at you if you decide to switch from biology to computer science or economics, or political science. That's fine—it goes on at a lot of universities. At Caltech, if you don't do well in the math, you don't do well in the physics, the core courses, and you switch to a social science—economics, even history—well, it's known as flunking in.

LIPPINCOTT: Wonderful!

GOODSTEIN: Flunking in. Sometimes the other students look askance at you, and you become maybe a second-class citizen; because everyone knows, even if they don't talk about it. At least that's the impression I got from listening to the student representatives on UASH.

LIPPINCOTT: Did you go to Erasmus Hall, your old alma mater, too?

GOODSTEIN: No, because by the 1980s Erasmus had changed, because Flatbush had changed from a predominantly Jewish neighborhood to a predominantly ethnically diverse neighborhood. Many people from the Caribbean settled there, and it was no longer the highly competitive school it used to be. In fact, I went to Brooklyn Tech once, and the student I met there wasn't bad, but he wasn't really suited for Caltech. I thought he would have a terribly hard time, and it would not serve him well, and I knew he would get into many other good schools. I also went to an aviation school on Long Island, because I felt that at least I should go and at least speak to the student—and also show the flag at the school, because the counselors appreciated it when someone from Caltech showed up. And I think I went to a school in Borough Park, because there was a large Russian community. This was a student at a very ordinary high school, not a special high school, and he was pretty good, but not really for Caltech.

LIPPINCOTT: Great Neck High School is David Baltimore's alma mater.

GOODSTEIN: I went there, yes.

LIPPINCOTT: A very good school.

GOODSTEIN: Very. I went all the way out on Long Island, all the way out almost to Montauk Point. It's a lot of driving. I used to come into the city, rent a car and go, spend nights in motels, and then on the weekend I would see my family. I would arrange it so that I had the weekend free.

LIPPINCOTT: Before we get into the end of the registrar story: With regard to your becoming a faculty associate in history in '82, you told me you had some supporters in the humanities division who supported that move?

GOODSTEIN: Yes, they were Peter Fay, Robert Oliver, Robert Rosenstone, and I assume Dan Kevles, too. But I remember that Rosenstone and Oliver and Peter Fay sought me out and/or sent me a note of congratulations, "Welcome to the division," which made me feel good.

LIPPINCOTT: Already you had been lecturing?

GOODSTEIN: I don't think I had lectured. I had lectured in Peter Fay's course probably before 1982. He had asked me to give a lecture on the Scientific Revolution.

LIPPINCOTT: So it was after that that you had your own course on the Scientific Revolution?

GOODSTEIN: Yes. I lectured for the first time in 1989—the same time that I became registrar. I had a lot on my plate that spring.

LIPPINCOTT: But if you were a faculty associate in '82—

GOODSTEIN: In '82. But I didn't start teaching right away.

LIPPINCOTT: Not until seven years later?

GOODSTEIN: That's correct.

LIPPINCOTT: Why did they make you a faculty associate?

GOODSTEIN: That was for my scholarly achievements. I could teach, but it wasn't incumbent on me. When I did teach later on, I was paid as a lecturer. I taught in 1989, again in 2001, in 2002. And I taught again in 2007. Then, the year before I retired, Diana Kormos-Buchwald and I co-taught a course. That was a totally different course; it had to do with forbidden knowledge.

LIPPINCOTT: What do you mean?

GOODSTEIN: Well, for example, when Copernicus published his book on the rotation of the planets around the sun, the Church put it on the Index, so it was forbidden knowledge.

LIPPINCOTT: Oh, so the course was on books that had been banned?

GOODSTEIN: Books or subjects. Evolution. Diana and I each gave several lectures, and then we had guest speakers.

LIPPINCOTT: Did you talk about the intelligent-design movement in this country?

GOODSTEIN: It's possible we did. We talked about genetic engineering, and we talked about Spinoza, who was kicked out of the Jewish community for holding heretical thoughts.

LIPPINCOTT: And Giordano Bruno, I suppose?

GOODSTEIN: Yes, we talked about Giordano Bruno.

LIPPINCOTT: OK, well, let's move on to the mainstream now and talk about your parting from the Registrar's Office.

GOODSTEIN: That was in 2003. I had been registrar for fourteen years plus. I was the longest-serving registrar, I believe, in Caltech's history. Well, let me say that when I was hired to be

registrar, I was hired by the vice president for student affairs, Jim Morgan, and I reported to Jim Morgan. Jim Morgan, unfortunately, didn't remain a vice president for much longer after he appointed me. You know, he had had his time, and I think he wanted to step down. He'd been a vice president for ten years—that's probably the limit, two terms. So then I served under a number of other student-affairs vice presidents, which was fine. I served under Gary Lorden [professor of mathematics] and Chris Brennen; those were the two vice presidents who succeeded Morgan—first Gary, then Chris. And then Chris stepped down, and they went, for the first time, to an outside person to be the vice president of student affairs. They had a national search, and they hired a woman who was at Chicago.

LIPPINCOTT: Margo Marshak, are you talking about?

GOODSTEIN: That's right, Margo Marshak. In the beginning, I reported to her. I understood very quickly, and she made it very clear, that she didn't want all of us who held positions of authority in Student Affairs—like Financial Aid, and the registrar—to report directly to her. She announced that Student Affairs had a flat administrative structure. "Flat" means that everyone is on the same level—all of the deans and directors—and reported to Margo. Margo did a reorganization of Student Affairs, and she made it vertical. She didn't want us all reporting to her. She had more important things to do than meet with us, even once a month.

LIPPINCOTT: She had a hierarchical ladder.

GOODSTEIN: Yes, that's what she had. You know how bureaucracies grow? Under Margo, Student Affairs grew, the bureaucracy expanded, and she created the position of assistant vice president for student affairs. And the person she hired was Erica O'Neal, from Stanford. And on paper, she looked good. But she didn't have too much on the ball, I'm sorry to say. She was very sweet, and she'd come in and say hello, and she would say, "Tell me all." Margo told me I would be reporting to her, as would the director of financial aid, and I think several other people. Because if you appoint someone assistant vice president for student affairs, you have to give them people to manage, otherwise they have no portfolio. Margo created a portfolio for this new person.

LIPPINCOTT: And you were part of it?

GOODSTEIN: Yes, I was part of it. And I resented it—because she was dumb, and she didn't understand what the Registrar's Office was about. That I knew. We were at that point about to digitize, to go online, in the Registrar's Office. We were all paper, and I had decided that it was essential for us to move into the twenty-first century.

LIPPINCOTT: What year was this?

GOODSTEIN: Probably within a year of Margo's coming—2003—the bureaucracy grew. And I used to go to many meetings. Many, many—there were so many meetings in student affairs. It was OK under Gary. It was OK under Chris. They kept the meetings to a minimum, and as registrar I didn't have to go to all of them. But under the new hierarchy, there were multiple meetings. You could spend your whole life going to meetings, at which nothing was accomplished. So when it was announced that the Registrar's Office would report to this new woman, Margo called me into her office to tell me. I knew what was going to happen, because my colleague in Financial Aid had already had the meeting with Margo. Margo had somebody else in the office with her, which was interesting. Stan Borodinsky, who was the financial analyst. He handled the money in Student Affairs; he was responsible for the budget. It was a big budget, because Housing was in Student Affairs, too—it was a big department. I don't know quite why Margo asked Stan to come in and be present when she told me this. Maybe she wanted a witness, and so it was Stan. So here's what I did. I said to Margo, "You know, Margo, that's an interesting job that's been created, and had I known about it, I would have been interested in applying for it, too, because it would have meant a promotion." To be honest, I would not have applied for the job, and I certainly wasn't interested, but I said, "I don't think it's a good idea. I believe the Registrar's Office is important enough that it should report directly to you, Margo. You should know what we're doing." Oh, no, she had other, more important things to do. She was going to reform all of Student Affairs, you know. OK.

LIPPINCOTT: How did she react to that?

GOODSTEIN: She sat there. But she was fuming. I could see the smoke coming out of her ears. I said, “Of course, Margo, I will report to her and do the best job that I can, because I’m a professional,” and I said thank you, and I left. There was no yelling. There was no shouting. It was a very short speech. And she didn’t really want to hear any of the reasons why I thought she was making a mistake with the Registrar’s Office.

OK, so what happened next is the reason I left. Sometime later, and not that much later, I was called in to speak to Steve [Steven E.] Koonin [professor of theoretical physics 1981-2004], the provost. And I had a feeling it had to do with what I had said to Margo—that Margo had decided that it was time for me to go. Well, how could she fire me? At least she had decided she wasn’t going to do it. I think she reported to Koonin, as provost, that she had a troublemaker as registrar and she wanted me out of the job. And so Koonin called me in. He was sitting there and he had his leg crossed and it was wiggling up and down. He said, “I want you to step down.” And I said, “Why?” I had barely sat down when he told me that. And he said, “You know, there have been complaints about you.” “I said, “Really? Tell me.” “Oh, I’ve had complaints.” You understand, when Jim Morgan hired me, he told me, “Judy, you have to have a thick skin. There will always be complaints.”

LIPPINCOTT: Oh, of course.

GOODSTEIN: And I said, “Are they serious?” “Well, some of the division chairs are very unhappy with you.” I said, “Really?”

LIPPINCOTT: Because maybe you wouldn’t let them coddle students?

GOODSTEIN: And maybe I didn’t allow them to run roughshod over the Registrar’s Office. And so I said, “Well, why don’t you show me the particulars? Do you have it in writing? Could you share it with me?” And there was this very long pause. I thought to myself, “I have never engaged in shouting matches with anyone, in all those years as registrar. I know I’ve had good relations with some of the division chairs. Others I don’t remember having much to do with one way or the other—probably e-mail, that sort of thing.” And remember, I would have seen all of them at various functions with David as vice provost.

LIPPINCOTT: Yes, so you were friendly with everybody there.

GOODSTEIN: So far as I knew. So there was the long pause when I said to him, “Show me the evidence.” And then he said, “Look, Judy, I know you really want to go back and do your writing. I know that’s what you really like to do. So Judy, you can go back full-time to the Archives, and on the full salary that you’re making now.” Because I was making more as registrar than I was as archivist.

LIPPINCOTT: So they weren’t going to dock you at all?

GOODSTEIN: No. That was the deal, if I would step down. And he said, “Be sure you write a good letter of resignation.”

LIPPINCOTT: Meaning what?

GOODSTEIN: Well, that it would be circulated. So I said, “You can be sure that I will write a very fine letter of resignation.” And perhaps we should include that; it’s still at home on my computer. But, to back up a little bit, it was at this meeting that he said, “You know, the institute is having financial problems, and it’s not obvious that we will be able to support the Archives at the level we’re supporting it now. So we might have to cut you back in the future. I don’t know.” He left that dangling. Well, I left the office. I came home and told David, who was shocked. I said, “Why are you shocked? I told you this is why he was calling me into his office.” And David just couldn’t believe it. He said [that Koonin] had no evidence. Now, let me tell you, I sent my resignation letter in that afternoon. I wrote a very fine one paragraph.

LIPPINCOTT: In other words, saying everything is fine?

GOODSTEIN: Everything is fine. But anyone who’s savvy about how things work at Caltech— As soon as that letter hit the computer, it was sent out as an announcement to the entire Caltech community. Harry Gray called me up—Harry Gray was the first director of the Beckman Institute, the building we’re sitting in. And I think he must have had disagreements with Koonin,

and one day we all had the announcement that he was no longer the director. So obviously he'd been given his marching papers by Koonin, too—the same sort of thing.

LIPPINCOTT: Harry was ditched before you were?

GOODSTEIN: Right. And Harry calls me. I was sitting in my office, the phone rings. “Judy, it happened to you, too. Welcome to the club.”

LIPPINCOTT: Well, that was nice.

GOODSTEIN: It was nice, because then I realized that everyone understood. And then Erica O’Neal said to me, “Oh, we’d like to thank you. Would you like to invite a few friends and we’ll give you a luncheon?” And I said, “No, thanks.” How tacky! After fourteen-and-a-half years?

LIPPINCOTT: Yes, ridiculous.

GOODSTEIN: She’s no longer here.

LIPPINCOTT: Well, neither is Margo.

GOODSTEIN: Margo was also let go. Because, when [Jean-Lou] Chameau came in as president [2006] she went in to see him—or was it the new provost? I’m sorry. I heard that she went in *pro forma*, because when you have a new head, everybody offers their resignation so that the new person— And she offered to resign, and whoever it was said, “Yes, I accept.” She was gone within a week.

LIPPINCOTT: I think she did rub a lot of people the wrong way.

GOODSTEIN: Also, the faculty seemed to be disturbed that she was making more money—a lot more money—than they were making. You know, the *Chronicle* publishes people’s salaries.

LIPPINCOTT: What *Chronicle*?

GOODSTEIN: *The Chronicle of Higher Education*. Once a year it publishes salaries of the key administrative people in academic institutions. Not individuals. I think her salary was published, and it caused a lot of talk among the faculty.

LIPPINCOTT: So you returned full-time to the Archives. This was in 2003.

GOODSTEIN: Yes, and it took almost two years for them to replace me as registrar.

LIPPINCOTT: Did it? Well, what did they do in the meantime?

GOODSTEIN: First they had David Levy.

LIPPINCOTT: You had had some good people working for you there.

GOODSTEIN: Linda King was my second in command, and Linda was very good. Everybody in the Registrar's Office was good. It was a good staff. They all worked hard.

There was a committee formed to search for a new registrar and also to decide what the qualifications of registrar should be. Up to then, through me, everyone had been an academic, with a PhD. The committee decided that you didn't need a PhD to be registrar. And they hired, eventually, Mary Morley, the current registrar, who came from a similar position at Cal State Fullerton, I think.

LIPPINCOTT: OK, so now you're back at the Archives full-time.

GOODSTEIN: Yes. Shelley was delighted to have me back. I think the staff was very happy to have me back.

LIPPINCOTT: And the staff was now consisting of—?

GOODSTEIN: Loma, and— Oh, I had some wonderful part-time people over the years, including Carolyn Kopp, Carol Finerman, and Ruth Gordon.

LIPPINCOTT: There was a young Englishwoman, Brenda.

GOODSTEIN: Brenda Shorkend was late. She worked on the Seymour Benzer papers. But we had some students who had gotten their PhD at Berkeley, and they came to Caltech, sometimes because they had a partner who had a job at Caltech and they were looking and they had a PhD. I always found money for them. So I had David Valone and Timothy Moy and Brenda for a while. Brenda came from the Einstein Papers Project. I had Elisa Piccio. Elisa started as a researcher on the book I was writing on Vito Volterra. First I had used Carlotta Scaramuzzi, because Carlotta came as a SURF [Summer Undergraduate Research Fellowship] student.

LIPPINCOTT: She's the daughter of Franco and Teresa, your friends in Rome, in Frascati.

GOODSTEIN: Yes. At a certain point, Carlotta wanted a break from her studies at the University of Rome. She had gone into physics and math, probably because her father was in physics, and I think by the end of her sophomore year she had had enough. She was suffocating. And so I invited her to come and help me. First, she had a SURF. I wrote a SURF proposal, which was accepted, and Carlotta spent the summer. And of course she met David's graduate student and they, ten years later, got married. She was wonderful, because she has a gift for translation—a true gift. For the SURF summer, we figured out what sort of things she should work on, and she gave a very lovely presentation at the end, and then she went back to Rome, to her family, and changed majors, and went into psychology, and graduated with a degree in psychology, but she continued to work for me from Italy, doing translation. So when I had handwritten documents, sometimes I couldn't do out all the handwriting, and I wasn't always sure if I had the right translation. I would make a rough translation, and I'd say, "Am I on the right track?"

LIPPINCOTT: Are you talking about your work on the Volterra biography?

GOODSTEIN: On the Volterra biography, yes, because I had all those family letters.

LIPPINCOTT: Well, let's not get into that yet. I want to talk about the digitization project. And the Caltech centennial.

GOODSTEIN: Yes. You know, Caltech was woefully behind in computer science—that is, in having computers and all of those things, and of course the library was even more behind. I

think I mentioned that we were the first department in the library to get IBM computers. They were really fancy typewriters, nevertheless.

LIPPINCOTT: That was way back.

GOODSTEIN: Way back. But you didn't need to use carbon paper anymore, and you could correct online. So it was wonderful for doing manuscripts and guides and all of those things. Loma can tell you what a relief it was not to have to paint out with the white-out. In 1989, the Apple computer company offered grants to universities to do things with their product, and Rich [Richard E.] Fagen and I cooked up a proposal.

LIPPINCOTT: Who's Rich Fagen?

GOODSTEIN: Rich Fagen is now the head of IMSS [Information Management Systems and Services], and then he was the head of, I guess, computer support.

LIPPINCOTT: That was also the first year of your being registrar. So you did that, too?

GOODSTEIN: Oh, you can't imagine all the things I was doing in 1989. [Laughter] So we called it the Apple Hyper-Archive Computer Grant. What did we get? We got a computer. That was exciting. We got an Apple, and we probably got some support, maybe some administrative support—enough to hire a student, one of Caltech's wonderful students who dropped out because he was so busy programming that he had no time to go to class.

LIPPINCOTT: So you hired him?

GOODSTEIN: I hired him, because, of course, he was very good with programming and that's what we needed, a programmer to do text and pictures, and video clips, and narration, too. It was a stand-alone product. It was wonderful. For what it was, it was quite snazzy.

LIPPINCOTT: For the layman, could you explain what this entailed?

GOODSTEIN: In glorious Technicolor, you might see a banner that said, “Caltech’s beginnings,” and then you would see a picture of the first building that classes were held in, in downtown Pasadena, the Wooster Building, in 1891. And then it moved to another site downtown, and then you would see maybe a page from a student notebook from the 1890s.

LIPPINCOTT: So these were things that the young student scanned in, is that right?

GOODSTEIN: Yes.

LIPPINCOTT: And put on—?

GOODSTEIN: This was Apple Hyper Card, the program for making multimedia presentations. It was like a little movie. It was a movie, which incorporated visuals of all sorts, based on materials we had in the Archives, which we took pictures of and then scanned. As I say, video clips, text, music. It was quite the thing in 1989. And in 1991, during the centennial year, we brought the computer over to the Athenaeum, and it was in the main lounge, and people would go over and look at it.

And then we wrote a second Apple grant. They were still giving out grants then; this was a long time ago. And this second grant probably had a different name, but it was the beginning of PhotoNet, and maybe that’s what we called it, PhotoNet. It was meant to put images of our collections— You know, we have thousands of photographs of scientists and apparatus; the photographs go back to the Civil War era. They were really historic. A lot of photographs of the scientists at Caltech, but also photographs of Albert Einstein and all the other greats of the twentieth century. Plus, we have lots of prints of nineteenth-century scientists’ engravings. The idea was to digitize them and share them with the world. This is what the second Apple grant allowed us to do, to start in a modest way. It involves a lot of programming. None of us in the Archives are programmers. Glenn Smith is the name of the person who did the programming. He worked for the Archives for many years. He also ultimately came back to Caltech, because as registrar I used to remind him, “Glenn, you really should come back to Caltech and get your degree. I’ve never looked at your record; that’s none of my business; you work for me. But if you ever come to see me in my capacity as registrar, we can discuss your academic record and figure out what you need to graduate.” At some point, Glenn Smith made an appointment to see

me as registrar, and then we didn't talk about his computing in the Archives. We only talked about his academic record and what he needed to graduate. We figured out what he needed. He did it, and he graduated.

LIPPINCOTT: What was his option?

GOODSTEIN: Computer science.

LIPPINCOTT: Of course. Well, that's nice.

GOODSTEIN: So Glenn was our, as they say today, our IT person.

LIPPINCOTT: And you intended to put this stuff on the World Wide Web?

GOODSTEIN: Absolutely. And in 1994 the NSF sponsored a workshop on digital libraries in science and technology studies, and I was invited to be one of the speakers.

LIPPINCOTT: This was in Washington?

GOODSTEIN: No, New Orleans. The title of my presentation was "PhotoNet: The Caltech Archives Online Photographic Database." The other science archivists who were in the audience, my colleagues, their jaws dropped open, because they had never thought of this. The AIP has a very large presence now on the World Wide Web with their photo archives, but at that time they hadn't even started. And when my colleague at the AIP, Joan Warnow, heard this, she said, "Oh, my," and they went back and got busy. They have a much larger budget, a much larger staff, and of course they're into this big time.

LIPPINCOTT: This is the AIP?

GOODSTEIN: The AIP's Niels Bohr Library and Archives. And everyone does it today. But back in 1994, we were, for a short time, the pioneers.

LIPPINCOTT: That's impressive.

GOODSTEIN: And there are always requests coming in from all over the world to the Caltech Archives for permission to use photographs, and queries about whether we have photographs of certain people.

LIPPINCOTT: Well, if they're online, don't people sometimes crib them without—

GOODSTEIN: Not anymore, because Glenn Smith put on a watermark so that you actually have to order the picture. That took time, because in the beginning we probably put them on in high-res scan. Now I'm sure we only do low-res scans. Publications prefer high resolution to low resolution.

LIPPINCOTT: So they still have to ask you?

GOODSTEIN: And because it has this banner across them, the watermark, that says "Caltech Archives." Other archives now do that, too. In other words, we all started off very naïve. Then you learn that the business world is very different from the honor code at Caltech and such things.

LIPPINCOTT: Well, since we're in 1994, that's a very important date for the Archives, because it is when you got out from under, so to speak, the library. Is that not right? The Archives was a library department up until that time.

GOODSTEIN: That's true.

LIPPINCOTT: And we should talk about—

GOODSTEIN: How it happened?

LIPPINCOTT: Well, not so much that, but the pros and cons of independence from the library. By this time, you were in Beckman?

GOODSTEIN: We were in Beckman. And Glenn Brudvig, who was the librarian the Archives reported to for many years, retired [1995]. And the new director of libraries was a woman who came from industry, Anne Buck. She was very good, and she pointed out almost immediately that the Archives was reporting to her but she in turn was reporting to the vice provost. And that was a conflict of interest, because I was married to the vice provost. [Laughter] She was the first person to point that out; it never occurred to me. We had very good relations. I enjoyed working with her. She seemed interested in the Archives, and she left us alone, and she wasn't hostile. She didn't say "I'm going to take away your budgets."

LIPPINCOTT: She let you run the Archives.

GOODSTEIN: She let me run the Archives.

LIPPINCOTT: So when this happened, you then began to report directly to the provost, who was then Paul Jennings [professor in civil engineering and applied mechanics, emeritus]?

GOODSTEIN: Yes, Paul Jennings. And he was the best provost I ever served under. When I retired, he was there at my retirement party and I did say that. I meant it. He told me he had to read many boring documents and he always looked forward to reading my annual report—not only did he learn something but it was fun to read. I enjoyed writing annual reports for him. I always spent a fair amount of time on them.

LIPPINCOTT: What would you include in those reports?

GOODSTEIN: I would write about what the Archives had accomplished. Then I would single out each of the staff people and what they in particular had contributed to the progress of the Archives. And then I would talk about what collections we had gotten in, and what sort of books, what sort of publications, had come out using materials in the Archives, and lastly I would talk about what I had done, what my scholarly contributions were.

LIPPINCOTT: Did you also make budget requests at that time?

GOODSTEIN: No, they were separate. The annual report was separate. Under Paul Jennings, things were very good. There was never any issue, and I never had any money problems, because for a long time we sold the poster of Einstein on a bike—until Hebrew University told us we were in violation of the California Celebrities Rights Act and there was a cease-and-desist order.

LIPPINCOTT: It came from Hebrew University because they owned the Einstein legacy?

GOODSTEIN: Yes.

LIPPINCOTT: Well, how funny!

GOODSTEIN: And Caltech lawyers told me I needed to listen to them. So I said OK.

LIPPINCOTT: Well, did they have a copyright on that photograph?

GOODSTEIN: He's a celebrity, Einstein, and in California if you are a celebrity then the heirs have rights. So, who's a celebrity? Very few scientists are celebrities.

LIPPINCOTT: The Hebrew University was the heir —

GOODSTEIN: The heir to Albert Einstein's estate. And the other scientific celebrity you have to be careful of is Richard Feynman—you cannot willy-nilly use his picture without getting the permission of his estate.

LIPPINCOTT: Well, I never knew that—that's very interesting. So you had good relations with Paul Jennings from year to year?

GOODSTEIN: Excellent. Toward the end, there was what they called a structural-deficit problem at the institute, and there were layoffs. Paul told me we had to tighten our budget, too, and I was starting to run out of my sundry donors account. The sundry donors account was made up of various sources. I remember talking to Paul about this, and he said, "Send me a memo, Judy."

So I went back and I wrote a memo telling him what the problem was. And he put some more money into the Archives budget. He really was a decent man. As they say in the vernacular, he was a *mensch*. He also appreciated what we did in the Archives.

LIPPINCOTT: And some of that money went to the oral history program.

GOODSTEIN: Yes, it went to the oral history program, or wherever the need was greatest. To finance an oral history program successfully is an expensive undertaking.

LIPPINCOTT: Well, you have to pay the interviewers, like Shirley and myself.

GOODSTEIN: Yes, and pay for the editing.

LIPPINCOTT: And the transcribing.

GOODSTEIN: You know, it comes to about \$5,000—between \$3,000 and \$5,000—it comes to several thousand dollars per interview. But now they go on the Web. For example, Robert Christy's obituary in the *LA Times* cited his online oral history.

LIPPINCOTT: OK. So how about the provosts that came after Jennings?

GOODSTEIN: Then came Koonin. Well, I always felt, even from the beginning, a cold wind blowing. And he did tell me that if the financial situation continued to be bad, he could not guarantee that I would be able to stay in the Archives full-time and that I would have to cut the staff. He said all kinds of dire things.

LIPPINCOTT: And now we have Ed Stolper, who was definitely hostile?

GOODSTEIN: He's the current provost. He was definitely hostile.

LIPPINCOTT: Hostile in what way?

GOODSTEIN: Well, when Ed Stolper came on board [2007], David said he wanted to step down; he had served twenty years as vice provost—four terms—and there was a new president, Chameau, and David felt it was time. And also, David wanted to retire. He'd always said when he wanted to retire, and he did retire just when he said. So soon there was a new vice provost, so they said I didn't have to report to the provost anymore. Once David stepped down as vice provost, I would report to Steve [Stephen L.] Mayo [Bren Professor of Biology and Chemistry], the new vice provost. Steve Mayo took a long time to get around to talking to me, because he was new at the job; it took him about a year. I always knew that the Archives was living on borrowed time, and I enjoyed it—it wasn't Steve Mayo I was concerned about. But I finally got Steve Mayo to come to the Archives. I invited him, and he came, and he had a wonderful time. He was supposed to be here for twenty minutes, and he stayed for more than an hour.

LIPPINCOTT: He was impressed?

GOODSTEIN: Very. And then came the day of reckoning. He called me in and said, "You know, we have to tighten our belts. Everybody's getting cut. We need to cut everybody from the Archives, and we need to cut you from full-time to part-time. I said, "You're joking." He said, "No, I'm not joking." I said, "This is what Stolper told you to tell me?" And he blushed. He wouldn't say bad things about Stolper, but I knew where this was coming from.

LIPPINCOTT: When you say "cut," do you actually mean—?

GOODSTEIN: Fire. Fire everyone else in the Archives and cut me to part-time.

LIPPINCOTT: So there'd just be one—?

GOODSTEIN: Me. Me. A custodian. I said, "You were in the Archives, you saw the operation. It's a complex operation. OK, if you want to talk about reducing our budget, let's talk about that. But leaving me as a skeleton crew?" [To which he replied], "Yes, that's what I'm saying."

LIPPINCOTT: Judy, do you think that Stolper felt that for Caltech to have a good working archive was just icing on the cake and wasn't really necessary?

GOODSTEIN: I think someone should ask Stolper that. I really don't know. Stolper came to visit me before the visit with Mayo, so maybe we have to go back.

LIPPINCOTT: Let's talk about that.

GOODSTEIN: Stolper, one afternoon at 4:30, when basically the Archives is shutting down for the day—and probably it was a Friday, if I'm not mistaken—he comes to see me, sits in my office for about an hour, and it was a very unfriendly discussion about what we do in the Archives, why we have rare books, why do we need rare books at Caltech. Well, the books in Caltech's rare book collection are our crown jewels. Why does the Queen of England have all those diamonds and other things—why? It's not that she plays with them every day and wears them. It's because those are, literally, her crown jewels. Well, these books are Caltech's intellectual crown jewels, because they trace the development of science in the West from the 1500s almost to the present, and Caltech is the intellectual descendant of the people whose work, whose achievements, are recorded in those books and the papers we have. The collections are also the collective memory of the Caltech scientists and their colleagues around the world. And are you telling me that this is not important to Caltech's mission? Someone should ask the provost that.

LIPPINCOTT: Well, do you think that maybe Koonin had this idea, too, and then Stolper to a greater extent? And do you think one of the reasons might be that now much of the collection is online and the scholars who used to come here physically and sit down in that room next to our Rare Book Room could now access your collections online? And that they felt that you didn't need—?

GOODSTEIN: That's a very good question, but the answer is No, because the guides to the collections are online, but none of the collections are digitized. If you want to come and look at Millikan's papers, they're all here. There is a microfilm edition of Millikan's papers. All of the twentieth-century scientists post-Millikan—none of them were digitized. There are issues with digitizing.

LIPPINCOTT: So the only thing that is online are the guides and some of the oral histories? But the papers of scientists—

GOODSTEIN: There's a steady stream of scholars who come to the Archives from around the world. What would happen if I had been here all by myself? Frankly, I understood what was wanted, but—

LIPPINCOTT: What was wanted?

GOODSTEIN: They wanted me to retire. OK, so I said to Steve Mayo, "Well, Steve, let me go away and think about what you've just told me." Steve said, "Fine." I think Mayo was very uncomfortable—that was my perception. Nevertheless, he delivered the message, because he had to; he works for the provost. But let me tell you the background. When the provost came here, I told him what the Archives does, why the rare books were important, why paintings were important, why everything we have collectively is a jewel in the pantheon of great things at Caltech. We're one of the columns. He said to me, "Judy, it's not your Archives; it's the institute's Archives. It's not your budget; it's the institute's budget. It's not your collections, it's the institute's." I said, "Peace! That's how I speak of it, but we all know I work for Caltech. It's Caltech's. I don't take any of it home." So it was very unfriendly. And then sometime later, Mayo called me into his office—that was December 2008. And I came back and said, "OK, Steve, I know what the provost wants. I'm willing to retire if you leave Shelley, if you leave Loma. You cannot do the job without them—and, really, you need Elisa too."

LIPPINCOTT: And we do have Elisa now. And we also have the oral history program going.

GOODSTEIN: So, you've asked me about the pros and the cons. The current director of libraries, Kimberly Douglas, is not particularly receptive to Shelley's professional ambitions.

LIPPINCOTT: But wait. We have to stipulate that for fifteen years, from 1994 to 2009, when you retired, the Archives reported first to the provost, and then, when David retired, to the vice provost. But in 2009, it went back under—

GOODSTEIN: It went back to the library, and that was also per Stolper: “We don’t see any need for the Archives to report to the provost; your activities are those of the library’s.” I fought it, but it was a lost cause. I’m not a librarian; I’m trained as a historian. I have nothing in common with the librarians—nothing! “Oh, no. They’re library functions.” Well, libraries check out books—I think they still check out books. They acquire books. The Archives is something quite different. The administration wanted the Archives out of the provost’s office and out of the administration. Anyway, it was arranged. I said, “Here are my terms.” This was a negotiation. “Shelley stays. Loma stays. I think Elisa should stay, too. And the budgets need to stay. And I would like to work until September of 2009.” I said the Archives could go back to the library when I left, but not while I was in charge, and Mayo said, “Fine.” And then I asked him for some research funds so I could continue to do research and have a little budget. All Caltech professors—at least in physics; I don’t know about the other divisions—when they retire they get \$3,000 a year, for travel and stuff like that. So I asked him. I asked for \$10,000.

LIPPINCOTT: A year?

GOODSTEIN: No, cumulatively. A thousand a year, to be divided—\$5,000 from the humanities division and \$5,000 from the provost’s office. And that was done by Mayo, he worked that out. So far, the humanities division has given me everything [of theirs]. They gave me \$3,000 this year, because Susan Davis, who was the administrator, retired, and she said it would be neater if they paid up all of theirs. The provost’s office just gave me \$1,000. So I have two more years of \$1,000, to make up the \$10,000.

LIPPINCOTT: To do your own research.

GOODSTEIN: Yes—when I pay for research in Rome. When I pay to have editing done. But I husband the money very carefully. You’d be surprised how fast it goes. One other thing they didn’t do: Mayo promised he would get me an office, and that he didn’t deliver on.

LIPPINCOTT: So you don’t have a Caltech office?

GOODSTEIN: Well, Diana [Kormos-Buchwald] gave me space in the Einstein Papers building, and I have a nice title.

LIPPINCOTT: What is it?

GOODSTEIN: Visiting associate of the Einstein Papers Project.

LIPPINCOTT: Well, how nice! Do you have emeritus status?

GOODSTEIN: Yes, I'm university archivist, emeritus. And Steve Mayo told me that was the title I should have. He said, "You do not want to be faculty associate, emeritus, you want to be university archivist, emeritus." And I accepted Mayo's suggestion.

LIPPINCOTT: That brings us up to date, but there are things I still want to talk about with you.

GOODSTEIN: Can we do it next time?

LIPPINCOTT: We can do it next time. And that, namely, is when I want you to talk about your work on Volterra.

GOODSTEIN: But one more thing: I was seventy when I retired, and I had a good long run at Caltech—forty-one years. It was time. But if they hadn't pushed me out, if they hadn't threatened to fire everybody, I might have gone part-time. Which is OK.

LIPPINCOTT: Yes, you've got plenty to do. OK.

[Recording ends]

JUDITH R. GOODSTEIN**SESSION 6****October 12, 2012**

LIPPINCOTT: One thing I think we should start out with, and we got into it a little bit last time, is that the Archives, which for fifteen years, beginning in '94, was under the provost, has reverted back to the library, starting with your retirement in 2009, when Shelley Erwin became the archivist. She now reports to the head of the library rather than to the provost. I wonder whether you have any thoughts on how the Archives worked in both situations?

GOODSTEIN: When we reported to the provost, there was minimal oversight. I wrote an annual report every year describing the accomplishments, the achievements, what the staff had done, collections we had taken in, how the Archives had been used both internally and externally, whether there were any issues that needed to be addressed by the institute, such as space or equipment or funding opportunities. When the Archives went back to the library, the major handicap for my successor, Dr. Erwin, is that she no longer has the authority to spend money from the budgets that had been part of the Archives. There was a budget for oral histories. There was a budget called “sundry donors”—because people left us money. George Housner, for example, was a very generous donor to the Archives.

LIPPINCOTT: Who’s George Housner?

GOODSTEIN: George Housner was a very distinguished earthquake engineer [Braun Professor of Engineering, Emeritus], who died a few years ago and left a substantial amount of money to Student Affairs. George had spent nearly his whole career at Caltech. But he also was interested in rare books. And in fact one of the pluses with being associated with the library was that even while we reported to the provost, we certainly had collegial relationships with the librarians—especially the librarians in humanities, but also with Dana Roth, who was head of the chemistry library. And George Housner’s library—some of the books were in his office after he died. The library invited us to come look at the collection, and through his executor, John Hall, a younger

earthquake engineer who was a close friend of his, we acquired most of Housner's rare books. He had a collection, as you might expect, in earthquake history. George himself was an archivist of sorts, and he had in his office, which was quite large, the papers of Romeo Martel [1890-1965], who was the first earthquake engineer at Caltech. Romeo Martel went back to the Throop days, and I always wondered what happened to his papers—well, George Housner was keeping them. Safekeeping. So we accessioned them for the Archives. And George also had a collection of old scientific apparatus, which had been used by engineering students when they went out into the field and did measuring in the twenties and thirties. So that's quite neat! We have a very good instrument collection in the Archives. Many of them are now accessible via the Web—that is, you can see pictures of them. You can scan them.

LIPPINCOTT: What was the sundry donors account used for?

GOODSTEIN: Well, for all sorts of creative things. If I was running out of money to transcribe and/or edit the oral histories, we used sundry donors' money. If I thought there was an opportunity to acquire a rare book that would fit in, would complement the collections, we would use sundry donors' money. If Elisa Piccio, who was working in the Archives—if we didn't have a source of funds for her, I could pay her from sundry donors. Shelley lost all of that. She also told me that the university librarian does not allow her to buy rare books with the sundry donors funds. We had a good working relationship with two rare book dealers, one in New York and one in England. The rare book dealer from England used to come once a year; he would go visit the Clark Library, the Huntington Library, and the Caltech Archives—those were his three stops. Probably UCLA, too.

LIPPINCOTT: What's the Clark Library?

GOODSTEIN: The Clark Library is a wonderful institution managed by UCLA. They have a wonderful collection of rare eighteenth-century books. Of course, the Huntington has a wonderful collection. By the way, we never bought books that the Huntington has, because it made no sense; you could just go to the Huntington.

The dealer in New York always sent me his catalogs early, and he knew what our

holdings were, so he could point out books that would complement our collection. If you have a rare book collection and you don't add to it, it essentially goes stale, because nothing's happening to it. I had branched out from those 202 rare books on the Copernican revolution, going into the eighteenth century and the early nineteenth century, or editions of works by scientists who had at one point not accepted Newton's worldview and then did accept it. If you could buy the whole range, the different editions of certain textbooks, you could follow the evolution of ideas of an individual and basically how the history of an idea changed over time.

LIPPINCOTT: Yes, that's terrific! So the institute library now doesn't want the rare book collection enlarged?

GOODSTEIN: That's how I take it. If you can't buy books, probably that's true.

LIPPINCOTT: Was it a budget issue?

GOODSTEIN: No, because there was a fair amount of money in the budget.

LIPPINCOTT: For that?

GOODSTEIN: For any purpose the archivist, the person in charge, deemed important to promote the Archives. You know, sometimes the money was used for computer support—I should say that. Every time we needed to upgrade our systems, we had to use sundry donors money, so that we remained at the cutting edge, or close to it. And there were lots of improvements as we digitized the Archives: PhotoNet, and putting the oral histories online—well, that took computer programming. All of that came from the sundry donors account.

LIPPINCOTT: And the sundry donors fund is no longer with the Archives?

GOODSTEIN: I think Shelley can no longer tap into it without seeking permission, and I'm not sure she always gets permission.

LIPPINCOTT: It exists but—

GOODSTEIN: I think it still exists.

LIPPINCOTT: —but it's under the auspices of the library?

GOODSTEIN: Correct. When the library took over the oversight of the Archives, it also took over all the budget sheets. I don't think Shelley gets budget sheets anymore.

LIPPINCOTT: So it really amounts to another layer of bureaucracy on top of you?

GOODSTEIN: It does. And if the institute librarian, whoever it is, is not sympathetic to the goals of the Archives, and if the administration is not sympathetic to the aims and the goals of the Archives—

LIPPINCOTT: Or not interested.

GOODSTEIN: —or not interested, then you have problems.

LIPPINCOTT: Yes. OK, let's move on. This is kind of on the same topic. We want to talk about the important collections you amassed while you were archivist. You spoke about [Max] Delbrück. Do you want to talk about him?

GOODSTEIN: In the beginning, we had Hale, we had Millikan, and we had Theodore von Kármán's papers—those three collections plus a lot of smaller things wrapped in brown paper with string. A lot of photographs. But I thought it was important to get important collections at the very beginning—to sort of say, "This is what the Caltech Archives represents."

LIPPINCOTT: And these were of Caltech faculty?

GOODSTEIN: I thought my mission, certainly in the beginning, was to go after Caltech faculty

and the administration, the presidential papers. In fact, over the years, we asked for and received the presidential papers—all of them. Through [David] Baltimore, every president is reflected. Then we went after division chairs—for example, the biology divisional files. It took time, but we got the biology divisional files. I was less successful with physics. But we got the astronomy files. That's very important—the departmental astronomy files, a very interesting collection.

LIPPINCOTT: What would a departmental file consist of?

GOODSTEIN: Certainly it would have personnel matters. But if they're old—if they're personnel matters going back fifty years—it's not terribly sensitive anymore. And if it *is* sensitive, you simply close it. We have many files that are closed.

LIPPINCOTT: So these show how, maybe, a particular curriculum developed?

GOODSTEIN: Yes, or a particular subject area that the division decided to recruit people for. You would expect to find staffing discussions, budget discussions, space discussions, and maybe other extraneous or miscellaneous things that a secretary didn't know where to put so she put it there.

LIPPINCOTT: OK. Do you want to tell me, before we get to Delbrück, about some book you thought was important?

GOODSTEIN: Over the years, I bought the books I thought were useful—either to the organic growth of the rare book collection or for the particular needs of a scholar on campus. I sometimes did that. If someone on the faculty told me they were interested in a particular area that was old, I would try and assist them in that, so we bought a few books along those lines, too. I always wanted to acquire a book by Giordano Bruno, but very few books of his still exist.

LIPPINCOTT: I wasn't aware that he even—

GOODSTEIN: He wrote books. He wrote political—well, he wrote tracts. But they're very hard

to acquire, and if they do come on the market occasionally, they're frightfully expensive because of their scarcity.

LIPPINCOTT: Original editions of his work?

GOODSTEIN: Yes. The year I retired, just a few months before, I remember asking the dealer whether he had any Bruno books. He said he had one or two, but they were not in good shape. I said, "What do you mean?" Well, there were pages missing, and photocopies of the missing pages had been tipped in. I said, "Can I afford them for the Archives?" He said, "Probably." So we did buy a Giordano Bruno book for Caltech's rare book collection: *De monade, numero et figura (On the Monad, Number and Figure)*, in which he discusses Pythagorean number symbolism and the meanings of the numbers 1 to 10. Not the most beautiful book, but it's the historical association; it was written by someone who was burned at the stake in 1600.

LIPPINCOTT: That's terrific—very exciting! OK, now how about Delbrück?

GOODSTEIN: I used to play tennis quite regularly in those days, and David and I came to the tennis courts at the Athenaeum. And it was our turn—you make an appointment, and then the players before you are supposed to wrap up; if they see you, they wrap up. You certainly let them go on to finish the point or the game or even the set if they're close to it. But Max kept playing on.

LIPPINCOTT: Whom was he playing?

GOODSTEIN: I don't remember, he may have been playing with one of his daughters. I asked him if he was finished, or close to being finished. Anyway, I think he was a bit taken aback.

LIPPINCOTT: Did you know who he was?

GOODSTEIN: No, I'm pretty sure I didn't know who he was.

LIPPINCOTT: It was early in your career.

GOODSTEIN: It was early in my career. When he stopped playing, he came up and said, “I’m Max Delbrück, and who are you?” [Laughter] So I introduced myself. I said, “I’ve recently joined the Caltech community. I’m the archivist.” And we chatted for a few minutes. He understood what archives are all about. He had a very keen sense of history, and he came from a very distinguished family. If you go back in his family, his ancestors included Justus Liebig, the chemist. He was from a distinguished family, and he would not have thrown out his papers. So, you know, we became friends. He would have parties, and some of those parties David and I would be invited to. Pretty soon after I met him, I sent him one of my little notes. It was a very short note: “Here we are; we would love to have your papers. They would mean a lot to future historians of science.”

LIPPINCOTT: Did you ask this of people in general? Before they were decrepit?

GOODSTEIN: I didn’t like to ask them on their deathbed. I liked to ask them when they were in good health and active and vigorous.

LIPPINCOTT: Yes. But the papers are not turned over to you before—

GOODSTEIN: Well, that depends. Max started turning over the papers fairly quickly. And I want you to know that he touched every piece of paper before he would give us some boxes. But he did not take anything out, I can assure you, because you can see Max, warts and all. There’s a lot of personal material. If he had wanted to preserve his image as a saintly figure, he would have taken out some documents; he didn’t do that. It all came, and then he would send me little notes, as he gave these boxes and folders to me, on what each of the folders was about. Finally, after it was all in the Archives, occasionally he’d come and look at his boxes. He would just stand there and look at them.

LIPPINCOTT: Well, describe to me the process that these papers go through when they get to the Archives. You do work on them. What exactly do you do?

GOODSTEIN: Max's papers came in very good order. They were organized, probably by correspondent. You have to look at the collection when it comes in. If it's an unholy mess, then you can decide to impose your own order on it, "your own order" meaning the kind of organization that archivists feel are good practices. Sometimes a collection comes in and it's organized chronologically. If it came in organized chronologically, we would not disturb that. We would not break it up and take out all the A's and all the B's and all the C's. If we had the time and the money and the staff, we might do an index of the correspondence, so that you could have access both chronologically and by subject or by person. That makes the collection very useful and workable from the researcher's point of view. We did that for Millikan. Millikan was already organized when I came—and it isn't the greatest organization, but it works because we did an index by person, so you can go back and forth in the collection. In the case of Delbrück, we never changed the order. He gave us all of his correspondence, then all of his grant proposals, then all of his correspondence with institutions. It's a very nice arrangement, by subject. We put everything in acid-free folders and we numbered them and labeled them, and we made a guide. Acid-free—that's another thing. With our sundry donors funds, we bought supplies. Archival supplies are expensive: You buy the boxes, you buy the folders, which are guaranteed not to rot—because we know we're not going to be around in a hundred years. I would say so far they look good. Now, of course, the letters inside are not acid-free—they're full of acid. But in a climate-controlled archive, which this is, and housed in the proper folders and boxes, they will last a long time. Much longer than you and I will.

LIPPINCOTT: Did a lot of researchers come?

GOODSTEIN: Oh, yes. Max Delbrück's collection was one of the earliest and most heavily used collections. There have been countless articles and books written based on his correspondence, because he had correspondence with everybody who was part of the great DNA revolution. You know the book, *The Eighth Day of Creation*?¹³

¹³ Horace F. Judson, *The Eighth Day of Creation* (New York: Simon & Schuster, 1979).

LIPPINCOTT: I sure do. I worked on it when it appeared in *The New Yorker*.

GOODSTEIN: Well, all of the molecular biologists who were quoted and interviewed in that book are reflected in Max Delbrück's files. Every one of them. And the infamous letter by James Watson, who was a postdoc here at Caltech, in Max's lab, and then he went on to Cambridge. He wrote a letter, which is widely reproduced, in which he tells Max what he and [Francis] Crick are doing and asks him not to tell Linus Pauling.

So that was Max. Richard Feynman was my next big acquisition for the Caltech Archives. That was done on a personal basis. I had met him in 1966, when we first came. I think I told you about when he went off to Chicago with David. Then, when we came back from Rome, he visited us in our apartment one or two times. David invited him, because David had told him about this Etruscan pot we had. Anyway, the point is Feynman came and he was the center of attraction in our very small apartment, which had very little furniture. He picks up the Etruscan pot and he starts to turn it upside down, looking to see if it says "Made in China." [Laughter] And he says, "How do you know if it's real? It could be a forgery." It could be this, it could be that. And I keep thinking, "He's going to drop the damn thing." He could see that I was squirming, and he enjoyed that, too. And then finally he handed it back to David, who handed it back to me, and I put it away.

LIPPINCOTT: Why was Feynman interested in an Etruscan pot?

GOODSTEIN: He was interested in being an iconoclast. He wanted to poke holes, challenge you: "You say it's this, I say it's that."

LIPPINCOTT: Oh, I see.

GOODSTEIN: I don't know, quite—except that everybody sat there on the floor spellbound while he lectured on Etruscan pottery.

LIPPINCOTT: This is in your apartment?

GOODSTEIN: In our little apartment.

LIPPINCOTT: Who else was there?

GOODSTEIN: Well, I guess David's graduate students—maybe he had a postdoc then. They were all very young, like we were young.

LIPPINCOTT: And in awe of Feynman.

GOODSTEIN: And in awe of Feynman, oh, yes, yes!

LIPPINCOTT: How did you approach him to give you his papers?

GOODSTEIN: I think it may have been when he was up at Santa Barbara visiting, and he invited us. We were going to go to Santa Barbara for a long weekend.

LIPPINCOTT: That was at the [Kavli] Institute for Theoretical Physics [at UC Santa Barbara]?

GOODSTEIN: Way before that. Let's say it was the early seventies.

LIPPINCOTT: Well, why would he go up there?

GOODSTEIN: I don't know. Maybe to give a talk. He must have been invited to give some lectures. And we were going up there, too, by coincidence. He invited David to come by and say hello to him and his family, so we did. I had Marcia, who was about four, and their son was about two, so it's pretty early in the game—maybe '69. I don't think Mark was born yet. So, making small talk, I said, "You know, the Archives would be very interested in your papers. You're an important figure in the history of twentieth-century physics, and that's what the Archives is about, and it will be used." "Oh-h-h," he said, "Charlie Weiner's always telling me I should do something with my papers." Charlie Weiner, at the time, was at the American Institute of Physics, the Niels Bohr Library, in New York. Weiner used to come out here very

often to see Feynman.

LIPPINCOTT: Weiner probably wanted Feynman's papers?

GOODSTEIN: Weiner knew in a certain sense that he shouldn't ask for the papers for the AIP, because, even then, the AIP said it was the repository of last resort. If a physicist died and nobody wanted his or her papers, the AIP would adopt them, but that was not their goal. Their goal was to work with archives in the United States to help those archives get collections, but not to compete with them.

LIPPINCOTT: So Feynman said?

GOODSTEIN: He said, "Come visit me. Come and talk to me about it." I'm pretty sure that not long after we came back from that fateful visit, I called on him. He had an office in East Bridge. I went over there. Then Feynman started visiting the Archives. He said, "Where are the Archives?" I said, "They're next to the photocopying room in the basement of the library." So periodically he'd come visit, and you could always tell when he was visiting, because you could hear his voice in the distance asking, "Where are the Archives?" And then of course when he came in, whatever I was doing I would stop doing, and everybody else around would stop what they were doing. It was a kick when he came in.

LIPPINCOTT: What did he show an interest in? Was he interested in any of these rare books?

GOODSTEIN: At that time, he didn't say he was interested in rare books. He would sit there and chew the fat.

LIPPINCOTT: About what?

GOODSTEIN: I wish I could remember, but I can't. But I would certainly float on air after he left. Usually he would ask me what I was working on. That's what people do at Caltech—maybe everywhere: "What are you working on?" At one point I was writing something about

Richard Chace Tolman, and Feynman was the Tolman Professor [of Theoretical Physics], so I told him about Tolman. Then once at a faculty reception in early October—at the beginning of the academic year, the president and the president’s wife host a reception for the faculty—I was there with David, and Feynman comes over to me: “So, what are you working on?”

I said, “Well, I’m working on *Millikan’s School*.” This was much later, in the eighties. And he said to me, “Can’t you do anything better?” It was a put-down. I cannot tell you the precise words, but I wanted to dig a hole and bury myself in it. He said, “Well, it’s a piece of fluff.” He was thinking, undoubtedly, of typical alumni histories of institutions, and that was the last thing I was going to write about. But he never even gave me a chance to tell him what the book was about; he just dismissed it out of hand and walked away. So I stood there for a while, and then he came back and said, “Well, if you’re doing it, it’s probably going to be a much better book than I thought.”

LIPPINCOTT: That’s a terrific story. Did he ever say, “I want my papers to be here?”

GOODSTEIN: Well, finally we got around to that. I used to go over to his office rather often. This was all quite harmless; he was not interested in me. I should say that. He had an eye for women.

LIPPINCOTT: Not for you?

GOODSTEIN: No, not for me—I never flattered myself along those lines. There is a funny story about this. Feynman had a graduate student who obviously saw me coming and going; I never saw this person, but he saw me. This person, once he got his PhD in theoretical physics under Feynman, went to medical school to become an ophthalmologist—which is often the case for theoretical physicists or engineers, because they understand light and optics very well. And he practices. His name is [Mark B.] Kislinger. He practices right here in Pasadena. He became friends with Val Telegdi, because Val used to visit here and was friends with Feynman, so he met Kislinger. There was a dinner party at Val’s house—this is a small aside—and Kislinger was there and Feynman was there. It was a great party.

LIPPINCOTT: And you were there? And David?

GOODSTEIN: And David. So I'm speaking to Kislinger, the first time I've ever met him, and he says, "Oh, I used to see you go to Feynman's office. I thought there was something going on between the two of you." This is many years afterward, in the eighties. It had never occurred to me that people were looking out of their offices on the first floor of East Bridge to see who was going to visit Feynman. His secretary, by the way, was a very sweet woman named Betty Brent. She typed my dissertation—she used to do that on the side, you know, on weekends and nights. I probably met her through my connections to Feynman.

You know what he did? He agreed that he'd turn over his papers! He said, "OK, if I give you my papers and I want to borrow them, what are you going to say?" I said, "Of course, you can check them out. And we'll make a little note that you've borrowed them and when you're finished, you'll give them back. Won't you give them back?"

[Voice lowered, mimicking Feynman:] "Yes."

And in fact I think on one occasion, he did borrow them. He was very active in the late sixties, something having to do with curriculum reform of mathematics in California. Either he was on a commission or a panel, and there are folders on that subject in his papers, and later on he wanted to look at those folders, so he borrowed them and he brought them back. But usually he'd call me up: "Judy, I'm looking for such-and-such, could you check and see if they're there?" Which I would do; I would do that for anybody, of course—anyone who gave us their papers. You understand, as custodians, we go in and do the research. But he goes into his office and he puts his hand on a desk drawer and he opens it and he pulls out a packet, and he says, "These you can't have. I'm going to burn these." I knew that was—

LIPPINCOTT: Theatrics?

GOODSTEIN: It was theatrics. So I said, "What are they, that you're going to burn them?" "Ah, these are the letters from my second wife." Oh. And he said, "You know, they're personal. You can't have them. I'm going to burn them." I said, "Well, I don't think you should burn them." He said, "I don't want them to embarrass Gweneth."

LIPPINCOTT: Gweneth, his present wife?

GOODSTEIN: His present wife.

LIPPINCOTT: His third wife.

GOODSTEIN: His third wife. So I said, “Well, we can seal them. We do seal things. You stipulate the conditions under which they’re sealed, with an open date. After everyone’s gone, no one will be embarrassed. But it does shed light on your personality, and your life, your biography.” Well, needless to say, he gave them to me.

LIPPINCOTT: And you have them still?

GOODSTEIN: Well, let’s try and reconstruct. He said, “Don’t put them in the collection; I’m just giving them to you. You have them. You take care of them. You know what to do with them.” So they stayed in the Archives, but not in the collection—not with his papers. Before he died, we had half of his collection, and the rest was at his home, in Altadena. Sometime after he died, I contacted Gweneth and said, “We have half the papers. Are you interested in donating the rest to the collection?” And she said, “Yes.” So I used to go up to the house—this was in the winter, and there was no heat. She wasn’t very well; I think her breast cancer had recurred. So she left me there, and she said, “Here, just take what you want.” I never went upstairs—there obviously were personal letters upstairs. I only went into the basement, where he had an office—that was his home office. And there were textbooks there, and piles of stuff, including all his medical records from his various bouts with cancer. So I did bundle up all of that stuff. It took me about a month. You could only work on it for about an hour, then you just needed a break. And then, also, it was depressing. There was another room, which had the furnace, and I saw there was a box in there, too. I said to her, “What about this box?” “Oh, no,” she said, “you mustn’t touch that box. I promised Richard”—she didn’t call him Dick, she called him Richard. She said, “I promised Richard I would burn it. I promised him.” I said, “OK, but at the top”—because I had started to look through it; well, that was my job, to go through papers—“there are all these medals that he won, gold medals.” “Oh,” she said. So I gave her the medals—presumably she

wouldn't burn the medals. The National Medal of Science was there, too—not the Nobel, but the National Medal of Science.

Anyway, I'll tell you what happened to that box. James Gleick came out here to cover the memorial service. He was then working for the *New York Times*; he was one of the science reporters. And several people spoke, including David. Gleick came to the Archives at the same time, and he asked me, "Has anyone said they're going to write a biography? Because I'm going to." OK, so he introduced himself; and I know he went to see Gweneth, and Gweneth gave him that box.

LIPPINCOTT: Oh, she did?

GOODSTEIN: Yes, she did not burn it. And I believe that Gleick still has that box. And that's where all of the information that you read about Feynman's second wife in Gleick's biography—that's where it comes from. Because that box had all the letters from his girlfriends, who wrote to him after Arline, his first wife, died.

LIPPINCOTT: Whom he loved very much. And she died of TB when they were still at Los Alamos.

GOODSTEIN: Right. So that box never got burned. But if you read the Gleick biography very carefully in those places—I did, because I read them as an archivist, and I realized that he just glides over citing where he got the information. And where he got it is from this box, which I think he still has. So then we come to the little pile that Feynman kept in his file drawers, which he gave me. He didn't keep them at home, he didn't keep them as part of that box—I don't know why. I forgot about them. After the Gleick biography came out, I found them. I had put them away in a careful place in the Archives, and I came across them. The question was, What to do with them?

LIPPINCOTT: Now you could put them in the collection?

GOODSTEIN: And that's what I did. I put them in the collection.

LIPPINCOTT: OK. I imagine that was a pretty heavily used collection, too.

GOODSTEIN: Yes, it was heavily used. Charlie Weiner interviewed Feynman.

LIPPINCOTT: For the AIP?

GOODSTEIN: For the AIP. Charlie Weiner interviewed about 150 physicists, Feynman being among them. We had a copy of that interview here in the Archives. The AIP allowed us to have a copy.

LIPPINCOTT: It's probably on the Web now?

GOODSTEIN: Now it is, for the first time. It's been cleaned up, transcribed in a proper way—because that was just a typescript, and I read in a recent AIP newsletter that it's now accessible on the Web.

LIPPINCOTT: Well, a lot of their interviews are.

GOODSTEIN: Right. But Weiner's Feynman interview, which Gleick used, is the real backbone of Gleick's biography.

LIPPINCOTT: Do we have an oral history of Feynman here?

GOODSTEIN: No, we never did an oral history with him. I figured that Weiner did it, so we did not do it.

Feynman called me, shortly before his death—one of the last times I spoke to him. Before he went into the hospital for the last time, he called me up at home. Sometimes he would call me up at home, to talk to me, or to talk to David about something. He was looking for something that was on his mind. It had something to do with Cushing Strout, the Cornell intellectual historian. But then he went on to say, “You know, you've been very helpful to me

all these years. I've really appreciated it." Oh, I felt terrible.

LIPPINCOTT: That's hard.

GOODSTEIN: Then we said goodbye.

LIPPINCOTT: Well, how nice that you got a chance to do that!

I want to talk about his lectures on physics, too. *The Feynman Lectures on Physics*, which are tremendously important. Caltech owns the copyright?

GOODSTEIN: Yes, they own it. These are the red books we're talking about, now?

LIPPINCOTT: And they're for Physics 1 and 2, freshman physics and sophomore physics?

GOODSTEIN: Yes, the first two years. At some point, the physics department said those courses needed to be redone, refashioned. And I think Feynman agreed to take a shot at it.

LIPPINCOTT: This was in the early sixties.

GOODSTEIN: Yes. And he worked very hard at it. He gave the lectures, and the lectures were taped, and the blackboards were photographed. Feynman said, "I don't want to be involved in the editing. I don't want to look at the transcripts." So there was a committee, which consisted of Robert Leighton, Henry Victor Neher, Matthew Sands, and a few others—a group of physicists who volunteered to do this work, for which they were not paid. The idea was that it would be copyrighted by Caltech and the proceeds would go to the physics department for instructional use. So that became a very generous revenue stream, because those books were bought by physicists around the world, for years and years.

LIPPINCOTT: I've got one somewhere.

GOODSTEIN: There you go. They're still being sold, and they've come out with new anniversary

editions.

LIPPINCOTT: This is Addison-Wesley.

GOODSTEIN: Yes, Addison-Wesley. OK, so Feynman didn't make any money from that. Nobody made any money. The physics division benefited. And it's for instructional use. When the ceiling in 201 East Bridge was peeling, I used to needle them and say, "Why don't you paint the ceiling?"

LIPPINCOTT: With the funds from the Feynman lectures?

GOODSTEIN: Yes. It wouldn't cost much just to paint the ceiling. Anyway, when David came here, he volunteered to be a TA in that course, in Physics 2, and they were using *The Feynman Lectures on Physics*.

LIPPINCOTT: Are they now?

GOODSTEIN: No, no, because everyone decided it was too difficult for the undergraduates. It wasn't too difficult for the physicists, but it was *way* too difficult for the undergraduates. And then at a certain point, the physics division decided they needed to rethink the core physics course again, and that's when David Goodstein stepped up to the plate.

LIPPINCOTT: And did what?

GOODSTEIN: He did *The Mechanical Universe*.

LIPPINCOTT: Oh, and do they use that for freshmen?

GOODSTEIN: He did. Well, he redid the course, and from that *The Mechanical Universe* grew, out of the lectures.

LIPPINCOTT: How long did David teach the core physics course?

GOODSTEIN: Many, many years.

LIPPINCOTT: OK. I guess what Shelley was telling me about your role with the Feynman lectures had to do with the audio edition, in '93.

GOODSTEIN: I used to get donations from divisions, donations for the Archives, as they were cleaning out offices and when they would run out of space. But in the case of Feynman, Robert Leighton had kept all of the audiotapes from which the books were written, and he gave them to the Archives.

LIPPINCOTT: This is Feynman lecturing?

GOODSTEIN: Feynman lecturing. Leighton said, "Someday, people will be interested in them."

LIPPINCOTT: Oh, sure.

GOODSTEIN: Not now, but someday. "And your job is to keep them, to preserve them, and then to do what's right by them." That was very important to him—to do what was right by them. I said, "I will do that." This was probably in the seventies, when Leighton was PMA [Physics, Mathematics, and Astronomy] chairman [1970-1975]. And he gave me, as archivist, something else, too, to preserve on behalf of the physics division, and those were the actual film clips of the lectures. Every so many seconds, they took a picture of the blackboard while Feynman was lecturing, and Leighton had saved all of those, too, and he gave me all of those for the Archives. And once again he said, "Do the right thing by them. Someday people will be interested." So those were two important acquisitions. After Feynman died, the Archives was inundated with phone calls and visits from book publishers who wanted to publish Feynman's papers. They didn't quite know what, but they thought there was gold in them thar hills. So I suggested to Gweneth that we have a committee, that the institute form a committee made up of the archivist—because the material was here in the Archives—and people from physics, who could

make the best decisions on how to make public Feynman's papers. By "Feynman's papers," I'm including correspondence, something like the Einstein Papers Project, and all his scientific notes. The publishers were all hot to do it. All the big publishing houses came rushing out here. I told them I wasn't in a position to give them the green light, that we were only the custodians. Then things got very murky, because Ralph Leighton became involved.

LIPPINCOTT: And he's the son of —?

GOODSTEIN: Robert Leighton. He had been a bongo drum player with Feynman, and he had become a friend of Feynman's.

LIPPINCOTT: But he's not a physicist?

GOODSTEIN: Oh, no. He taught high school, or junior high school, science or math—I'm not sure. But he inserted himself, and then things became rather ugly, so the publication of Feynman's papers, as such, never took place. The committee that I had suggested the physics division set up, that never happened. And Gweneth died, so I couldn't talk to Gweneth anymore about it. And she had asked their son to be involved, and the son didn't live close by. And then an offer came in to the Archives from Addison-Wesley to publish the audiotapes. I had been in correspondence with them, and then a new person came—who, by the way, now works at W. W. Norton. He had a friendly tone, and I said to him, "You know, what you really want to publish are the audiotapes." And he said, "There are audiotapes?" I said, "Yes, there are audiotapes. They would be worth publishing." So he came out here right away, and he listened to them. He got very excited.

LIPPINCOTT: Because Addison-Wesley was doing editions of the hard copy, the print copy.

GOODSTEIN: Yes. Nobody had ever asked me about audiotapes. And, remember, when Robert Leighton gave them to me, he said not only should I take good care of them but I should do the right thing by them. And I thought, as a professional historian of science and an archivist, that doing the right thing in this case was sharing them with the wider world, via a respectable

publishing house. It was clear to me that the copyright was Caltech’s, because these were works for hire. Feynman lectured as part of his duties as a professor.

LIPPINCOTT: Just as the copyright for *The Feynman Lectures on Physics* went to Caltech, so should this?

GOODSTEIN: Right. By now, Charlie [Charles W.] Peck was the physics division chair [1993–1998]. With the help of Caltech’s intellectual property lawyers, we drew up a contract—I mean they drew it up; I’m not a lawyer. We agreed that the Archives should get ten percent and the physics division should get ninety percent, which seemed like a very generous offer to me. I told Charlie Peck, “This is a wonderful contract for physics. Look what we’re doing,” and he looked at me blankly. Either he didn’t grasp what I was saying or I didn’t explain myself well, which is possible—or he resented, at some level, that I, over in the Archives, was conducting business for the physics division. I can’t tell you exactly—but I never got a thank you. And I can’t tell you how much money went into physics as a result of publishing these audiotapes. It started with *Six Easy Pieces*, which was a runaway bestseller.¹⁴ It was snapped up like crazy. Addison-Wesley did a wonderful job on it. And then it got more and more sophisticated—that is, the publishers had somebody, I think in Colorado, clean up the tapes to get rid of the hisses and background noise. It got better and better. The Archives got ten percent. You asked me where the sundry donors funds came from. After *Six Easy Pieces*, that ten percent was a good chunk of our budget for a long time and allowed us to do a lot of things, especially with the computers and putting things on the Web. And I am told that, this year, the provost took that fund away.

LIPPINCOTT: What, the sundry donors?

GOODSTEIN: He took away the Feynman money, the ten percent.

LIPPINCOTT: How can he, if it’s supposed to come to the Archives?

¹⁴ Richard P. Feynman, *Six Easy Pieces: Essentials of Physics Explained by Its Most Brilliant Teacher* [Audio CD] (Reading, MA: Helix Books/Addison-Wesley, 1994).

GOODSTEIN: Well, ask him.

LIPPINCOTT: OK. Well, that's terrible.

GOODSTEIN: Not only that, but Shelley wasn't told. It vanished.

LIPPINCOTT: Was it substantial?

GOODSTEIN: Yes, especially in the beginning.

LIPPINCOTT: Like any kind of royalty, it peters out.

GOODSTEIN: It gets smaller and smaller. But it was still—

LIPPINCOTT: Interesting enough to Stolper to have him seize it.

GOODSTEIN: Yes. And, you know, I'm sure he didn't take away the physicists' share.

LIPPINCOTT: Well, who knows?

GOODSTEIN: We don't know. I think the physics division would raise holy hell.

LIPPINCOTT: Do you want to talk about how you discovered Feynman's lost lecture?

GOODSTEIN: Robert Leighton, as he got older, deteriorated mentally. I think he had Alzheimer's or some kind of dementia, so he was in a facility, along with Leverett Davis, another physicist whose papers we have. Leverett's papers came here after he died. His widow said, "Please, would you like his papers?" and we said yes. So after Leighton passed away, in due time the physics division notified us that his widow, Marge Leighton, and Ralph Leighton, the son, had gone through all of his papers and that whatever was left we could have. That's how it was put to us. So I went over there. But in the back of my head what I was going to look for was any

association with Feynman and *The Feynman Lectures on Physics*, because Leighton had been a major player. But I thought to myself, “Well, I’m sure they’ve taken it all.” In his office, it was mostly garbage, and there wasn’t very much to take—I have no idea what they took. But there was a storeroom—one of these horrible closets that janitors use to keep their cleaning equipment.

LIPPINCOTT: Was this in Bridge?

GOODSTEIN: No, this was in Downs [George W. Downs Laboratory of Physics]. So I sat down and started going through things that were in boxes; and by golly, I came across a folder. The story of how I found it is recounted in the preface to the book that became *Feynman’s Lost Lecture*, and which became the source of a lawsuit against Caltech. You know, I was expecting to find *something*. I figured he was a cautious man, Robert Leighton, and he had given me the audiotapes, he’d given me the photographs, so I figured he might have saved something else. I also remembered, in the back of my head, that not all of Feynman’s lectures had been included in the project. If you remember, there were four or five lectures that Feynman gave that are not in the red volumes.

LIPPINCOTT: Yes, because they’re guest lectures for other people’s courses.

GOODSTEIN: Well, he gave three on how to solve problems. They’ve now been published.¹⁵

LIPPINCOTT: What you found was one of those guest lectures—not part of the core physics course?

GOODSTEIN: Yes. It was a lecture he gave many places besides Caltech, because in the course of the lawsuit, David and I got a letter, a very nice letter, from a professor at Cornell, who told us that he thought it was a scandal that the family was suing and that Feynman had given that lecture at Cornell and that he would be happy to testify to that effect.

¹⁵ *Feynman’s Tips on Physics: A Problem-Solving Supplement to the Feynman Lectures on Physics* (Reading, MA: Addison-Wesley, 2005).

LIPPINCOTT: The family was suing Caltech because they felt they had a right to that lecture, although you and David had written a book about it?

GOODSTEIN: Most lawsuits of this sort are about money—not about principles, about money. I don't think anybody other than David would have done what David did.

LIPPINCOTT: Explain what David did, that's the point. What the lecture is about is the path of the planets around the sun?

GOODSTEIN: Right. It's an elliptical path. And all that remained of Feynman's lecture on it was the lecture itself. We did have the audiotape. You can hear him giving the lecture, and that's included as a CD in the book, but you don't see him writing on the blackboard.

LIPPINCOTT: Wasn't the blackboard photographed?

GOODSTEIN: I don't remember that. Isn't that interesting? It was only three pages. They probably didn't photograph it.

LIPPINCOTT: Three pages of notes?

GOODSTEIN: That was all, because it was a guest lecture, so they didn't photograph it.

LIPPINCOTT: It was about how Newton arrived at the motion of the planets?

GOODSTEIN: Yes. It's how to solve that problem without using calculus.

LIPPINCOTT: Which Newton did not use for this.

GOODSTEIN: That's right. He did it using geometry. So Feynman wanted to show the class how you solve the trajectory of planets around the sun using only geometry. David had to look at those three pages of diagrams, listen to the tape, listen to the lecture, and then figure out how he

did it.

LIPPINCOTT: Well, Feynman probably demonstrated it, but you just had the notes, the bare-bone notes, so David had to work out all the steps in the geometric proof.

GOODSTEIN: Which he did.

LIPPINCOTT: I think there were something like 151 steps.

GOODSTEIN: You edited the book and Marcia, our daughter, did a computer program to draw the diagrams. In those days, there wasn't software designed specifically to draw such diagrams.

LIPPINCOTT: Well, the fascinating thing about the book was that this was a way to get inside the mind of Newton—or the mind of Feynman.

GOODSTEIN: Both of them. That is correct.

LIPPINCOTT: Which anybody can do, if you're willing to sit there and look at each proof and the progression of them.

GOODSTEIN: Their progression. Just like when you study plane geometry in high school. That's all you need.

LIPPINCOTT: It's amazing, because [the fact] that Newton, the inventor of calculus, did it that way is kind of startling. I think he did it that way because, for his audience, the calculus would have meant nothing.

GOODSTEIN: But plane geometry did. **[Pause in recording]**

LIPPINCOTT: I think we lost some of this, so if you don't mind, I'm going to say again what David did, because this [recording machine] was blinking, and it's not supposed to blink. That

he went through those three little pages of scribbles and, I guess, the audiotape and worked out, step by step by step, the argument—Newton’s argument and Feynman’s reconstruction of Newton’s argument—

GOODSTEIN: That planets go around the sun in ellipses.

LIPPINCOTT: And this would be Feynman’s reconstruction of Newton’s geometric argument, which is fascinating because it lets you get inside the mind of both of those men. And the CD is the audiotape of Feynman actually giving the lecture. And that was pretty popular. You said Ed Barber, your editor—

GOODSTEIN: Our editor. He couldn’t see why we should include the tape, because they publish books, they don’t publish audiotapes. And I said, “No, no, people will want to hear Feynman’s voice!” David and I have gotten hundreds of letters and lots of e-mails, because people will read the book and they’ll play the audio, and then they try to do it themselves, to reconstruct the argument.

LIPPINCOTT: Well, that’s the reason for reading it.

GOODSTEIN: That’s the reason for reading it.

LIPPINCOTT: I want to talk about *The Volterra Chronicles*. This is your magnum opus, published by the American Mathematical Society, copyright date 2007.¹⁶ What gave you the impetus to write a biography of Vito Volterra? How did you get involved with an Italian mathematician?

GOODSTEIN: When I realized we were going to start going to Italy every year, I went looking—this is in ’71. We had the von Kármán collection, the Hale papers, and the Millikan papers, and I looked in the finding guides for those three collections to see the names of Italian scientists.

¹⁶ Judith R. Goodstein, *The Volterra Chronicles: The Life and Times of an Extraordinary Mathematician 1860-1940* (Providence, RI: American Mathematical Society, 2007).

Because, remember, my dissertation was on English chemistry and the early nineteenth century. I didn't know any Italian mathematicians at that time. I discovered there was somebody named Tullio Levi-Civita, somebody named Vito Volterra. I looked at the Volterra correspondence with Hale, and there was Levi-Civita correspondence with von Kármán. I couldn't read Volterra's handwriting, but I could read Levi-Civita's handwriting, and that decided me: I'd do research on Levi-Civita.

LIPPINCOTT: And this was because David would be spending a lot of time in Italy with Franco Scaramuzzi?

GOODSTEIN: Yes, and I knew the logical thing for me as a historian would have been to take my dissertation and turn it into a book. But I really didn't want to look back. I wanted to look forward, so I thought, "OK, I'll see if I can do an Italian subject instead." I remember I had the address of Levi-Civita in 1971, and I went looking for where he lived.

LIPPINCOTT: This was when David was there for how long?

GOODSTEIN: We were there for ten weeks. It's the summer in Rome. So I went looking and I found the house. It was a three- or four-story building, small building, not very big. The porter came out and said, "Can I help you?" I said, "Well, I'm looking for a mathematician who lived here a long time ago." And he said, "What was his name?" And in my halting Italian—because this was '71, and I hadn't used my Italian much yet—I said "Levi-Civita." He said, "Oh, the widow is alive." I kept thinking, "No, the widow can't be alive," because I knew he was born in 1873. [Laughter] Well, I didn't *think* she would be alive, let's put it that way. Though it was possible. He said, "No, no, she's alive." He takes me into an empty apartment and he says, "*Uno minuti*," and he calls up the widow, and he says, in Italian, "There is a stranger here, an American, who would like to speak to you." Mrs. Levi-Civita did speak English.

LIPPINCOTT: She must have been, what, eighty, ninety?

GOODSTEIN: She was his student when he was teaching at Padua, so she was considerably

younger than him. So I got on the phone, and we spoke a little English and a little Italian, and she invited me to come visit her. So I went and visited her in her apartment, which was in another area of Rome. She was then in her early eighties. She said to me, “Oh, yes, I have my husband’s correspondence.” I hadn’t done much research before I went on really what I considered a wild goose chase, but I thought, “Oh, well!” And she said, “Yes, it’s in the other room, in the study. I have it, but I need to ask my son-in-law, so come back.” So I came back and I met the son-in-law. His English was worse than my Italian at that time, so it was mostly in Italian, and he said, “Yes, you can look at it.”

LIPPINCOTT: Did you tell them that you wanted to write a book?

GOODSTEIN: Well, I said I wanted to do research on this—that’s really all I could say. I doubt if I said I wanted to write a book. So I went away, and it was sort of left there. It was time to go home—or I think they were going away. You know, many Italians go away in August, because it’s the national holiday on August 15th. But I had found the correspondence. I hadn’t really touched it—well, I had looked at it. So it was agreed that the next summer I could come back. The next summer I came back and I got in touch with Mrs. Levi-Civita, and then I actually looked at the letters. They were tied up in string and they were arranged chronologically. I realized I wasn’t going to get very far.

LIPPINCOTT: You needed to have them translated?

GOODSTEIN: Oh, no, not translated, because I could do some reading. I used to read some Italian when we lived there for the year—the newspaper. But I had never read books in Italian—maybe guidebooks, if we were going to visit a town. My first real challenge was to read handwritings, and Volterra’s I couldn’t read at that time. Anyway, to make a long story short, the second year we were back there—this is now 1972—the son-in-law tells me that there’s going to be a celebration of Levi-Civita’s hundredth birthday in 1973, and on that occasion the family has decided to give the correspondence to the Lincei—the Accademia Nazionale dei Lincei.

LIPPINCOTT: Is that the equivalent of our National Academy of Sciences?

GOODSTEIN: That's it, yes. And then I said to him, "Gee, maybe the Caltech Archives—me, in particular—could organize the collection and send it to you in time for the celebration." So there already, you can see, I have extended the mission of the Archives. The son-in-law said, "Let me talk to the president of the Lincei." Which he did, and the president said OK. So all these letters, hundreds of letters, were put in a big container and shipped air freight to LA; and I went down to a special area of the airport and put them in a van and drove them back to the Archives. I worked on it that year, along with everything else. I used to come in on weekends. Loma and I used to come in on Saturdays.

LIPPINCOTT: Just to organize that collection?

GOODSTEIN: Yes. I kept it organized chronologically, but I opened up every letter, and I found an Einstein letter to Levi-Civita. That really was my first paper on Italian mathematics.

LIPPINCOTT: You wrote a paper on this?

GOODSTEIN: Yes, I wrote it and I was invited to present it at the Lincei. I was invited to be on the program for the centennial celebration. In December 1973 I went there and gave the paper. Now you'll say to me, "But this is a book about Volterra." Yes, that's true, because, you know, I had other fish to fry. I worked a lot on Italian science under Fascism, that's what I did. I wrote another paper, and I gave a lot of talks. Well, there are no family letters in the Levi-Civita papers, and I didn't quite know at that time how to write a book that would be interesting for me to read. I didn't want to write a book that only historians of science would read.

LIPPINCOTT: Or only mathematicians?

GOODSTEIN: Or only mathematicians. I always wanted to write a book that my mother would read, or that my nieces would read, or my friends would read. At the 1973 conference, I met one of Vito Volterra's granddaughters, Angelica Volterra. She was then, I think, a senior or a junior

at the University of Texas in Austin; she became a dermatologist. In time I came to know that family, the American branch of the Volterra family, quite well. Many years after our meeting, Angelica mentioned in passing that there were family letters.

LIPPINCOTT: Letters from Vito to members of his family?

GOODSTEIN: Oh, first to his mother.

LIPPINCOTT: When he was young.

GOODSTEIN: Then to his wife. They ended up in Austin.

LIPPINCOTT: We should talk about why Volterra's important. He's a very important figure in Italian mathematics, is that not so?

GOODSTEIN: Oh, yes. Levi-Civita is very important, and so is Volterra. Volterra was important for things that Levi-Civita was never interested in doing. Not only was Volterra a world-class mathematician but he also was an Italian statesman of science. He saw it as his mission to develop institutions that would enable Italian science to flourish, and his model was what [George Ellery] Hale had done in this country, in creating the National Research Council.

LIPPINCOTT: So that's why he corresponded with Hale?

GOODSTEIN: Correct. Hale came to Rome and was Volterra's guest. Volterra became a foreign member of the National Academy of Sciences, and Hale was nominated by Volterra to become a foreign member of the Lincei. So it's Volterra who, after World War I, creates what is now the Italian National Research Council. And that's how Italian science is funded today, in large measure.

LIPPINCOTT: He and Levi-Civita were both Jews and suffered, really, when Mussolini came to power.

GOODSTEIN: They suffered. When Mussolini came to power, Volterra made it abundantly clear that he was anti-Fascist. There was no middle ground with Volterra—it was black and white, and he said so. He said it was his responsibility as a senator; Volterra had become a senator in 1905. He had sworn allegiance to the state—not to the Fascist state but to the king and the national state of Italy. When Mussolini became dictator, he imposed a Fascist loyalty oath on all the academics, all the university professors. This was in 1931. And Volterra said, “I can’t sign it. This is not where my allegiance is. This asks me to swear allegiance to the king and the Fascist state. I can’t do that. That’s not what my title as senator will allow me to do.” So he resigned from his university position, which essentially made him an outcast. It was as if he didn’t exist anymore. He lost his membership in all of the Italian academies, because they, too, had to sign an oath of allegiance to the Fascist regime. Also, Volterra became the president of the Lincei, so he was—

LIPPINCOTT: Well, this was before —

GOODSTEIN: This was in 1923 to ’25.

LIPPINCOTT: And he lost that position?

GOODSTEIN: He lost that position, too. He was forced out of that position. Somewhere in the Hale papers—I never found where exactly, but somebody was writing to somebody else, and they described Vito Volterra as “Mr. Italian Science.” Unfortunately I was up on the ladder reading this file, and I never made a note of where it is, and to this day I’ve never found it. But I started using it, and every Italian who has written about Italian science since has used it. They don’t all give me credit for saying it first—and I *didn’t* say it first. OK, he was Mr. Italian Science.

LIPPINCOTT: So he was an eminently suitable subject for a biography.

GOODSTEIN: Oh, yes. No one had ever written a full-scale biography. Italian politics is such

that there are many Italians who don't think Mussolini was all that terrible. You know, the phrase is that he made the trains run on time. He prevented Italy from becoming a communist state after World War I, when there was a lot of upheaval. There is a neo-Fascist party in Italy today, and it's not really a splinter group. They exist, and they have followers, and Mussolini's granddaughter is in the parliament.

I learned how to read letters written in Italian. I got much better. It turns out I have probably a greater talent for that than speaking. The speaking doesn't flow like water, but I can dope out handwritings, even a bit of Volterra. But I had help—I had Carlotta Scaramuzzi, when she was a SURF student here.

LIPPINCOTT: And she translated the letters?

GOODSTEIN: She did various things. She did bibliographic work. I would tell her what I was interested in, and she would look in Italian libraries, online, for certain things. She would do summaries of important letters, and then I would decide whether I wanted to use a letter or not. I never used a whole letter—you use portions of letters. And I had her also check my translations, because quite often you misread one word and it changes the whole meaning of the sentence. As you know, there's an art to translating. She helped me a lot.

So, that was *The Volterra Chronicles*. Now the funny thing is, I'm now going to write the Levi-Civita biography.

LIPPINCOTT: That's your next one?

GOODSTEIN: That's my next one, because now I have a better sense of how to write a book about him; I have an idea for how to do it. We'll see if it plays out.

LIPPINCOTT: Before we leave Volterra, I have this book review from *Nature*. You got a very nice review from *Nature*.¹⁷ I'll just read the end of it. In an appendix, you have an obituary of Volterra written by the distinguished English mathematician Edmund Whittaker, and the *Nature*

¹⁷ Salvatore Coen, "Ups and Downs of a Senator Scientist," *Nature* 449, pp. 406-7 (2007).

reviewer says, “It is a fitting end to a biography of an outstanding scientist which is remarkable for its accuracy and scholarly rigour”—that must have made you feel pretty good—“and—unlike its predecessors—for its potential to engage a wide readership.”

GOODSTEIN: Yes.

LIPPINCOTT: So you succeeded with Volterra, and you’re going to be attempting the same thing with Levi-Civita. Well, this is a good place to end, I think.

GOODSTEIN: That was good!

[Recording ends]