In the Beginning...and Beyond:
Edward M. Landesman—
Professor of Mathematics, UC Santa Cruz

Interviewed and Edited by Irene Reti

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Interview History

Edward Landesman was born in Brooklyn, New York, the son of Jewish immigrants from Eastern Europe. He and his parents and his twin brother moved to Los Angeles when Ed was two years old, the city which was to be his home through his undergraduate and then graduate education at the University of California, Los Angeles. Landesman was a first-generation college student, as his parents never had the opportunity to pursue higher education. He graduated from UCLA with a BA in mathematics in 1960, earned his MA in 1961, and his PhD in 1965, all from UCLA.

While at UCLA, Landesman discovered that he loved teaching, a passion to which he was to dedicate himself for the rest of his career. He was honored with several major teaching awards, including the UCSC Santa Cruz Alumni Distinguished Teaching Award in 1984, and the Mathematical Association of America Deborah and Franklin Tepper National Award for Distinguished University or College Teaching in 1996. However, his record is equally distinguished in pure mathematics research, and in research about mathematics education, both at the college and K-12 levels. And Landesman also made major contributions to administration and institution-building at UCSC. He served on numerous Academic Senate committees, became UCSC's first associate academic vice chancellor for undergraduate education, and was provost and senior preceptor for academic affairs at Crown College. He has also been a pioneer and leader in mathematics education on a statewide and national level.

It was the University of California, Santa Cruz's commitment to emphasizing undergraduate teaching within the structure of a major research university which drew Landesman to join the mathematics faculty at the innovative new UC campus in 1966. The campus had opened one year earlier. "I knew this was going to be a unique place relative to the UC system, unique in the sense that they were going to put great emphasis on undergraduate education, and that it was going to be the UC campus that would place emphasis on both high-quality research and high-quality teaching," remembers Landesman. Landesman's reflections on the complex trajectory UC Santa Cruz has traveled over the past five decades comprise the heart of this oral history, which is part of the Regional History Project's series on University History.

Landesman affiliated with Crown College under Founding Provost Kenneth Thimann, whose leadership and international reputation are often credited with creating UC Santa Cruz's stellar reputation in the sciences. Landesman himself became a key figure in building the new campus, serving on the committee which established a long-awaited engineering department and starting innovative programs such as the Center for Teaching Excellence.

In the 1980s, Landesman collaborated with Ronald Henderson, a professor in the education department. These kinds of interdisciplinary collaborations represent one of UCSC's strengths. Henderson and Landesman researched the use of technology in the teaching and learning of mathematics. Landesman also directed the Monterey Bay Area Math Project, one of seventeen California math projects which train K-12 teachers in math education. As director, Landesman emphasized a team approach for his instructional staff. This focus on team-based teaching became integral to his teaching philosophy. Landesman's venture

beyond the academy next extended to founding the Math Academy math enrichment program at Santa Cruz High School and Watsonville High School, a successful program which is still in operation.

These forays into math education eventually inspired Landesman to take a leap and retire from UC Santa Cruz in 1994, as part of the campus's early retirement incentive program [VERIP]. In the next twenty years he devoted himself to improving math education in the state of California and beyond. First, he helped begin Academic Systems Incorporated, a company which produced interactive computer-assisted learning materials to assist college students with improving their skills in mathematics. This innovative company was years ahead of its time in developing interactive, multimedia, computer-assisted learning that prefigured online learning. Landesman eventually became the company's executive vice president.

After six years, Academic Systems Incorporated was sold and Landesman became the education director of the Collaborative for Higher Education. This cooperative effort on the part of UC Santa Cruz, San Jose State University, and the Foothill-De Anza community college district promoted the learning and teaching of math, science, and technology. Many of the activities were related to the research and educational endeavors at NASA Ames Research Center in Mountain View, California.

Finally, in 2005 Landesman was hired by Cal Teach, a Science-Math initiative at the Office of the President at the University of California systemwide, to provide outreach and training to community college students interested in teaching math and science at the secondary level. Landesman traveled throughout California developing relationships with twenty-eight

community colleges who participated in Cal Teach, and created and secured funding for a program which offered students paid, hands-on experience in a school classroom teaching math.

Landesman concludes this oral history by returning to the beginning, the subject of UC Santa Cruz. He offers some reflections on the past and future of the campus and expresses his gratitude for the many years he spent here. This oral history is the result of two sessions conducted on December 2 and December 10, 2015. The first session took place at McHenry Library at UCSC, and the second one in Palo Alto. I transcribed and audited the interviews and returned the transcript to Landesman, who reviewed the text with careful attention and suggested some minor edits.

I want to thank both Ed and Miriam Landesman for their warm and welcoming hospitality during the second interview session, which took place at their lovely home in Palo Alto, California, and for Ed's kindness and generosity when I confessed that his interviewer (me) has suffered from math anxiety her entire life. I only wish I had had the good fortune to be one of Ed's many students, or a young beneficiary of his visionary programs outside of the academy.

Copies of this volume are on deposit in Special Collections and in the circulating stacks at the UCSC Library, as well as on the library's website. The Regional History Project is supported administratively by Elisabeth Remak-Honnef, Head of Special Collections and Archives, and University Librarian, Elizabeth Cowell.

—Irene Reti, Director, Regional History Project, University Library
University of California, Santa Cruz

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Early Life

Reti: Today is Wednesday, December 2nd, 2015. And this is Irene Reti. I am here with Ed Landesman for the first session of the oral history that we're going to be doing together. So let's start, Ed, with why don't you tell me when and where you were born?

Landesman: Of course, I don't have this as first-hand experience—

Reti: [Laughs.]

Landesman: —but this is what I was told.

Reti: You were told that you were born.

Landesman: I was told I was born in Brooklyn, New York, in March of 1938. I have an identical twin brother, Howard, so there were two of us that were born to my parents that day. I'm five minutes older than he is and I make sure every so often to let him know that.

Reti: [Laughs.]

Landesman: My parents came to California when I was two years old, Los Angeles in particular, and so in many ways I consider myself a Californian, although I have been back to New York to visit on occasions. But I was raised in Los Angeles.

My parents were both immigrants. My mother came to this country when she was six-months old, so she was, in many ways an American. My father, though,

was seventeen years old when he came to this country. He was raised in either—well, it was some part of Czechoslovakia or Hungary; the borders were not so clear then. He did speak Hungarian. He spoke German and spoke English, but if he met anyone from Hungary, they could rattle off Hungarian pretty rapidly.

Neither of my parents went to college. My brother and I were the first—and they had only two children, my brother and I. In fact, my mother was told she'd never have children, and they didn't have us until she was around thirty-five or thirty-six years old. My parents were about the same age.

They both had the opportunity to go to college, but my mother—she was one of five children. She was the oldest girl and she was very close to her mother. I think as a consequence, she felt an obligation to stay at home and help her mother. But she was a very accomplished pianist and, in fact, accompanied her older brother, who was a professional violinist in his early career. He was very, very good, but I'm guessing she may have been even better, but at that time all the emphasis went to the man. And so that's what happened. But she was an extremely fine pianist.

My father had a chance, when he came to this country, to go to college. He came from a family of, I believe, nine children and those were the ones that survived childhood. He was the youngest of the nine. When he came to this country, one of his brothers who was already here had three shoe stores, and he wanted to send my father to college. My father did not want to go, but wanted to go into the business with his brother, and that's what he did.

So neither of my parents went to college, but both had had a good pre-college education and both were capable of higher learning.

Reti: Were your parents fleeing some kind of persecution in Europe?

Landesman: My mother's father, my grandfather, who I knew—fled Russia because he was probably going to be drafted, and if he had been, it would have likely been a death sentence for him. So he left his wife, (my grandmother), and two children—my mother and her older brother—in Russia. My grandfather came to America and then brought them here.

Reti: I see. And what brought them to Los Angeles?

Landesman: Well, that's an interesting story. Part of it has to do with the Depression, which completely took care of my dad's businesses. My father's brother had passed away at an early age. My father, consequently, was in charge of the shoe stores. But they were all lost in the Depression. Also, I was told that my brother and I, as babies, needed to be in a warmer climate but I'm not convinced that was the major reason for our coming to Los Angeles. My father's sister and her husband had come to Los Angeles a few years earlier, and his sister wrote to my father saying she had a job for him in the shoe business in Los Angeles. I think the job offer in 1940 was the major motivator. And so, my parents, with my brother and me, came by train to Los Angeles.

Reti: So you grew up in Los Angeles, primarily—

Landesman: Yes, I did.

Reti: What part of L.A.?

Landesman: When we first arrived, we lived near USC [University of Southern California], by the Coliseum. My mother talked about how she would wheel my brother and me in a double stroller and everybody would stop her along the way to see "the twins." With time, we moved farther west, and we ended up not far from UCLA, not in Westwood, but in West Los Angeles. And prior to that, we lived in two other areas of Los Angeles. I went to school—elementary, junior high, and high school—in Los Angeles. Really good public schools and I obtained a good education. I did well in school.

Reti: And when did you first feel compelled by mathematics?

Landesman: It's very interesting. I did well in math. I was good at it. But my leaning was towards electronic or electrical engineering. As a child, when quite young, my brother Howard and I were fixing everybody's radios in the neighborhood and maybe some out of the neighborhood. And we began to understand the basics of electronics, by working with radios. That did involve some math. Not a great deal of math, but some. And so my thought then was: I probably want to be an electronics engineer. But that changed, and we can talk more about that, if you wish.

Reti: Sure. So you started out at UCLA, and was that the point where you changed?

Landesman: Actually, it began to change in high school, but the major change took place at UCLA. In high school, there was a course called *Radio Shop*. Most of

the students who were more academically inclined did not take that course. The shop courses then, were typically for students who probably were not going to continue in pure academics. However, this particular *Radio Shop* class turned out to be one in which I'd say at least half the people in there were highly academic, who went [on] to college, UCLA, Caltech [California Institute of Technology], and others. The instructor was excellent, in that he motivated us in many ways to learn more about electronics. And we had to build electronic devices. In fact, one person in there—I still remember him—I saw him years and years later—he built an actual computer. We're talking 1954.

Reti: That's remarkable!

Landesman: Yes. And the other influence that this teacher had—there have been articles written up about him—he was a ham radio operator, an amateur radio operator, and he motivated us to get our FCC licenses. So a number of us, mainly the academic ones, traveled by streetcar to downtown Los Angeles, to the local Federal Communications Commission (FCC), and passed our tests and obtained our beginning licenses, and then in time, obtained higher class licenses.

All of that played a major role for me in many ways. In particular, electronics has always been of great interest to me and amateur radio has continued to be an ongoing hobby, especially in retirement. In studying for the FCC licenses, there was math, and one had to think about not only the electronics and the rules, but you had to think mathematically, and that started to play a role.

By the way, the family I came from was far from well to do. We weren't poor, but our income came from my father, who was a shoe salesman. I never felt as

though I was being deprived of anything. But it was pretty obvious that going to college meant going to UCLA. We didn't live far from UCLA. And thank goodness there was a UC campus nearby. I am such a fan of UC—I mean, there's likely no way I could have afforded to go to a major university had there not been UCLA nearby.

So I went to UCLA, and that's where my interest in mathematics truly evolved. I graduated high school in mid-year; in those times you could graduate in mid-year. I started at UCLA with a major in math, thinking that I probably would switch over to engineering. And things went well for me in math. I started to really enjoy it. Little did I realize that if you didn't start in engineering as a freshman at UCLA—unlike today—at that time you would have had to go to a community college for two years in pre-engineering, and then you could transfer to UCLA engineering in your junior year. I was totally naïve. I thought I'd start in math and switch over to engineering in a semester or two. I couldn't switch over then, even if I had wanted to.

Reti: Oh, my gosh.

Landesman: But it turned out to be just fine because things went well for me in mathematics. I might also add that I was very popular in school, and I think part of it had to do with being a twin. You know, we were "freaks of nature."

Reti: [Laughs.]

Landesman: I was president of my graduating high school class. In fact, we're about to have our sixtieth reunion.

Reti: What high school did you go to?

Landesman: [Alexander] Hamilton High School in West Los Angeles. And that may have played a role, I think, in my starting to understand about taking on leadership roles.

Reti: Ah!

Landesman: What also played a role is that I came from a relatively traditional home, where religion was important. Both my parents were Jewish, and I was raised that way. I went to Hebrew School every day after school, starting at age eight until age sixteen. And I took it very seriously. The teachers were good. Consequently, not only did I learn the Old Testament, the history, the rituals, et cetera, but I also learned the Hebrew language quite well. In fact, at one time, I could speak Hebrew almost fluently, but now, my vocabulary is lacking since I haven't spoken Hebrew too often. But if I meet someone who can speak it, I can carry on a conversation pretty well. I think learning another language as a child contributed to my learning of math, believe it or not. Languages came very easily to me. I took Latin. And later on in college, French. And then German, which I learned pretty much on my own. In many ways the structure of language and the associated rules you have to learn—if I were continuing to do research today—and I see it's becoming—or maybe it has already become known, there's a definite link between, not only music with mathematics, but language as well.

Reti: That's fascinating.

Landesman: So all of the experiences that I had learning languages, which came relatively easy to me, I think played a role also in my being able to learn mathematics.

Reti: Were your parents Orthodox?

Landesman: My parents were Orthodox, but when I say "Orthodox"—they were, however they weren't Orthodox to an extreme that you may see with some Orthodox people today. But, yes, it was considered Orthodox, and I was raised that way. I later broke away from the orthodoxy. I still practice Judaism, but in a reformed way.

Reti: The teacher of the class where you learned radio and electronics—

Landesman: Yes.

Reti: What was his name?

Landesman: Jack Brown. I recently read a very nice article that was written about him and which emphasized the positive impact he had on students, especially in the area of electronics and amateur radio.

The other influence that Los Angeles had on me, in a very different and limited way that I don't often speak about, is related to my attendance at Hebrew School. I was in a choir. I had a good voice. I could sing quite well. The choir got to be very good, and was chosen to participate in a motion picture in Los Angeles. And as a consequence, I actually was in two movies, one for MGM and one for Warner Brothers, four years apart. The MGM movie was in 1948, and the Warner

Brothers movie was in 1952. And believe it or not, every so often they're on TV late at night. [Laughs.]

Reti: And this was as a choir member, you were in the movies?

Landesman: Yes. In the first movie we recorded, and then they chose a few choir members to actually be in the filming.

Reti: I see.

Landesman: My brother and I, being twins—I'm sure that played a role—we were chosen and we appeared in a few scenes in each movie That was a rather interesting experience. My parents found it exciting, but in no way were they going to put any great emphasis on that. We did it, and it was an interesting experience. By the way, in the studio school, at MGM, I sat near Elizabeth Taylor.

Reti: [Chuckles.] Oh!

Landesman: She was sixteen, and I was ten. And she had just finished making the movie, *National Velvet.* I borrowed a pencil from her. I still remember that. It had very little meaning to me that she was Elizabeth Taylor except that I obtained her autograph, and I still have it. [Laughter.]

Reti: That's certainly a part of growing up in L.A.

Landesman: It is. Did that have any influence on anything as far as my career? I never thought so. I did become very interested in interactive video technology for the teaching and learning of mathematics. Maybe my early involvement in film played a role? I doubt it, but who knows?

Reti: You also have had a lifelong passion for teaching and I wondered if there were any particular teachers in your high school years who taught you how to be a teacher, or inspired you about teaching.

Landesman: I don't think so. Not in high school.

Education at the University of California, Los Angeles

I think college is where—at UCLA I think is where it really occurred. In many ways, the inspiration for teaching came from two extremes. One, the very fine teachers that I had really influenced me. But some of the teachers that were not so fine influenced me as well. I don't believe that those who were not so fine were that way because they didn't care. I just think that some people have a greater knack for teaching than others, personality-wise, et cetera, and being an expert in a particular academic discipline does not necessarily mean you have the ability to impart it to others, as we know.

Reti: Absolutely.

Landesman: What really, really made the big change for me was graduate school, when I was chosen to be a teaching assistant. Besides taking three graduate classes, I had two classes to teach, and sometimes they were quiz sections for calculus or other beginning courses, and other times they were my own classes.

Reti: Two. Wow!

Landesman: The first two classes that I taught were trigonometry and intermediate or college algebra. They gave those courses then in the math

department at UCLA. So, I was teaching two classes, taking three graduate courses, and studying for qualifying exams.

Reti: Were you mentored in how to teach?

Landesman: No, not at all. I just went in there and taught. And somehow it all clicked, because within a month or two in the classroom, I was told by the math department that students who were in my classes were coming up to the office and praising my teaching. I was, soon after, asked if I would teach summer school. I said I would. And later on, I became a head TA [teaching assistant] for one of the professors. And I began thinking, wow! I really like this. And I really enjoy it. At the same time, I enjoyed what I was learning in mathematics and I saw that the research component would be really interesting and rewarding as well. So both began to have a great influence on my future career. But the teaching—almost immediately, I felt so much at home with it. I loved it.

Reti: What did you love about it?

Landesman: I think there were a number of aspects, but in particular it was very gratifying for me to see students really enjoy learning the math I was teaching them and also to see students who thought they couldn't learn math suddenly begin to achieve. I also saw that at [University of California,] Santa Cruz as well, where every so often, I taught a course called *Mathematical Ideas*, a course for non-math and non-science people. Math for liberal arts students. I would choose eight or ten topics of higher math but present them at a level for non-math and -science people. I had some students in those classes who thought they had no ability whatsoever in math, and yet I always found that some of them—there

were probably even more—that had definite ability. And in fact, in a few cases, I think some switched over to math. I remember, in particular, a woman who was an art history major. She had *unbelievable* ability in math.

Reti: That's remarkable.

Landesman: Yes. So very gratifying, extremely gratifying. I mean, in all—to be able to go into a classroom, teach mathematics, and see that students were learning and enjoying it and really appreciating it. I still remember one class, a large class in calculus, where after two days, I finished proving a tough theorem, and the whole class stood up and applauded.

Reti: Wow!

Landesman: I still remember that. I was rather stunned in many ways, but it was very gratifying.

Reti: Okay. So let's backtrack to UCLA. I'm assuming there was quite a contrast between UCLA and UCSC. So tell me about what UCLA was like at that time, when you were an undergraduate.

Landesman: Before I even get into that, let me say, in general, my education at UCLA was fantastic, both in mathematics and outside of mathematics. And that—whether it was a great teacher or not a great teacher, I thought what I learned was really great. I was totally prepared for graduate school. There was no issue about that whatsoever.

As an undergraduate, I felt very much alone. UCLA was a commuter school. I never did experience a dorm life. I, along with many of my friends who came from the same high school—as undergraduates, we lived at home until we got out of college, or close to it. A lot of us could not afford it any other way. UCLA was gigantic. It was like being in a small city. And I felt totally alone—especially after having been very popular in high school, having major responsibilities and knowing everybody—going to UCLA as an undergraduate was just overwhelming in many ways. The *education* was wonderful. I was learning. I was taking good classes. I had some wonderful professors. But I remember I'd often go to my car—you could park almost anywhere on campus at that time—and sit there and eat lunch by myself.

Reti: Oh.

Landesman: You did meet people in your classes but the undergraduate experience at the large university definitely influenced me as far as what I might want to do, or want to be, and where I might want to go in the future.

By the way, I said the graduate experience is what really solidified my decision that I wanted to go into mathematics, do research and teach. Yet, oddly enough, I still remember, as a freshman, in a basic course in French, French I—it's interesting that this recollection comes to mind—the professor—in fact, I feel almost certain he was a TA—went around the classroom asking each of us—and we had to answer in French—what we want to be someday. I still remember saying, *"Professeur de Mathématiques."* Really interesting. Somehow as a freshman I said that.

Reti: And you surprised yourself in that moment.

Landesman: I don't know if I surprised myself but somehow that's what popped out.

Reti: That's remarkable.

Landesman: I remember the instructor's response. He went, "Oh, oh," or something like that—he clearly wanted to be a professor of French, I'm sure. It's interesting about some of the things you remember—

Reti: And so you decided to also apply to graduate school at UCLA. Did you apply to other places as well?

Landesman: I don't think so. I don't remember for sure. But I was convinced I wanted to stay at UCLA. I liked it. I knew the professors. They knew me. A number of them encouraged me to go elsewhere. It was not the trend that you stay in the same place for graduate school.

Reti: No, not usually.

Landesman: They weren't discouraging me, but they said it would just be better for my career if I went elsewhere for graduate school. I know finances played a role as well, but as I said, I liked it at UCLA. And as I continued in mathematics, it was getting better and better. By the way, it may be hard to believe, but I was very, very shy as an undergraduate, and I never had the courage, except very rarely, to go up to a professor's office during office hours and ask questions. I think part of it was, even though I thoroughly enjoyed the education I was

receiving, I didn't feel that comfortable in this very large city-type environment. That had a great influence on me.

Reti: So you graduated from UCLA with your PhD in 1965, right?

Landesman: Yes. UCLA asked two math graduates if they would like to stay on for another year after receiving their doctorates, I and another graduate. That was a great honor. [They] hired me as a half-time research mathematician and half-time assistant professor. The one transition that was a bit awkward was the professors whom I had known as both an undergraduate and a graduate, whom I had always addressed as Doctor, or Professor, were now calling me by my first name, and it wasn't easy for me to suddenly start calling them by their first name.

Reti: [Chuckles.]

Interviewing for a Faculty Position at the University of California, Santa Cruz

Landesman: But it was a great honor to be asked to stay on, which I did for the 1965-66 academic year. And it was in that same academic year that UCSC opened its doors.

What influenced me to come here? I began interviewing [for positions] because it was a one-year appointment at UCLA. I was interviewed by UC San Diego. I had a letter asking me to apply to Duke [University]. UC Irvine had opened. They interviewed me. I feel pretty certain that had I shown interest, in especially UC San Diego, that I probably would have had an offer for an appointment there. I also remember a person from Bell Laboratories who came to see me each year,

during the last few years when I was a graduate student. He urged me to come to Bell Laboratories after receiving my doctorate. He even told me that I would be given the opportunity, during my first six months there, to explore the labs and to choose what division I wished to be associated with and in no uncertain terms, be fully paid while doing so. Interestingly enough, when he told me that the labs were located in New Jersey, I lost interest. I clearly wanted to stay in California.

I lived in such a sheltered environment that I didn't even know where Santa Cruz was located. My former wife, Carol, who was a history major, a graduate student in history at UCLA—knew about [UC] Santa Cruz because she knew Page Smith. She had courses from him. She had courses from [William] "Bill" Hitchcock and [Eugen] Weber at UCLA. Consequently, I got to know a number of the people in the history department, graduate students as well as professors. And Carol knew that Page Smith had been recruited to be the founding provost of Cowell [College], and I think Page may have even told her, "Why doesn't your husband apply to UC Santa Cruz?"

Reti: I see.

Landesman: And I asked, "Where is Santa Cruz?" I thought it was in Mexico. And I was told no, and we came up here and had a look at the place and—wow! I mean, both of us thought, this is really nice! I applied. Dean [E.] McHenry—in those early years of the campus—it is my understanding—he was traveling around the country and conducting personal interviews with potential hirees.

Reti: Oh, yes

Landesman: McHenry had taught and had been an administrator at UCLA. He was dean of social sciences, et cetera. He came down to interview me. I still remember that interview quite clearly. I remember one key question he asked. He said, "Ed, why do you want to teach math at UCSC? With the degree that you have in math, you can go into private industry. You could make a lot more money. Why would you want to come to a place like Santa Cruz?" He set me up. I mean, it was—you know, what else would you say?

Reti: [Chuckles.]

Landesman: I said, "That's what I enjoy doing. That's what I want to do. I want to do research *and* I want to teach. I want to do both. But Santa Cruz— from what I've read about it and what I've seen—it's going to be a unique place in the UC system." At the time, I knew a bit about what he and Clark Kerr had envisioned.

Reti: How did you know that?

Landesman: I think I read it somewhere, after I was told about Santa Cruz. In fact, I'm sure that was the case. I knew this was going to be a unique place relative to the UC system, unique in the sense that they were going to put great emphasis on undergraduate education, and that it was going to be the UC campus that would place emphasis on both high-quality research and high-quality teaching. I thought, that sounds like just the place where I want to be.

I learned later on that McHenry had interviewed me and another graduate student in mathematics who I knew at UCLA. And when McHenry returned to Santa Cruz, he told the math department chair, "You can hire either of them. I'd

take both of them." So I guess I made a good enough impression. By the way, the other math graduate student that he interviewed ended up going to the University of Maryland, where he has had a very fine career.

And then the next interview I had was with Ted Youngs. Ted Youngs was the professor recruited from Indiana University to start and head up the math department, a well-known, accomplished, and traditional mathematician, in the true sense of the word, and he interviewed me. He was doing some research at, from what I recall, the Rand Corporation, in Santa Monica, and we had a lunch meeting. I thought it went well. And the next thing I knew, a few weeks later, I had an offer to come to Santa Cruz. And I took it.

Oh, Harvey Mudd College was another college where I was asked to apply. They had recently started or were just starting. But I felt so strongly about my experience at UCLA and UC in general, and I thought, if I can go to a UC campus, that's where I'd like to be. I still feel that way.

UC Santa Cruz in the Early Days

Reti: So you arrived in 1966.

Landesman: Mm-hm.

Reti: What were your first impressions of this place?

Landesman: I was amazed at the differences. This was small. My typical classes, the ones I began teaching, could be anywhere from, well, a dozen students, maybe. A calculus class probably only had about twenty or thirty students in it, where at UCLA, my gosh, it was up to hundreds. The students were incredible.

Bright. Rebellious, in many ways, but extremely bright. I still remember one class, early on there might have been fifteen or twenty in the class, and I don't remember if it was differential equations—but it was an elementary course in mathematics. And about half of the students in that class went on to graduate school and earned PhDs.

I also remember being called down to the admissions office. We were assistant professors, just starting out, young people, and we were asked to read applications of students who were applying to come to Santa Cruz. There were seven times as many *qualified* applicants as there were available slots for entering students. Almost all of them had four point zero GPAs. And we made recommendations based on the letters written on their behalf, the essays they wrote, etc.

That was one of the many unique experiences in the early years of the campus: As young assistant professors, we were put on many committees. In no way would that have happened at UCLA, or UC Berkeley, or any other campus. Early on, we were given the responsibilities that typically full professors and minimally, tenured professors would have.

Reti: So what other kinds of committees were you on?

Landesman: You name it. I could look through my list here. The Committee on Colleges, Committee on Committees, Committee on Educational Policy. Early on, I was asked to serve on the initial committee for starting an engineering program.

I was really very much in favor of having engineering on the campus. Based upon every experience I had had, I thought Santa Cruz should *definitely* have an engineering department. And, as you know, that did not happen in the early years of the campus because at the time when the proposal was submitted, Stanford [University] and UC Berkeley each had engineering departments. The recommendations and opinions that emerged were that the state did not need another engineering department. Francis [C.] Clauser had been brought here as the first vice chancellor for science and engineering and was clearly recruited here to start an engineering program. But it didn't happen. That was a big blow. In many ways, justice did occur. But it took many, many years. In the 1980s, I was on the engineering committee that finally did get engineering here at UCSC.

Reti: Oh, that's wonderful.

Landesman: It was very satisfying.

Speaking of engineering, there were a few times when one or two professors in the engineering department asked me to come over to engineering and teach mathematics and do research in their department. I always had mixed feelings. A couple of times I thought I ought to do it. But I also felt a certain loyalty to the math department, and so I said, no. I was a mathematician and I felt that I should stay in the math department. But I did help engineering, as far as writing the first *Math for Engineering* course for them and teaching it. And I always continued to be happy that UCSC had engineering.

You said something that got me thinking about the interview process that came about when I first came here. I was interviewed by each of the provosts: by Page

[Smith], who was the provost of Cowell College; by Charles Page, who was the provost of Stevenson College, and also by Kenneth [V.] Thimann, the provost of Crown College, who was here a year or two early, before Crown [College] was going to begin. Page Smith knew me, or knew of me because of UCLA, and he was very kind and so on, but it was very clear he didn't want any more mathematicians; he had already hired his math faculty in that first year. Charles Page had already hired his mathematics professors for the second year and he didn't want any more mathematicians, as well.

I had a great interview with Kenneth Thimann and to this day, I am so pleased about that. However, I was incredibly naïve. He asked me, what do I do? I started explaining [to] him that I work in differential equations and what I do, et cetera, et cetera. I'm sure he didn't really know all of the details I provided. A very bright man, but not into mathematics. And I, as naïve as I was, said to him, "What do you do?"

Reti: [Laughs.]

Landesman: And he said, "Oh, I'm a biologist. I play around with biology or botany." He was extremely, extremely modest. But it was a wonderful interview. He hired me for Crown a year early. I think I may have been one of the first hirees for Crown College. And when I came here, my former wife and I were preceptors, live-in residential preceptors at Cowell College in that second year of the campus. But I was waiting to eventually go to Crown College the following year.

Reti: So do you remember what Thimann's vision for Crown was, how he articulated that to you at the time?

Landesman: I, of course, knew that Cowell was focusing on humanities; Stevenson, on the social sciences; and that Thimann was hired to be the provost of the science college. That's what Crown was going to be. What impressed me with Thimann from the start and always, from the whole time I was here—Thimann was a superb researcher—a member of the National Academy [of Sciences]—and a first-rate scientist. He came from Harvard. I mean, first-rate. At the same time, as much as research was important to him, I never saw any change in his attitude when it came to teaching, when it came to the Crown core course, when it came to doing specialized seminars, when it came to talking about the dormitories. When it came to any issues related to the college or education in general, it was like there was no change in attitude between that and doing top-notch research. That impressed me about him. I was always impressed by that.

Research was primary in his mind and it should have been. But he also respected top-notch teaching. He respected leadership in different ways, committee work, et cetera. I always felt extremely comfortable in Crown. I know that there were some who said that Crown, in many ways, was different from the other colleges, more conservative. Perhaps it was, but I never felt as though it was out of touch with what the campus was meant to be, and I gave a lot of credit for that to Thimann.

Science in the Early Years of UC Santa Cruz

Reti: I've interviewed some people over the years who have thought that the scientists, most of whom were affiliated with Crown, were not as devoted to the college system because the scientists were mostly at their labs.

Landesman: Sure.

Reti: Do you think that that's a fair analysis?

Landesman: You know, I think that may have been the case for a few, but I don't believe that was, in general, true. It's like the notion that UC Santa Cruz was "the liberal arts campus and there's no science going on there." I mean, to this day, there are people that I meet who say, "Oh, Santa Cruz. Yeah, that's the place where there's liberal arts," et cetera. I think the same thing happened with Crown. There were those who thought that it was somehow different than the other colleges, in that the associated faculty weren't involved with the college.

I remember teaching a seminar on *Responsibility*, a senior seminar in Crown with a philosopher and a political scientist, who were both in Crown. I had the students read [Jacob] Bronowski's *Science and Human Values,* and [Rolf] Hochhuth's *The Deputy*, and we talked about responsibility. I took the scientific point of view. The philosopher did his part, as did the political scientist. It was the hardest course I ever had to teach, but it was wonderful.

Reti: Why was it hard?

Landesman: It was out of my field. And, of course, there were some people that felt that was not the correct thing to do. If you're a mathematician, you should

just be teaching mathematics. But, you know, we're more than just that when we're academics. My feeling is yes, we're mathematicians or physicists or whatever, but at the same time, we're academicians, and we know about other disciplines besides our own specialization. We may not be the greatest experts outside of our specialties but you get three academicians together, each of whom has viewpoints on certain aspects of a discipline, and each who have read articles and books about that discipline, you can do quite well. I had colleagues in Crown who taught courses outside of their departments as well. I never heard too much grumbling. I never did.

Reti: Well, this whole misconception that Santa Cruz is not a science place is quite interesting and I wonder if you have any sense of where that comes from.

Landesman: I believe it comes from the publicity that initially came out about the campus. And as we know, once something written is seen by many people, it can be very difficult to change their perception. Thimann brought in key scientists. And the irony is that if one were to look at departments, in my opinion, on the campus, most of the strongest departments are in science. I could go through each science department—there are some that stand out, really stand out over others: astronomy, earth sciences. I mean, incredible. And math is very good. You have faculty who are first rate. They don't always see things the same way together, but they're very bright people. Same in physics. Same in chemistry. And same in biology, of course.

Science in many ways, I think, made Santa Cruz. But that's often not the image. Now, the image has certainly gotten better with time. I think probably [Robert L.]

Sinsheimer saw that when he came in, but we can talk about that later. There're positive and negative things to be said.

Reti: So Dean McHenry, himself—what was your sense of his support for science?

Landesman: My feeling is that—and this may be partly because of what I heard from others and what I learned over the years—I think he, in general, probably didn't feel that comfortable with science. That's not to say he wasn't in favor of it, but I think that was not his comfort zone. I think his comfort zone was the social sciences and humanities. But he certainly made the great move when he brought in Thimann. That's what changed it. Thimann came in and brought in heavyweights in science. And in many cases, they wanted to come here because of the uniqueness of the campus. Not everybody, but a number of them did.

Reti: Because of the colleges?

College-Board Tensions

Landesman: Yes. And of course, that was the uniqueness of the Santa Cruz campus: the college system. Now, that's not to say that went perfectly. I mean, the fact that a faculty member here would have an equal, one-half appointment in their, "department"—it wasn't a department; it was a board of study—and an equal one-half appointment in the college—from the start, that was definitely a challenge, to put it mildly.

Reti: How was it a challenge?

Landesman: Well, in a typical department at any major university, the department has control over a faculty member, not a college. That, almost immediately caused a conflict. In my opinion, it wasn't so terrible, but I think it wasn't carefully thought out and could have been done a bit differently. But it's always easy, in retrospect, to look back and say it could have been done differently.

The idea was very innovative and unique at the time, but in retrospect—you see, the whole implementation in many ways, had a certain—I hate to use the word—schizophrenic aspect to it. You were brought here with the notion that this was going to be a place that's going to value *both* teaching and research *and* working with undergraduate students. That's why I came here. Research, teaching, and working with undergraduates.

However, when it came to making tenure, you were evaluated pretty much the same way as if you were at Berkeley or UCLA. They sent out your scholarly work to the best people around the country and abroad, and then made a decision on whether or not you fit in relative to what the experts at the other universities thought of your scholarly contributions. And often, those people who wrote the letters had little or no understanding of this campus and all of the other obligations and other commitments that were asked of faculty here. Well, that's not quite the way it [chuckles], was intended to be. And yet it had to be that way. And so this immediately caused conflict. It caused conflict in the sense that you learned early on where you had better focus your efforts.

By the way, you could be in a very dangerous position if you were regarded as a really fine teacher. I won all kinds of teaching awards. That could be the kiss of death at a major university.

Reti: That's right.

Landesman: But what was ironic is that I cared about teaching but I also cared about research. I have a theorem named after me and a colleague at another university. I did the things you were supposed to do in both research and teaching, yet I was often labeled by my department as the undergraduate guy because I was putting so much effort into that. I still remember a senior faculty member coming up to me one day. I had quite a few students in the office and I was helping them with their math. When the students left, he said to me, "Don't put so much time into working with students. Write another paper." That was before I made tenure.

So the conflict was there. I stuck to my beliefs, but I did both, and I did both, in the sense of what I believed the campus was intended to be and I still believe that. I did research and I became known in the area of my research. I did teaching and I gained recognition for that. And then I expanded my academic work in other directions as well, with technology, and doing research with Professor [Ronald W.] "Ron" Henderson in education.

And, by the way, that's where Santa Cruz and the college system was ideal. You got to know people in other departments, in other fields. I [just] used the word "departments," interestingly enough, not "boards of study."

Reti: [Chuckles.]

Landesman: You had a chance to do things here that you likely would not have had a chance to do at another campus. Did it cause conflict? Heck, yes. But was it worth it? Yes.

Reti: Did you ever feel that the duties, or the service that you were doing for the college created issues for either you or your colleagues with getting tenure, just the amount of time that young faculty were putting in?

Landesman: Sure, I did, absolutely. Several faculty members who were hired early on in the math department did not make tenure. Yes, I did feel that. But I also felt that something's wrong in this whole enterprise—you're advertising key aspects of the campus that make it unique in the UC system, and yet that isn't what is always happening.

Reti: Did you ever have any conversation with Dean McHenry about that contradiction, or schizophrenia, as you call it?

Landesman: Mm-hm. Perhaps I shouldn't have called it that. That may be a bit strong. But you understand what I mean.

Reti: Sure.

Landesman: No, I never did discuss that with McHenry. I did have conversations with Angus [E.] Taylor about such issues, when he came in as an acting chancellor and then chancellor for a couple of years. I knew Angus. I had him as a professor at UCLA. I waited to take advanced calculus with him

because I heard that he was a terrific teacher, which he was. And he was a fine researcher as well. I did well in his class. He did not remember me when he came here. He was happy to know that I had taken a course from him and that I had been at UCLA, but he certainly didn't—and I didn't expect him to remember me. As I told you, I was very shy. I rarely went up to a professor's office.

But Angus and I definitely became closer friends when he came here, and on certain issues, he confided in me. I had seen him when I was on the Committee on Educational Policy here. For one or two years, I was also the representative to the systemwide educational policy committee—and when I attended meetings Angus would be there because he was the vice president for academic affairs at the Office of the President. So he would attend the systemwide Committee on Educational Policy meetings. I guess I can be very explicit. I thought then, you know, here's a man who has so much talent and ability. I think he's wasting his time there. I talked with him about that years later, when he came to Santa Cruz. I learned that he had the opportunity of starting the math department here. Clark Kerr, who then was president, gave him the choice of either starting the math department here or becoming a vice president at the Office of the President. And he chose the latter. But he could have started the math department here. I think, had he started the math department, it might have been somewhat different.

Reti: So I realize this is getting ahead a little bit, but when you were talking with Angus Taylor while he was chancellor here for those couple of years, do you recall what his thoughts were about these kinds of contradictions or tensions in the campus's founding philosophy?

Landesman: Yes. He knew it. He was well aware of it. Without a doubt, he was well aware. He had had enough experience as an administrator, enough interactions with Clark Kerr, enough understanding of what this campus was supposed to be, so as to see faculty in a way that was, I think, much more open minded. In that regard, he realized the tensions that they were under, and he would judge them for a host of things, relative to the uniqueness of the campus. And by the way, that is not to say that he gave research any lesser value.

Narrative Evaluation System

Reti: Okay. We haven't talked about the Narrative Evaluation System and how you felt about teaching with narratives.

Landesman: You see, it's relative, in the sense that when I came here, when you taught classes that had ten or twelve or twenty or thirty students, it was superb. It was fantastic. I was writing something really meaningful about every student in the class because I knew every student. It had meaning, incredible meaning. So if a student started in those early years and was not in large classes, they had a book written about them when they left here. And a meaningful book.

In later years, I didn't teach as many beginning classes; I was teaching more advanced ones—but I taught calculus occasionally as well, when there were a few hundred in the class. Narrative evaluations became far less meaningful. I was basically writing about how a student did on each test, and translating how they did on the test to excellent, very good, average, etc., on how they did on their homework assignments, and their performance on the final exam. I could distinguish between those students who were superb and those who were weak

in the aforementioned categories, and I could make meaningful remarks about those students. But for the vast majority, it was just more or less how you did on the tests, your homework, and the final exam. So I think that the system was great when we began and when there were smaller classes. But as classes got larger and larger, it wasn't nearly as meaningful.

Graduate Education in Mathematics

Reti: Okay. And the math board was one of the first to have a graduate program, if I recall—

Landesman: Yes, early on.

Reti: Tell me about that.

Landesman: I think that was extremely important. And ironically, as much as I had been characterized as the faculty member in my department who was most interested in working with undergraduates, in the years that I was here, there were three professors of mathematics who put out the most PhD graduate students, and I was one of them. Harold Widom, [Gerhard] Ringel, and I put out twenty among us. I think they each put out seven; I put out six. But the three of us directed the most PhD graduate students. That was really important. To have a first-rate math department, you need to have a graduate department. I fully believed in that, and I still do, and it's incredibly stimulating. I loved teaching and working with graduates as much as I loved teaching undergraduates. Very, very different, however.

I never gave as much value—I think that's the word—to when a faculty member came up to me and pointed out his or her best graduate student and said, "Look how wonderful this person is," et cetera. I thought graduate students, in many ways, didn't need you as much as the undergraduates, who really did need you. And to point to the best graduate student you had, I thought, that's really very nice and very important, but guess what—it probably wasn't as much as what you did as you thought it was.

In so many ways though, the graduate students were [an] excellent stimulus. I mean, the ones I had—they were very bright and extremely interested in learning all they could in the area of nonlinear elliptic partial differential equations and writing doctoral dissertations that would contribute to the discipline. And they all built upon research that I and others had done in partial differential equations and wrote very good dissertations. I have to say, without any bias, every one of the graduate students I had was also a fine teacher, on top of being a fine researcher, and all of them landed very good jobs at colleges or universities.

Visiting Researcher at UCLA

The one thing I failed to mention was another nice thing that happened to me at UCLA, and that's where, in many ways, I did some of my best mathematical research. The math department at UCLA, had a grant from—I can't remember if it was the Department of Defense or Office of Naval Research, but they had major grant funding for about four or five years, where during each year, they would bring in thirty to forty mathematics professors from around the country

who specialized in one particular area. And you batted heads together. It was terrific. You also taught. Two years after I'd been here, it was my area, in differential equations that was the specialty, and I was one of the professors that UCLA invited to spend the year down there. It was a superb year for my research. I met another professor, Alan Lazer, who also had been invited and with whom I collaborated and did some of my best research. That was a great experience. It was wonderful.

I took a leave from UCSC that year, '68–'69, and as I have mentioned, I had a wonderful year doing research in nonlinear partial differential equations. That year I also had a negative experience. It was the year that I got divorced.

UC Santa Cruz Students

Reti: So you mentioned that you were living at Cowell when you first got here. What was that like?

Landesman: Well, it was a woman's dorm. It was my former wife, who was really the residential preceptor, but I, being her husband, in a sense, was also. It was at Prescott House, and we had our own little apartment. All the dorms had their own individual little apartment. You got to know the students. You saw what it was like for a student. I had never experienced dorm life, so it was very interesting for me. I saw the different aspects of what some of these students were experiencing in, for many of them, their first time away from home. We would have students over for dinner, and we would take them out and talk. It was very, very nice. I wasn't that much older than they were, about ten years older than the freshmen who were arriving.

Reti: That was during the height of the Vietnam War. Do you have any memories of how that affected the students?

Landesman: I do. I was, in many ways, non-political in my early years. My former wife played a major role in opening up my eyes to many liberal causes, which was really good for me. It was excellent for me. And I became much more involved as far as my understanding about civil rights, about understanding the Vietnam War. I had been in a very sheltered existence, the way I was raised. I now was beginning to understand students' viewpoints on all types of current events. I didn't always agree with everything they did, but at least I was able to gain an understanding of what they were experiencing.

One incident that I still remember was a group of students coming to me and saying they would not be at a certain exam I was giving on a particular upcoming day because there was going to be a march, and how did I feel about that? What would I do if they didn't come to take my exam? I thought for a moment, and I said, "You know, if you truly believe in that, you should do that, and I'll give you a make-up exam, but you need to understand also that a make-up exam often can be harder because of the way you write it up relative to how the original exam was written. Nevertheless, you have the right to do what you believe in, and I will go along and give you a make-up test." Events like this got me thinking about things that I had thought little about before. It was very good for me. Really good. And Santa Cruz was quite a liberal place.

Reti: So there were quite a few protests going on?

Landesman: There were protests. There were protests at almost all of the UC campuses, as well as campuses throughout the country. UCLA, too, the years when I went back down there in '68, '69. I remember having an experience there similar to the one described above, where students weren't going to be at one of my classes because of a protest that was going to occur on the campus. I was just going into a class where a professor there, who I knew at UCLA, and who was not very sympathetic to such goings on, and he was standing at the door, listening to what I was going to say to the students. I said the same thing I said to the ones here, "You have a right to believe in certain things, and I will go along with what you want to do, and I will give you a make-up test." But he sort of shook his head and walked away. He thought I was being way too lenient, forgiving, or whatever the word. But I didn't feel I was. I thought young people have to learn by experience and by doing things, and so long as they weren't doing anything that was violent, I thought that was just fine.

Reti: Did you have students that were drafted into the war?

Landesman: I don't remember that. I do remember that when I was probably still a graduate student, I had a deferment because I was a math major, considered vital defense.

Reti: Really? Oh, yeah, because you would have been a draftee as well, sure.

Landesman: Absolutely. I had a status that deferred me because of vital defense, where some student colleagues, did not, who might have been art majors or history majors. It was very strange. I think I'm remembering it correctly.

Reti: I see. So first you were at Cowell in residential life, living there. And then you moved up to Crown? Were you living at Crown?

Landesman: No, I was never a live-in preceptor at Crown. Immediately, however, Thimann and Levin saw that I was interested in the academic achievement of students and interested in trying to help them. So I was made an academic preceptor, where I spent a few hours every week on the Crown office team. Max [M.] Levin was the senior preceptor, a psychologist and I was designated as an academic preceptor. I would meet with students and help them with their decisions on what courses to take, talk about what difficulties they may be having in certain classes, and decide on the appropriate steps to take. I was an adviser for the Crown students in my role as an academic preceptor. I also participated with Thimann and Levin in the meetings that took place at the end of the quarters, where students were up for potential academic dismissal because they had not passed a number of classes, etc., and we had to decide what actions were going to be taken.

I think probably—I wouldn't be surprised—I don't know this for sure. Some of my colleagues in the math department, were wondering, what am I doing there? Why am I taking time, doing that? I thought it was important. I did it then. I'd do it again.

Reti: When you mentioned earlier that UCSC students in the early years were brilliant and sometimes rebellious—

Landesman: Mm-hm.

Reti: —what did you mean by rebellious?

Landesman: As a very, very trivial example, it would not be unusual occasionally, as I was teaching a class for a student sitting in the front row to have his bare feet up in my face.

Reti: [Laughs.]

Landesman: As I said, that may sound trivial. It was. But it opened me up to understanding people in lots of different ways and I needed that.

Reti: I've interviewed some professors who have talked about the ways in which the students wanted to kind of redesign their curriculum. I don't know if that would happen in math, as much as perhaps some other classes, but—

Landesman: You know, they did have more opportunities [chuckles] here than they would have had in other places—

Reti: [Chuckles.]

Landesman: —in that they could do—there were some options for doing things like that, but I remember at Crown it was monitored very carefully. Yes, they could perhaps do an interdisciplinary major, where they combined courses from several disciplines, but it was looked at carefully. You had to take a certain number of classes in one discipline, and a certain number in another discipline, and the courses chosen had to be linked in a very rational way. I thought some of that was good because it allowed students a chance to acquire knowledge in two closely linked areas. For example, today, to have a dual-major combining

economics and mathematics, or economics and law is considered fine and dandy. Then it might have been looked at [as] somewhat suspicious.

Reti: But that was something that was possible at UCSC.

Landesman: It was possible here. And I'm sure not so possible at another campus. Of course, there were always some students who looked for an easy way out to not do the important academic courses, but we monitored that at Crown. There were also those who wanted to stay on and on and on. I had some students approach me in their fourth year and suddenly decide they're going to change their major and go on to do this or that, etc. I said, "No, no. You've done well here. It's time for you to leave and move on now." Most parents were very grateful to me for that. [Chuckles.]

Reti: [Laughs.]

Landesman: But I didn't do it for that reason. There were some who just could not let go. They had to stay. There were some for whom that was necessary. For most others, most others, it was time to move on.

Reti: Did you sponsor student-directed seminars?

Landesman: Oh, the answer is probably no, but I can't say in detail that I remember, which means that probably not too many, if any at all.

Reti: Okay. And what about the Crown core course? Were you involved with that?

Landesman: I was, in the initial core course. One or two faculty played a major role, and then a number of other faculty, like I, came in for one or more lectures. From what I remember, I came in for one or two lectures and talked about [Sir Isaac] Newton and about the creation of calculus, how that all came about and how Newton needed that for his work in physics on instantaneous rates. I had to study my history—and I knew some of it as well, but I participated in the core course that way. It was very interesting, time very well spent.

Town-Gown Relations

Reti: Great. Okay. Let me ask about your impressions of the town of Santa Cruz in that period of the sixties and seventies, in terms of the cultural life, politics, tensions with the campus, if there were any.

Landesman: [pause] It was so different from being in Los Angeles.

Reti: [Laughs.] Yes, indeed.

Landesman: How's that for—

Reti: Said the L.A. girl here, yeah. [Laughs.]

Landesman: It was a small town. It was, from what I remember, the third—I think it was the third highest as far as number of retirees, aside from places in Florida. There were definitely lots of people retiring in Santa Cruz. And quite conservative. And suddenly in comes a university with students—long hair, et cetera—and not surprisingly, it created tensions.

Now, McHenry was very wise in that he made sure, when the campus began, to hire some key staff and administrators who were from the town itself. And he also hired some faculty who were not what I would call flaming liberals. So he tried to keep somewhat of a balance.

One story I have told often is the following: In my first year or two here, I was walking on the campus, and McHenry came by and, in a very paternal way, put his arm around me and began walking and talking with me. "How are things going, Ed?" I said things were going great. I was really happy. And as we finished walking, and we were about to go our different ways, he looked at me. I had grown a small goatee, a beard, and he said, "Ed, when I was a young man, I would have never thought of growing a beard." And just left it at that, and that was it. Now he, in a very gentleman-like way, was telling me, "Get that beard off." Because he was very fearful of the image of people, how the campus was being viewed.

Reti: That's a great story.

Landesman: It was interesting.

Reti: Were you upset?

Landesman: I went away thinking about it and a week later I shaved off my beard. [Laughter.]

Reti: Beard: tenure; beard: tenure.

Landesman: I suppose so.

Reti: [Laughs.] Were you involved in any kind of political protests yourself, like some faculty were?

Landesman: Not here on the campus. No. I did some marching in San Francisco on Market Street, attended some rallies, but I didn't get involved in political protests on the campus.

Reti: I know that was something that McHenry was quite concerned about.

Landesman: Oh, he had some issues with some people here, for sure.

Reti: Yes.

Landesman: But not with me. However, it was not because of McHenry. I was very involved with my teaching, my research, and working with students.

Reti: So you were saying earlier, just before we started the recording, that you lived in Capitola? Was that when you lived in Capitola?

Landesman: When I came back from UCLA, from the '68–'69 visit, when they invited me to be there, I was no longer married. I wasn't living on the campus, and I needed a place to live. I can't remember why I chose Capitola, but I saw this large apartment house, and they had a "For Rent" sign, and each apartment overlooked the bay. It was very appealing. It looked like a very pleasant place to be at home and do research and plan my teaching.

I went there, and I said, "I'd like to rent." And they said to me, "What do you do?" And I said, "Oh"—and I thought this was going to work in my favor—I said, "Oh, I'm an assistant professor at the university." They were all older

people, who were living there. And by "older"—of course, you always think everybody is older when you're young, but they were older, including quite a few retired people. And they said, "This place is a place where we rent typically to people who are retired, and we can't have parties, and we can't have noisy events going on around here."

Reti: [Laughs.]

Landesman: I said, "Wait a moment. I'm not going to cause trouble. I'm not going to create noise or provoke any disturbances. I said, "I'm by myself right now, and there will not be any issues like that." "No, no, no, we don't think so." And it went back and forth, and somehow—I don't remember why—they did rent to me, and I was there for three or four years. When I left, some of them were so sad to see me leave, that they cried.

Reti: My gosh.

Landesman: I do also remember a colleague, not in math, who also needed a place a year or two later, and they would not rent to him. I often think it was because of his appearance. And that bothered me. I didn't like that at all. I didn't like it initially, with me as well. I know I set an example for them so that they would perhaps think differently in the future. They did like me, but I don't know how much it changed them in general. Nowadays they probably could not have said to me what they said to me then. That was 1969.

Reti: Yes, that's interesting.

How was it for you in the early years at UCSC being a Jewish faculty member?

Landesman: It had no bearing whatsoever. Most of my colleagues, save maybe one, maybe two, were not in any way into religion, as far as I know. If they were, it wasn't practicing it, and religion never played any role in my stay at UC. And in fact, it's one of the reasons I always felt so comfortable with the whole University of California system. I never felt as though there was any bias against a person because of their race or religion or color or their sexual preference or whatever. I always felt good about that.

Reti: Okay, great.

Recruiting Women Faculty in the Math Board of Studies

And what about women faculty in the math board in the early days? Were there any?

Landesman: There was a woman who was hired in the first year, before I came. She was a good teacher and I thought she'd be a good researcher. She worked in algebra, a different area than I'm in. Her husband was an engineer who worked outside of the university and within a couple of years they left, I think because of a relocation of his job. [Pause.] Well, a few years later there was also a woman in the math department for a year or two, and we also had a woman mathematician who was a visitor. Some years later, I was put on a hiring committee and we hired a tenure-track, female mathematician.

I was never totally sure whether those who claimed they had no bias did or did not. But at least we did hire a woman. And a few years later, we brought in another woman. And so, for many years while I was here, there were two women mathematics professors in the department.

Reti: So the first woman to be hired, what decade was that?

Landesman: The eighties. I think I'm correct on that. I think it was the eighties.

Reti: To get a rough sense.

Landesman: But interesting you raise that. When I first started as a graduate student at UCLA, there were one or two women in a math class, in a class of forty, say. And by the time I finished here at UC Santa Cruz, my advanced math classes had as many as half the class composed of women. And typically, not always, but typically, the best, or one of the best students in the class was a woman.

Reti: Hmm!

Landesman: Interesting. So a real change in that respect. A lot more women were going in for mathematics and that was great. I saw that change over the years. I thought that was really good.

Reti: Do you think that that happened because of intentional kinds of programs or mentoring?

Landesman: No, I think it's what was happening in society. Women were getting more into the workforce—the way men had always been—there were women who were very capable of doing mathematics. There were women way back when, who were very capable, but because of the times they didn't do it or they weren't encouraged to do it—well, a very interesting story: My wife, who's extremely bright, as an undergraduate went to the University of Chicago, and

then, as a graduate, to Stanford in mathematics, and the University of Chicago was—I mean, it doesn't get much tougher than that in math, and she did extremely well in math.

Reti: This is Miriam.

Landesman: Yes. And Miriam was told when she was applying to go to graduate school, by a male professor there, "Women shouldn't go to graduate school in mathematics." She didn't follow his advice, but she accepted his words. It's only years later that she realized what had been said. She just accepted it, then. I'm sure there were many other women that accepted that, too. Miriam taught *Mathematical Methods for Economists* here, as a lecturer, and was very successful at that. So some things have changed. Is it perfect? Heck, no. Does it need to get better yet? Heck, yes. But it's better than it was.

The Monterey Bay Area Math Project

Reti: So we'll probably talk about this more next time, but I wonder—I know later in your career, at least, you've been very committed to working with minority students in mathematics. Does that interest date back to these early years at UCSC?

Landesman: Not in the very early years. I started the Monterey Bay Area Math Project, and that was one of the seventeen California math projects. It continues here today at Santa Cruz. I directed the project for over ten years. The project wasn't directed towards underrepresented students, but towards teachers of mathematics. I brought in twenty or thirty teachers every summer, who taught math at all levels, from elementary to high school. Often, we chose teachers who

came from underrepresented areas such as Pajaro, Salinas, and Watsonville, and we worked on upgrading their math skills, so that they would do better as far as getting their students interested in mathematics. I started that in the early eighties.

And then when I started doing research in math education with Ron Henderson, we went out into the schools, and we also worked in Pajaro, in Watsonville, in Salinas. I had several projects of my own, as well. It was just something else that I was doing.

I had a project at Washington Middle School in Salinas, where the students were not achieving in math at all, mainly underrepresented kids, Hispanic mostly. I obtained a grant from the California Academic Partnership Program. I had many grants from them. At one time, I may have had more grants than anyone in the math department. Almost all of the grants were in math education, as well as in the use of video technology for the teaching and learning of mathematics.

In Salinas, there was a burglar alarm system company, where they produced burglar alarm systems for homes as well as for businesses. The process in making that burglar alarm system, from beginning to end, involved middle-school math at every [stage], including the packaging and the mailing of the alarm system. We rewrote a math curriculum that incorporated the company's process for producing their product, and we had the students suit up, tour the plant, and see what goes on. Some of their parents worked there. I still remember one parent saying to the students, "You study and do well. Don't end up like me, where I'm just packaging boxes every day."

Anyway, while such incidents were important, that was not the major result that occurred. What did happen was that the students learned the math based on the redesigned curriculum, and they did better than they had been doing in their normal math work. And it also encouraged them as far as going on in their mathematics studies.

I had a number of projects like that one. I was doing that, from what I recall, back in the late seventies and early eighties. It just interested me. I began to get more and more interested in—and I saw it as I taught—how do students learn mathematics? What motivates them? Why do some do well and others not so well?

And the other aspect of this that interested me immensely was that there were so many students who said, "I can't do math," and that seemed ridiculous to me, in most cases. It was because, typically, many of those students either had not had the proper teaching, or because something had happened to them when they were younger and they were made to believe that they couldn't do math. And in most cases, while it was true that they weren't going to be mathematicians, they could nevertheless do some math. It just got me interested.

Now, did that stop me from doing the "traditional" things I was supposed to do? It definitely took away from some of that time, but I continued to do research in partial differential equations and direct PhD dissertations for graduate students in pure mathematics. I was invited and spent two quarters at the Courant Institute of Mathematical Sciences at New York University, where some of the best mathematicians in the world were doing research in differential equations. I

was also invited twice to the Mathematical Institute in Oberwolfach, Germany where I participated in week-long special sessions in differential equations, each with thirty selected invitees from all over the world.

Pioneering Videotaping Class Lectures

One other event that really played another major role in all of this was the day a group of students approached me in a large class and declared they would not be at the next class. Would I be willing to repeat my lecture when they returned? There was a good reason why they couldn't be there. I can't remember what it was. I didn't feel like repeating the lecture—it was a large calculus class. I said, "Why don't we do this? Why don't we bring in the video crew? Let them video the lecture that you're going to miss, and then we'll all go watch it together when you return."

It had an incredible impact on me. The crew here at Santa Cruz videotaped my lecture, and afterwards when I saw, it, I said to myself, "Oh, my gosh! Look at these mannerisms I have when I get up there. Look what I'm doing." I realized how much I could improve. And it got me interested in the whole aspect of using video technology for the teaching and learning of mathematics. As a result, the Regents funded me for several years in a row, where each summer I made a whole series of black-and-white videotapes for each quarter of calculus. I spent about twenty minutes on each major topic, presenting the main theorems followed by examples. Besides using the videotapes here on the campus, some professors at other universities began using them to help their students learn calculus.

And it continued to spur my interest in video technology. I applied and I received more grants from the National Science Foundation. I saw the benefits of technology as a means of helping students learn mathematics. And as the technology evolved, I got better at it. I progressed from the use of black-and-white videotape, to videodisc, to interactive videodisc technology. And then when Academic Systems [Corporation] started their company, they read some papers that I had written on the subject. Professor Bernard Gifford, the former graduate dean of education at UC Berkeley and a co-founder of the company knew of my work, and he called me and asked, "How about directing our math project?" That's how that all came about. And in many ways it happened because some students, many years before, said, "I can't be at your class tomorrow. Would you repeat your lecture?"

Reti: That's great! You just never know where something is going to lead to.

Landesman: Yes, indeed. By the way, the use of video technology for helping students learn has now become quite popular. One example is the Khan Academy. I'm pleased that I was one of the forerunners more than forty years ago.

Reti: So this prefigures online learning—

Landesman: Yes, it does.

By the way, when using the technology, I always believed that there needed to be an instructor, someone personal, there as well. They may not be "sage on the stage," but instead, may be someone who's asked to change their role quite a bit,

especially when students are learning much of the basic material via the video technology and the instructor is there to answer questions, to assist, and to help. That's not easy for some instructors. Not to be sage on the stage is quite a change. But for some, it often can be—and I saw that when I worked at Academic Systems—a whole new way to be reenergized and get back into teaching in a very unique and innovative way. It was very interesting.

Reti: Oh, that's really fascinating.

Landesman: Yes.

Reti: "Sage on the stage." I hadn't heard that one before. I like that. And this calls into question all the ways that teaching has been conceived of at the college level.

Landesman: Absolutely.

Reti: So let's backtrack. I have a couple of tie-back questions. One is the California Math[ematics] Project, the Monterey [Bay Area] Math Project.

Landesman: Yes.

Reti: Was the California Math Project something started earlier than the Monterey Math Project?

Landesman: It started maybe a year or two before. I became involved very early on. When I heard and learned about it, I said, "We ought to have a project here in Santa Cruz, in this geographical area." The organizers knew me. They knew of my interest and ability in helping students and teachers achieve in mathematics.

I applied and I received funding. And as our project achieved success, they kept funding me year after year.

One major aspect of The Monterey Bay Area Math Project [MBAMP] that might have been a little different than some of the other California Math Projects, is that ours did not just have teachers attending and talking about math. We really did math. I mean, I had teachers who were being taught and who were learning new topics in math, and who were actively doing the math. I also used a team approach for my instructional staff, brought in a first-rate math instructor from the community colleges, a successful high school math teacher, and a technical person from industry. I continually used a team approach throughout the years while I directed MBAMP.

The Team Approach to Learning

By the way, speaking of a team approach, the way I was raised, with a twin brother, I had no choice: I always had to be working in a team. And as a result of that, I was very much influenced. I always believed in the team approach. And now there's all kinds of research, with people writing [about] group learning and working in teams. I truly believe that in our whole educational system and in society there's too much emphasis on being quote, the Lone Ranger. I mean, when you get out into the real workforce and have to produce, you're typically working in a team, working with others. We don't teach people how to do that. I think that's a real error, a real mistake.

I thought about that as an administrator and even as a researcher. I always liked to work with others. Now, there is the ego factor. Some people will not do that

because they want to make sure when it's all over they're the ones that get the full credit for what has been accomplished. I never had any problem with that. I always liked working with others, and I felt that talking and tossing around ideas back and forth was a much more beneficial situation for me. That's not to say that as a team member, you did not do any individual work. On the contrary, each individual member of a team must do their part in order for the team to be functional and successful. In fact, in retrospect now, I only wish I would have spent more time working with some of the physicists and with some of the engineers on specific problems. I did it in education, but I would have, I know, enjoyed doing it also in physics and in engineering. But there weren't that many hours in a day. And there wasn't that much encouragement.

Reti: Maybe we should talk about your time in education, because we've sort of touched on that—

Landesman: The education board. I can't remember when it was, probably in the eighties. Everything happened in the eighties. [Chuckles.] They called me in. They didn't have that many senior faculty, and they needed a few more to make decisions on tenure, and to collaborate on research. So they asked if I would like to be, quote, an "under the line," faculty member. I said, "Sure." I can't remember if that happened after or before I started working with Henderson. But I did attend their meetings, and Ron Henderson and I began doing quite a bit of research together.

Reti: Okay. So we'll talk more about that—

Landesman: Research in math education

Reti: —next time.

Minority Students and Math Education

And then one last question: So you were working with minority, Latino and all kinds of different students outside of the university. But in your classes here, in, say, the sixties and seventies and even the early eighties, did you have Latino and other students of color—

Landesman: Very few. A few, but very few. As far as African Americans, I can't remember having any, maybe one or two. And as far as, Latino, a few. Not that many. As the years went by, there were more. In the research that Ron Henderson and I did, we went out into the communities in Watsonville, and Salinas, and talked to parents about the aspirations they had for their children. Typically, they didn't want anything different than any of us would want for our own kids. But their means of getting it and their knowledge of how to do it was often not too realistic. I still remember one woman saying that her daughter was certainly going to be a physician. I said, "Great. How's that going to happen?" They had a community college nearby and her daughter was going to go to that community college. The implication was that the education obtained at the community college would make her daughter a physician. There was little or no understanding that that's a beginning, where you then have to transfer to a four-year college, then be accepted and attend medical school, et cetera. The aspirations were there, but not often the means and the knowledge of how to achieve it. Very sad.

Reti: That is really sad.

Landesman: It was very sad. Hopefully, it is better today.

Reti: Yes. In the early years of UCSC, I know that there were some programs, started by Frank Talamantes and other people, to mentor students of color in the sciences.

Landesman: Yes. I worked with the ACE [Academic Excellence] Program. Oakes College started quite a bit of that. I knew [J.] Herman Blake when he first came to the campus. Herman asked me to come over to Oakes when he was chosen to be the founding provost of the college. (In fact, I just saw Herman here at UCSC when there was a celebration commemorating the fiftieth anniversary of the campus. It was really nice. We had a great little chat.)[1] Herman wanted me to come over to Oakes and work with their students in mathematics and the sciences. And, again, it was, in many ways, just like with engineering. I like to think of myself as a loyal person, in the sense that when I start with something, I prefer to stay with it. I started with Crown; I stayed with Crown. I started in the math board; I stayed in the math board. I did, however help students at Oakes, in that I worked with the ACE Program and I worked with some of the instructors that were hired in the program. But I was never directly involved with Oakes College. Indirectly, yes.

[1] On September 26, 2015, Dr. J. Herman Blake gave a talk at McHenry Library as part of the celebrations of UC Santa Cruz's fiftieth anniversary. For more on Oakes College and J. Herman Blake see Cameron Vanderscoff, Interviewer and Editor, *Look in M' Face and Hear M' Story": An Oral History with Professor J. Herman Blake.* (Regional History Project, UCSC Library, 2014). Available in full text at https://library.ucsc.edu/reg-hist/blake

A Time of Transition

Reti: So when you were at Crown, you were provost from 1976 to '77, and that was a key transitional time in the campus' history, which ultimately led into reorganization. So let's talk about that period. What was it like being provost?

Landesman: I was provost for two years, although in the first year they called it "Executive Officer." Few know or remember that.

Reti: I had never heard that.

Landesman: Yes, and the reason being—I won't use the word "rebellion," but my predecessor was not successful at Crown. He certainly meant well, but personality-wise or whatever the case, he was not successful. The students were very vocal and made it clear that they didn't want, quote, "a provost" again. And after many discussions, I was chosen to be the executive officer of Crown College. I was able to work with the students. I could resolve almost all of the issues they presented and deal with their misgivings, rebelliousness, and you name it. And I restored order to the college. After one year, the students were comfortable in once again calling the head of the college a provost. I became the provost of Crown College in that second year.

It was a tough time because of what was occurring on the campus. The whole issue with Mark Christensen, the successor to Dean McHenry, arose. Christensen was a really nice guy. There isn't anybody who would ever say he wasn't. I think he was being groomed at UC Berkeley, from where he came, to be a chancellor at some UC campus. McHenry retired, and Christensen was selected to be his successor. He was young, energetic, but very different than McHenry. Without

going into great detail, it suffices to say that his style of leadership just didn't work at Santa Cruz. I was provost of Crown College when this was happening, and it was a very, very stressful time.

I remember when it came to the very end of Christensen's chancellorship here, all the provosts went up to Berkeley to meet with [David S.] Saxon, who, at the time, was the president of the University. There was a long discussion about what was happening on the campus. It was not pleasant. Not at all.[2]

It had been a tough time at Senate meetings and many other meetings, as well, and there were so many faculty that were extremely unhappy with Christensen—how he was running the campus. [UC] Santa Cruz got a bad reputation as being an ungovernable campus. I'm sure you've heard that before.

Reti: I have heard that, yes.

Landesman: And it was certainly not good for the campus.

Reti: Do you think that that was justified?

Landesman: Well, when you have a chancellor here for a year or so and you say you don't want him anymore, the systemwide administration cannot be too happy. They expect chancellors to last for five or ten years, or perhaps even longer. So you can be sure that there was some justification. At the same time, it wasn't working here. I still remember some of the details when the provosts met with Saxon. I knew Saxon. His daughter was a student of mine here, in mathematics. A very good student, too. Saxon had been a physicist at UCLA, a

[2] For Chancellor Angus Taylor's oral history see https://library.ucsc.edu/reg-hist/taylor

professor of physics. I didn't know him at UCLA. I knew his name but I didn't know him personally.

I still remember someone at the meeting with Saxon making the statement, "You have nothing to worry about. The next person we choose as chancellor at UCSC will be perfect, and there won't be any issues whatsoever." [Saxon] listened and came back and in no uncertain terms, told us basically to go "jump in a lake," saying, "There's no way you can *ever* guarantee me that who you choose is going to be a success in administration. In academia, often yes, you can, because the cream rises, in a natural way, to the top. But for administrators, you can't guarantee me anything like that." There was silence. It was not pleasant at all. I think everybody was well meaning, trying to do something that would get things running better here, but it was a very unpleasant time. And in many ways it was tough on me. I just found that emotionally very, very difficult.

Reti: It sounds very, very stressful.

Landesman: Yes, it was very stressful. When you look back on it now, you think, well, that chancellor left and a new chancellor took his place, but it was not as easy as that at all. Very, very stressful.[3]

Reti: Yes.

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[3] For more on these years at UC Santa Cruz, including the chancellorship of Mark Christiansen, see Irene Reti and Randall Jarrell, *UC Santa Cruz in the Mid-1970s: A Time of Transition, Volume I: An Oral History with John Marcum, Siegfried Puknat, Robert Adams, John Ellis, and Paul Niebanck* and *UC Santa Cruz in the Mid-1970s: A Time of Transition, Volume II: An Oral History with Professor George Von der Muhll***.** (Regional History Project, UCSC Library).

Landesman: But I managed to get things working well again at Crown. I only served as "provost" for two years and then I resigned. Typically, I was often brought into administrative positions, and I think I did fairly well and I did what was needed, often maybe even restoring order out of some chaos, but I really always wanted to get back to doing my research and back into the classroom, because I felt that in doing so, there was a certain amount of satisfaction gained by the appreciation from students and from colleagues. When you're an administrator, yes, you can do things to help, but in some sense you are also a dartboard.

Reti: [Chuckles.] Yes.

Landesman: Rarely did someone come to you as an administrator and say, "This is great." [Laughs.]

Reti: No. Well, that was also a very tough time in the campus' history because UCSC's enrollments were dropping.

Landesman: There was talk at the time that they might cut out two campuses. They talked about [UC] Riverside and UC Santa Cruz. And there was even talk that another university—I can't remember if it was a university in Utah—was going to actually come here and take over this campus, or buy it. It was really strange talk and never really clear to me whether it was fact or fiction. Our enrollments were way down. We had had trouble in the city and there were articles written in newspapers that pointed to Santa Cruz as the murder capital of the country.

Reti: Did you have any sense of why we had such a severe enrollment crisis?

Landesman: That's a really good question, and I'd like to sit back and reflect more on that, although one reason that was often mentioned is that parents were very reluctant to send their children to a campus in a city that was publicized to be the murder capital of the country.

Reti: Next time, if you have more thoughts about it, we can dip back into that.

Landesman: Yes. I think one other reason certainly, was some were arguing that the Narrative Evaluation System and the pass/no record system were not allowing students to achieve beyond Santa Cruz. When I was provost, I did a survey so as to gain greater insight and to gather some statistical data. There were students that were complaining they didn't get into medical school because they had narrative evaluations and not grades. In the survey, I looked at all of that, and when I finally finished, [I could see that] those students would not have been accepted into any medical school, regardless where they had been as undergraduates. They were typically average students, who were fine, but they weren't the ones that medical schools, at the time, were accepting. The students were blaming it on the evaluation system, or on the pass/no record system. It wasn't that at all, in my opinion, based on that small bit of research that I had done.

In general, independent of medical schools, I think it was not easy for some institutions to accept UC Santa Cruz students as graduate students because of the pass/no record and the narrative evaluations. It was different. It was much easier for an institution to look at a list of grades and GPAs than to read a book

of evaluations, even though those evaluations would yield a great deal more valid information about a student. And in education, as I learned after many, many years—you'd better not be too different. As much as you try to be innovative and helpful, if you stray too far from the norm, it catches up with you and eventually the easiest route is back to the way it is at most other places.

And unfortunately, or fortunately, whatever the case might be, I believe that's what's happened to UC Santa Cruz. The campus, today, aside from the colleges, is not what was envisioned by Kerr and by McHenry. Initially, this was going to be different, and that difference was something we were going to build on. But I think when push comes to shove, it's a lot easier for institutions to just go back to what everybody else is doing, instead of exclaiming, "Let's be what we are, and we can be very fine at that." Irrespective of what has occurred, I still believe that UC Santa Cruz is a great place, and I'm so glad to have been here, even though I believe that the campus today is different than what Kerr and McHenry had in mind when they conceived the plans for UCSC.

Reti: So a key moment in the shift of that vision was reorganization.

Landesman: Sure.

Reti: Do you want to talk a bit about that?

Landesman: Sinsheimer came in.[4] I was on one of the interviewing groups, the Committee of Provosts, and he was far and away the best candidate. I mean, here was a man from Caltech who was probably on the verge of getting a Nobel Prize.

[4] See Randall Jarrell, Interviewer and Editor, *Robert L. Sinsheimer: The University of California, Santa Cruz During a Critical Decade, 1977-1987* (Regional History Project, UCSC Library, 1996). Available in full text at https://library.ucsc.edu/reg-hist/sinsheimer

Nobody came close to his academic qualifications and his scientific ability. But when he came here, he immediately saw that this was not the research place it should be. He was used to Caltech and figured it was time for a change.

Now, there's some validity to that. However, I believe that it went to an extreme, where it changed, to a great extent, the direction of what the campus had been. Yes, you could do things to make it a better place for research. Great. But at the same time, let's not forget how the campus was meant to be, why it started the way it was, why it was supposed to be different than the other UC campuses. I think it was the beginning of making us no different than any other campus of the University of California, let alone other campuses throughout the country.

By the way, I experienced something similar when I was invited in 1980 to UC Irvine. I was asked to collaborate with some of the mathematicians in research and to also do some teaching. And I did. I enjoyed it. But it was clear to me, in my time there, that they were trying to be another UC Berkeley, rather than building on their own particular strengths.

They gave me large classes to teach, which is often a natural thing to do when you have a visitor; you give him the courses nobody else wants to teach. I'm being a bit facetious.

Reti: [Laughs.]

Landesman: So they gave me large calculus classes. They had a system where they evaluated professors in the entire science division with regards to their teaching ability. And it was posted. They would rate you relative to everybody in

math, science, computer science, physics, biology, etc. I came out number one in the entire division and I think I embarrassed them a bit. Let's stop here.

Reti: Okay. So today is Thursday, December 10th, 2015 and this is Irene Reti. I'm back with Ed Landesman for the second session of our oral history. And this time we're in Palo Alto, at his house.

So last time we ended up in talking briefly about UCSC in the mid- to late-seventies and some of the things that were going on, such as the enrollment crisis, the arrival of Chancellor [Mark N.] Christensen, who wasn't here very long. And then the arrival of Chancellor Robert [L.] Sinsheimer and his program for reorganizing the college system and other things on campus. Would you like to talk some more about that time period?

Landesman: Sure. As I said, in the sixties, when the campus began we had seven times the amount of qualified potential enrollees as we had spaces. And as a result, some of us were called in to read applications and to decide which students we'd like to recommend for admittance. It was incredible.

At the same time, in the sixties, as we know—Santa Cruz began to be known as the counterculture campus. I'm not sure it was any more counterculture than the [University of California,] Berkeley, but we definitely had that reputation. The students were very bright. They did extremely well. But they also—as a result of the times, were involved in a number of protests, a number of counterculture activities, if one wants to use that terminology. And Santa Cruz, of course, was unique in that it was using narrative evaluations. It was on a pass/no record grading system. UCSC was viewed from the outside as the liberal arts campus,

with little or no knowledge about the sciences. Consequently, that had an effect in the seventies, when enrollments went down. There was also a mass murderer in Santa Cruz, which gained nationwide attention.

And suddenly enrollments dropped. I think all of the aforementioned factors contributed. Certainly, there were parents that thought this was not the place to send their children if you wanted them to continue into graduate school and/or have professional careers.

And consequently, enrollments went down by several hundred. There were rumors that, in fact, the campus could be closed. I don't know how true those rumors were. There was a rumor that another university was going to come in from the outside and buy up the campus. How true that was, I don't know. We [also] became known as the campus that could not be governed. [The] Christensen era did not help, although it wasn't an era; it was just a couple of years.

And [Dean E.] McHenry, who had pretty much been the person who controlled everything, in so many ways, retired. Christensen came in. His style of leadership did not work. Another reason for the ongoing claim that we were ungovernable was the fact that over a period of approximately fifteen years, we had as many as twelve or more deans of natural science.

Reti: Good heavens! That's about one a year.

Landesman: That's right. The average came out to be almost one a year. Some were there for two years; some, for six [months].

Reti: Why do you think that was?

Landesman: There were always some science faculty who felt that the Natural Sciences Division wasn't being administered appropriately. And consequently, all of these rapid administrative changes did not go well and show well, especially up at the Office of the President.

Also, when McHenry started the campus, although well-meaning, he gave the impression—more than giving the impression—he made it clear that this campus could run with the same kind of a budget and funding as any other UC campus. [But] that was not going to be possible, nor could it work with the college system and the way the campus was organized.

That put us in real jeopardy in the middle seventies. In fact, my recollection is that [David S.] Saxon, UC president at the time, did say that he would go along for five years supporting the campus if we could reorganize in a way that would make the campus begin to have a decent enrollment, et cetera, et cetera. In comes Sinsheimer.

Reti: So Saxon said he would give the campus five years and then what would have happened?

Landesman: My recollection—I can't recall this precisely, but he really believed that the campus could do quite well, but he was going to give us five years as far as making sure that we "get our act together." Now, there's greater depth to that than what I'm saying, but that was the basic gist of it.

I was executive officer and provost of Crown College for a couple of years during that period, in the middle seventies. And when we interviewed Sinsheimer from Caltech [California Institute of Technology], he was by far the best candidate. There wasn't anybody that came close. He was likely a candidate for a Nobel Prize for the research he was doing in biology. [He] arrived, looked at the campus, looked at the college system, looked at how the research was proceeding, and did not find any of it too favorable, especially based on his experience at Cal Tech, a very traditional [college], producing top-notch research, in science. He saw our research as being weak. And he, of course, had the burden of turning things around, or this campus might not survive.

Reti: Now, do you think that his assessment of the research record at that point on campus was a fair one? *Was* it weak?

Landesman: I can't really make a complete judgment of that, based on having been in Crown College, the science college. [Kenneth V.] Thimann, a renowned scientist himself, brought in key scientists, and I would say that, in general, in the sciences, I don't think it was weak. There were some excellent research professors in math, chemistry, physics, biology, earth sciences, and astronomy—I hope I'm not missing any. I think what may have played a major role is when he looked at the whole structure of the campus, at the college system, where there was an equal division of a faculty's commitment and the way faculty were hired, the way they were promoted. I think that was just not something he cared for.

The reorganization essentially took away any of the affiliation that a faculty member had with the colleges and basically put it all back into the departments.

They essentially were then in charge of the hiring, the promotion, and pretty much as it would be on any other traditional campus. There were some exceptions, with Oakes College and College Eight, but in general, that's what occurred.

Now, one can question whether he went too far in doing this? Did it kill the whole vision that McHenry and [Clark] Kerr had? In many ways it did. But at the same time, in many ways he may have saved the campus. So there was an incredible dichotomy. You say, "Wow! Why did he do this? He killed the vision of McHenry and Kerr." Yet he may have saved the campus. Within a few years, our enrollments went back up, and we were just fine. Now, could it have been a bit different? I always say "time," the variable "t" is a big one.

Reti: [Chuckles.]

Landesman: It's very easy, n years later, whatever number n might be, to say, "Oh, yes, it could have been different. It could have been this way, or that way." But you think of it in today's time, and you forget about what it was then. You don't have complete recollection, and know all of the pressures and tensions that were present. And as a result, it's easy later on to say, "Oh, yes, of course it was bad. It should have been done this way or that way."

At the same time, now, in retrospect—and, again, I say it being cognizant of the time factor—there could have been some compromises, in the sense of having the colleges playing a larger role than what they were left with.

I think that McHenry's vision, with half of a professor's commitment to the college and half to the board of study, was pretty unrealistic. It was innovative and well-meaning at the time, and it worked in the first few years. I think it especially worked at Crown College, which I was most familiar with, where you had a man like Thimann, who initially built up a very strong science division. And consequently, Crown College in many ways was not that much different than any traditional campus and often was viewed as the most conservative college at UCSC.

At the same time, Thimann cared about other aspects of the campus, akin to what McHenry and Kerr envisioned. He cared about teaching, about courses in the college, about the core course, about advising, and student achievement. So he was a perfect fit for scientists and for Crown. I'm so glad that I was part of that. I loved both research and teaching. And as we have discussed, I also did work out in the schools and I became engaged in research with the education department and also with projects dealing with emerging technologies.

What could the compromise have been? I think—and, again, it's all in retrospect—what if McHenry and Kerr, when they started the campus had allocated a faculty member's time to three-quarters in his/her board of studies and one-quarter in his/her college? Might that have been enough of a shift of the norm, so that it could have worked? In that scenario, the boards of studies would have had the majority of the say as far as hiring, as far as promotion, as far as the typical academic endeavors that faculty are engaged in. The college would have still played a role, but would have had one-fourth, rather than one half the power. Again, it's in retrospect, and we'll never know. Also, McHenry should

have made it clear to the systemwide administration from the very beginning that in order for the campus to fulfill the initial intentions, financial funding would have to be greater than the norm.

Reti: When you say the original plan of half and half was unrealistic, what do you think was unrealistic about it?

Landesman: Initially, when you hired faculty, it was exciting, new, and innovative. But as you began to build up departments, then called boards of studies, and began to bring in more faculty, who typically came from other institutions that operated in the traditional mode, and where you even brought in some faculty who didn't make tenure elsewhere at a major institution where it wasn't expected that you make tenure there, but was a stepping stone to move on to another institution—it was not unusual for such faculty to think, something's wrong here. This isn't the way I was taught. It isn't the situation I was in when I was at my previous prestigious institution. Something's not right here. And all of a sudden, you have a break in the original culture, and things begin to change.

I always believed that the major mission of a top-notch university is research. But I also always believed that the amount of attention that was given to teaching was too little. Now, that's a dangerous belief because instantly, the moment you mention teaching, someone immediately pegs you as a person who doesn't care about research. I really came to UC Santa Cruz because I thought it would be the campus that paid attention to *both* research *and* teaching and to other educational endeavors that were in the academic realm.

When I think about it, and when I advised students, and when I talked to parents, as both a faculty member and as an administrator—parents, in general, didn't send their children to an institution thinking, "Wow, they're going to this great research institution." They thought that their children were going to a first-rate institution where they were going to obtain a first-class education and be taught really well—

And in many cases, if not most cases, that was what took place here. Even those faculty members at Santa Cruz who might not have been super-effective teachers—I don't think it was because they didn't care. It might have been a function of their personality and a function of a number of other things as well. But I always believed that there wasn't enough attention paid to teaching, irrespective of the fact that it was a major university whose primary mission is research. Research is extremely important and I fully believe in it. But I also believe that the balance between research and teaching is not correct. I'll always believe that. I stuck to that belief in my own everyday work. I did research. I totally believed in it. I did teaching, which I totally believed in as well. And I did other related academic activities.

Reti: Okay, and we'll talk more about those in a little while. I want to follow up just briefly with a question that I have struggled with for many years, which is trying to understand the difference between a board of studies and a department. Since you lived through that transition, I'm wondering if you could shed some light on that for me. Is it just another name for the same thing, or was there something a little different?

Landesman: At one time, I probably knew what the difference was. I can only guess that if it had been called a department, it would have taken away from the initial vision of the college playing some role in your teaching. It might also have come—and I don't remember this for sure—from the Oxford-Cambridge system, too, where they didn't call them departments. I really don't remember.

In many ways, at least in science, I think boards of studies were not that much different than departments. In the early days of the campus, we used a lot of words that were often based upon the Oxford-Cambridge system of colleges, et cetera. But somehow those words, in my opinion, did not always have as great a meaning as may have been perceived.

Reti: Okay. And also one more question on that time period, in terms of the relationship between Crown College and the other colleges. What was that like?

Landesman: I guess one could ask that for any college: What was the relationship between—

Reti: Well, you were at Crown, so that's why I framed it that way.

Landesman: I understand. I think that each college had its own agenda, as far as a core course, as far as what they expected from faculty. It didn't matter, to a great extent, what college a student was in, really. I mean, they could take courses anywhere. The major difference was the core course. If you were in Crown, you had a core course that had more of a connection to topics related to science. And the upper-division seminars—which, of course, after the reorganization no longer existed in colleges, except for some very special

exceptions—they were a function of who the faculty were in that college and how they got together to teach such courses.

As far as the relationship of one college to the other, geography played a role. Crown was next to Merrill [College]. Early on, we shared a dining hall. And so there was a relationship, in that sense. As far as anything beyond that, the provosts of the colleges would meet, and we'd talk about different issues that related to the colleges and the campus in general, but I don't recall any major collaborations going on between colleges. I think each college did its own thing.

Reti: Was there a rivalry?

Landesman: If there was a rivalry, I would say it was more in words than it was in actual practice.

Reti: [Chuckles.]

Landesman: I do recall there was a perception that some of the faculty, certainly not all, in Cowell College were anti-science. I think some of the faculty in the humanities perceived science as being very dangerous, with regards to some of the research and applications scientists were engaged in. I always questioned that. Nobody I knew in science was trying to do anything of an evil nature. And in many ways, I often found that the scientists were very humanistic.

Reti: Hmm. What do you mean by that?

Landesman: Well, in my interactions with scientists, I found that many, if not most, really cared about what was going on in the real world, really cared about

problems in the real world and about issues that were emerging relative to the times, and many played a role as far as being active in such scenarios. So I never cared for any of the claims that scientists were doing evil things, any more than the claims that people in humanities weren't doing anything productive or creative.

Reti: All right, great. Thank you. Was there anything else you want to say about that time period of the late seventies?

Landesman: Again, I think that we came out of it at Santa Cruz and held our own. I also think the initial dreams of McHenry and Kerr with regards to the Santa Cruz campus ended. I think Santa Cruz became pretty much the same as any other UC campus, aside from the fact that there are the colleges, and that students can be in a college and in a dorm setting that might be more comfortable than being in a much larger living situation, although in many ways that, too, changed. In the early days of Crown, I remember meetings that we had where there was heavy discussion on not allowing more than 375 or 400 students in a dormitory because that was a major strength of living in the college. And I think now—I haven't kept up with it—but I bet there's as many as 1,000 students in the dorms.

So times change. That's not a very profound statement. And the initial dream, I think, of the campus being what McHenry and Kerr had envisioned—I think that changed with the reorganization. But, as I said earlier, we may have also survived, as a consequence of it.

Chancellor Karl Pister

Reti: Okay, so that takes us into—Chancellor Sinsheimer was here until 1987, and then we had Robert [B.] Stevens.[5] And then we had [Karl S.] Pister in the early nineties. I know you wanted to say a bit about Pister, in particular.

Landesman: Yes. Pister had been in engineering and the dean of engineering at UC Berkeley. He was a very well-known engineer. Many awards. A highly rated civil/mechanical engineer. He was brought to UCSC as the chancellor. He, in my opinion, was a really strong advocate for the campus. He definitely had a feeling, more than a feeling, but a definite understanding of the major issues that are prevalent in education, prior to coming to UCSC. He was sympathetic with the goals of the campus, and he worked tirelessly to improve all aspects of the campus. I know at least one of his daughters was a teacher in the schools and I think that certainly had an influence on him. And as a result, I know he understood some of the work that was needed to improve education in the schools and especially in underrepresented districts in Pajaro, and Watsonville, and Salinas. He definitely understood the many challenging issues and he had very favorable sentiments towards anything that could be accomplished in that realm. I give him really a lot of credit for that.

Later on, after he retired, he served and was a co-chair on the Center for the Future of Teaching and Learning. I was a task force member of that committee. We'd meet in Sacramento on a fairly regular basis. It was pretty clear that his work there was an extension of the principles he believed in, as far as trying to

[5] For oral histories with Chancellor Robert Stevens and with Chancellor Karl Pister see https://library.ucsc.edu/reg-hist/ucsc

get more students from diverse populations to have a better education, and having the teachers that taught them be more qualified, and I appreciated that.

Associate Academic Vice Chancellor for Undergraduate Education

Consequently, when Pister's vice chancellor, who soon after became the executive vice chancellor, Michael Tanner, a talented computer scientist and experienced administrator, asked me if I would serve as the associate academic vice chancellor for undergraduate education. I agreed, and I served in that capacity for two years. After two years, I was asked if I would continue and I chose not to. The administrative positions that I took on as provost and then as associate academic vice chancellor were ones in which I felt I could help the campus. But I never gained the same satisfaction from them as I did when I was in the classroom, when I was doing research, and when I was working with undergraduates and with graduate students. I missed that. I was able to do some of it when I was the associate academic vice chancellor, but in many ways, I couldn't wait to get back into what I had previously been doing in my aforementioned everyday activities.

Reti: What does the associate academic vice chancellor for undergraduate education do?

Landesman: Well, it's changed, over the years. When I served, it was a part-time position. It was not what it is today. I think now it's become a more substantial type of job.

I know, in retrospect, one of the reasons why Tanner wanted me in that position. Tanner was excellent at understanding and managing the budget of the campus

and then working, accordingly, on a myriad of issues relative to the betterment of the campus. Pister gave over much of the everyday running of the campus to Tanner. Pister often mentions that when he is interviewed.

But Tanner really needed a faculty member who could communicate well and work well with the faculty. I know he saw me as being able to do that. And I think I was able to do it to his satisfaction. The work ranged from all types of mundane issues, to very important things. At one stage, the campus was being pressured by systemwide—when they looked at how many hours of teaching we were doing, in their eyes we were not teaching as much as they thought we should be. I was able to work on that issue and we were able to up our teaching a bit by doing a little extra teaching every other year, even some in the colleges, et cetera. We managed to get that passed by the Senate. It didn't last long, but at the time it did satisfy a need. Subsequently, the campus was looked at in a more favorable way. And there were also a variety of issues that arose with departments and divisions—from hiring to other personnel issues, coursework, interactions with University Extension, submission of grants. and a host of other academic related issues that would occur on a daily basis.

Reti: Okay. Thank you.

Collaborating with Ronald Henderson in Education

I think that brings us up to your work with [Ronald W.] "Ron" Henderson and being part of the education board at the time, still as an under-the-line fellow. I know you mentioned that last time. You did a lot of work with Ron.

Landesman: Yes, I met Ron when he was recruited by the education board. He had come from Arizona. I can't recall the exact situation how we met. I do know that he saw I was interested in working with underrepresented students in the schools. He knew I had directed the Monterey Bay Area Math Project for many years, also knew that I was interested in upgrading the skills of teachers in mathematics. And I learned about his work—he was interested in working with underrepresented students. We had a natural connection there.

And then my work with technology. I think I talked about—

Reti: Yes.

Landesman: —almost by accident, getting videoed and consequently doing research on the use of video technology for the teaching and learning of mathematics and being funded by NSF and other agencies for many, many years. So Henderson and I built upon some of this early work, as well as some of his work in the schools and we began to extend this into schools in Pajaro, in Watsonville, and Salinas. Along the way, I began to learn some of the education jargon, as well as the fundamentals of research in education. Even though I was the mathematician in our collaboration, I am not a statistician. Consequently, in our research, Henderson often did much of the statistical analysis.

One aspect of our research collaboration was very new and very interesting for me. When working in areas where the population was primarily composed of underrepresented groups, we interviewed the parents of students, and we learned about their aspirations, what they wanted of their children, which typically was really no different than those in non-underrepresented groups. But

the means of getting there and where they were in the socioeconomic chain often was very different.

We then began to make connections with the work I had done in technology to some of the work that Henderson had done in education, and this led us into more joint research. We had a natural connection to the National Center for Cultural Diversity. We became part of the center because their goals were very much the same as what we were doing: working with diverse populations and trying to understand and create a better environment for teachers, for students, so that they could achieve in all disciplines. So that became a very nice collaboration, one that I had not expected, and one which positioned me in a direction that was along the lines of what I had been doing in some sense, as service, and which now became a new area of research. We wrote and published a number of papers, gave presentations throughout the country, and acquired grant support from a number of different agencies. At the same time, I continued to direct some graduate students in pure mathematics who were writing doctoral dissertations under my supervision.

Reti: Did it also feed back into your teaching at UCSC?

Landesman: I can't say it did.

Reti: Did any of your students get involved, grad students, with this project?

Landesman: Yes, graduate students in education. I served on a number of committees for master's students in education, and some of them wrote master's theses related to the research that Henderson and I were doing.

Community Teaching Fellowship Program

Where I involved math graduate students was with the Community Teaching Fellowship program, the CTF program.

Reti: Tell me about that.

Landesman: The CTF program was a program that existed on every UC campus. Basically it was funding from the Office of the President for typically two or more graduate students, in mathematics—at Santa Cruz, two graduate students—who, rather than being funded as teaching assistants in the department were actually, in some sense, teaching assistants out in the schools. I directed that program on our campus for many, many years and I received funding from the Office of the President. I funded two graduate students in mathematics. I always looked for and I always found two math graduate students who already showed great promise of being very fine mathematics teachers. And almost always, they were also showing that they had excellent research capability in mathematics. They wouldn't, otherwise have been in the math graduate program.

And I would place them in one or two of the local schools. It was typically an elementary school, and they would be in a fourth, fifth, or sixth grade classroom. I had a good connection with various teachers in the local schools, since a number of these teachers were participants in the Monterey Bay Area Math Project. In fact, there were a few times when I could have used four or five math graduate students, because once these graduate students spent a few hours a week in a school, they not only helped the teacher with his/her students but

often they, with the teacher present, began to present to the students various topics in math, and they could really play a major role as far as getting students to achieve and to have an increased interest in mathematics. I chose some really good graduate students to participate in the CTF program. All of them earned their PhDs and went on to have very successful careers in mathematics. And all of them were very fine teachers, as well.

Reti: Did they go on to teach in the K-12 system?

Landesman: No. Typically, they went on and taught at colleges or universities. Several of them come to mind. In particular, I still see two people who were participants in the CTF program: Estelle Basor and Kent Morrison. Both of them earned their doctorates at UC Santa Cruz. Each went to [California Polytechnic State University] Cal State San Luis Obispo did research and taught there. Kent was the chair of the department for a while and Estelle did superb research in mathematics. Continues to do that. They were top students in mathematics, but at the same time, they were excellent teachers.

Reti: Great.

Ted Youngs and Angus Taylor

Landesman: That gets into, in some sense, what I mentioned before with Angus [E.] Taylor, when he came in initially as acting chancellor. Taylor was really a fine mathematician. Ted Youngs, who started the math department, likewise a fine mathematician, worked in combinatorics. He even got me interested in it. I wrote a paper with him on a particular topic in combinatorics. He was working on a theorem called the Heawood Conjecture, and I won't get into the details of it

but it was a problem that's basically a generalization of the four-color problem on surfaces that have genus other than zero. Anyway, I won't get into that.

Reti: [laughs] You would have to watch my eyes cross!

Landesman: But it was really out of my field of specialization. He kept talking to me about it, and as a result, I became interested, learned what I needed to know, and collaboratively, we were able to improve on one of the cases in the theorem.

Getting back to Angus Taylor, I think that if he had started the math department at UCSC, rather than Ted Youngs, who was more traditional, the department might have been somewhat different. Taylor understood the system at UC. He understood what Kerr and McHenry were trying to do at Santa Cruz. I think that he, like Youngs, would have hired fine mathematicians, but I think he would have taken into account other aspects—in particular, their teaching and service to the campus.

Reti: Did you have any colleagues in the math department who were also interested in teaching?

Landesman: Yes, absolutely. I did. Bruce Cooperstein was certainly interested in the teaching of mathematics. [Anthony J.] "Tony" Tromba was also interested in teaching, as were Richard Mitchell, Al Kelley, Sol Friedberg, and Chongying Dong. Debra Lewis, who was hired later on, also cared about teaching. And a few others as well. Some might not have had great interest in teaching, but they were nevertheless good at it. I am told that a number of faculty who were hired

after I left the campus have been doing excellent teaching, which really pleases me.

Center for Teaching Excellence

Reti: I know at UCSC for many years we had a Center for Teaching and that involved some training and mentoring.

Landesman: I was the first chair of the Senate Committee on Teaching. Consequently, I played a leading role in starting the teaching center. And we hired a director. Once a month we would have a get-together and invite faculty who might have an interest, and we'd have a guest speaker, typically a faculty member from the campus, who would speak on a topic that related to teaching. We would discuss a host of issues related to teaching in all disciplines—and often, ways in which faculty might wish to consider in order to improve their teaching.

You know, in looking back, I've been very lucky in my career, in that I was in on the beginnings of so many interesting educational endeavors. I came to the campus at the beginning of its existence. I was the first chair of the Senate Committee on Teaching. I think I was the first, or certainly one of the first, associate academic vice chancellors for undergraduate education. I began, very early on, to use video technology for helping students learn and achieve in mathematics. After retirement from UC, I was hired at an innovative start-up company, Academic Systems [Corporation]. And following that, I became involved with the Collaborative for Higher Education and then with the Science and Math[ematics] Initiative, CalTeach, at the Office of the President. So I was

very fortunate to be involved in many new educational ventures throughout my career. It was really exciting.

Reti: I want to talk more about those last two endeavors with the Office of the President and with Academic Systems, but is this is a good place to take a break?

Landesman: Yes.

Reti: Okay.

CS/Mathematics Learning Center

Reti: All right, so we're continuing on Part 2 of Interview 2 with Ed Landesman, and today is December 10th, 2015. So, Ed, talk to me about chairing the committee that started the first computer science and math lab at UC Santa Cruz.

Landesman: An ad hoc committee was chosen. I was asked to be the chair, and the intention was to develop a computer science math lab. The task force began meeting in the early eighties. The campus needed a basic skills laboratory that would help students in their lower-division mathematics courses, in particular, pre-calculus and calculus, as well as in computer science. The campus administration approved, provided funding, and in the fall of '82 the laboratory began operations in the natural sciences. We had a large room on the second floor of Applied Sciences that housed the lab. The lab had computers, videotape machines, monitors, and other equipment. With regards to the mathematics component, which I remember most vividly, students came in and made use of learning materials that were provided—in fact, some of the review materials were pre-calculus tapes, as well as the basic calculus videotapes that I had made

way back in the early seventies. They were twenty-minute modules on each key topic in calculus, starting with the first quarter of calculus, through the third quarter. Students could sit at a computer in the lab and review topics needed, at their own pace, as they viewed the videotapes. We began to receive very positive feedback on the success that the students were having.

As time progressed, we stocked the lab with a variety of other learning materials. If one walked by that laboratory on a daily basis, there were many students often sitting there and receiving help with their courses, typically their basic courses in mathematics and computer science. I think the laboratory continues to be in operation today.

Reti: And so were there peer tutors available. Who was helping the students?

Landesman: We hired one or two people who ran the lab, and they also served as tutors. We had graduate students in there as well, who helped out. The lab was used mainly for math and computer science. I felt that the lab really helped in making a contribution to the campus, as far as satisfying an instructional need for students. Of all the committees on which I served, the ones I regard as being the most significant for the campus were the two engineering committees, the second one being the committee that played a major role in the establishment of engineering at UCSC.

Working Toward an Engineering Program at UC Santa Cruz

I was put on the first engineering committee soon after I arrived at the campus in '66, and that was the one where we were expected to—and McHenry certainly wanted this to happen—start a school of engineering, but that did not come

about. Francis [C.] Clauser, who had been hired from Caltech [California Institute of Technology], was an engineer—and he was brought in to start an engineering school. There were two other faculty members from computer science, I remember, who were also on that committee. Harry Huskey and David [A.] Huffman.

When we presented our plan, it was turned down. There was a feeling that there were enough engineering schools in Northern California, let alone in the state. Also, at that time, there weren't that many engineering jobs available. Stanford [University] had engineering. UC Berkeley had engineering. The very distinguished engineer [Frederick E.] Terman at Stanford—and others, came back with the recommendation that we do not start an engineering school at UCSC. That took care of any prospects for engineering on the campus at that time.

I think, as a consequence, if I remember correctly, Clauser left Santa Cruz and returned to Caltech. I know a number of us, including McHenry, were very, very disappointed. McHenry had envisioned an engineering school as the start of other professional schools at Santa Cruz, and that did not happen.

But the happier part of the story is that it did happen, but it took more than twenty years for it to occur. I was delighted to be selected to be on the "second" engineering committee in the early 1980s, and that was when we finally did get engineering on the campus. At that time, what was most needed was computer engineering both locally and in the state. There was a real demand for highly qualified engineers with degrees in computer engineering.

Reti: So it started with computer engineering—

Landesman: It did.

Reti: —in the eighties.

Landesman: Yes. [Patrick] "Pat" Mantey was brought in from private industry to start engineering on the campus. Pat and I collaborated by developing and instituting the first advanced math course beyond calculus, for the engineering students. I still remember the number of the math course. Basically, the course was a combination of linear algebra and differential equations, some Fourier analysis, Laplace transforms, and a few other topics of use to engineers. And I am fairly certain that I was the first one to teach the course.

It was certainly exciting that finally engineering had been established on the campus. And, as already mentioned at the onset, it was computer engineering. Pat Mantey was chair of computer engineering and became the founding dean of the Jack Baskin School of Engineering. The Baskins were very generous in funding. Chancellor Karl Pister and [Chancellor M.R.C.] Greenwood[6] were both strong advocates. The Baskin School of Engineering has had a real positive impact on the campus.

Reti: And now it's gone beyond computer engineering.

[6] For an oral history with Chancellor M.R.C. Greenwood see https://library.ucsc.edu/reg-hist/ucsc

Landesman: It has. It has extended to other disciplines in engineering: such as bio-engineering and applied mathematics. It also has played a role in work I did with the Collaborative for Higher Education.

Reti: Okay.

Landesman: A connection was established with several of the local community colleges, whose students transfer into UCSC engineering after they finish their first two years of pre-engineering.

Reti: Okay.

Committee on Committees

Landesman: Another Senate Committee that I enjoyed being on was the Committee on Committees. That was a strange name.

Reti: [Chuckles.] It sounds very Orwellian to me.

Landesman: Yes. But that was the campus committee that recruited and appointed faculty to serve on all the other Senate committees, hence the name. To be a member of the Committee on Committees, you had to be elected by the faculty. And each time I was nominated, I was elected. That made me feel good. I was chair of the Committee on Committees several times as well, and I always felt that the faculty had confidence in me to serve well.

One reason that the Committee on Committees was important is that they appointed faculty who served on the Academic Senate's Personnel Committee. The Academic Personnel Committee was the committee that made

recommendations to the vice chancellor and chancellor, as to which faculty were deserving of merit increases, promotions, and tenure. And obviously, the faculty wanted to make sure the Committee on Committees chose colleagues who were competent, fair-minded, and had a good understanding of what it meant to receive a merit increase and/or a promotion.

I was asked a number of times to be on the Academic Personnel Committee, and each time, I said no. I always felt a bit uncomfortable, in the sense that I would so often run into faculty, whether it would be in a parking lot or somewhere else on campus, and they would approach me—I suppose they had enough confidence in my understanding of the campus—and often they would be telling me how they felt they had not been treated appropriately and should have had a merit increase, or they should be getting greater recognition for what they were doing, et cetera, et cetera. It never made me feel good to hear such things. I always tried to be sympathetic, and yet it definitely influenced my decision about not wanting to serve on that committee.

But in my last or next to last year before taking the VERIP, I agreed to serve on the Academic Personnel Committee. Interestingly enough, it turned out to be an excellent experience for the following reason: I decided—and I never told this to anybody nor made it public—I decided what would make me the happiest to serve on that committee would be, as I read files on those faculty members who were up for a merit increase or tenure or whatever personnel action, I was going to primarily look for their positive contributions. And I did that. When it was my turn to present, I always made it a point to emphasize the positive attributes. I definitely felt that I was being responsible, and at the same time, I came out

feeling good about what I was doing. It turned out to be a very pleasant experience.

Reti: Oh, good.

Tom Lehrer

And this is just backtracking a little bit to Kenneth Thimann and the math department, but Tom Lehrer was one of your colleagues, right?

Landesman: Yes, it's one of the characteristics of Kenneth that I always really appreciated. As I have mentioned earlier, not only did Kenneth bring to the campus superb people in science, which really made it a strong place for research and teaching, but Kenneth was always open minded as far as other related things that could enhance the research, teaching, and service. It was all part of his nature to think of all of those things, even though he was such a famous scientist.

Reti: He was into music, too, right?

Landesman: Very much so.

Reti: The Crown Chamber Players—

Landesman: The Crown Chamber Players were very important to him. Yes, very much so.

He came to me one day early on and said: "Ed, do you know who Tom Lehrer is?" I said, "Yes, I do." He said, "Well, I knew him a bit, or knew of him back in Cambridge," and he said, "could we get him here? Would we have something he could do here?" I said, "Sure." At the time, I was teaching a course called

Mathematical Ideas in the math department, math for non-science majors, math for liberal arts. I would choose about eight or ten topics in higher math and present them at an appropriate level for non-science majors, so that they might get interested and begin to understand some of the things mathematicians do. They had to do math; it wasn't just sitting there and hearing about it. In fact, it was interesting: in that course, I found often there were some people who thought they had no math ability, or had no inclination towards it, and yet they were quite talented at it.

I thought that would be a great course to ask Tom Lehrer to teach in the math department. Kenneth and I got in touch with Tom Lehrer and asked him if he'd be interested. He came out; we talked with him. And before long he was here, and spent many years—usually in the winters, he would be in Santa Cruz, and then go back to Cambridge in the summer. He did teach the aforementioned course in the math department. He changed it somewhat and taught it the way he wanted to do it, which turned out to be excellent. And he also taught a course for Cowell [College] and I believe Stevenson [College] as well. The course was *The American Musical*. And basically, at the conclusion of the course, he would put on radio shows, where he'd have students who were very talented singers sing the key solos from a well-known musical, while he accompanied them on the piano. It was very, very nice.

As a side note, when I worked for Academic Systems—and we'll talk about that in a bit—I was given the opportunity to go into a studio with him and [chuckles] record a few words as he sang a very innovative and creative song that he had composed.

Reti: How fun!

Awards

And I think you were one of three professors in 1996 to receive the Mathematical Association of America Deborah and Franklin Tepper Haimo National Award for distinguished university or college teaching.

Landesman: Yes, that was a terrific honor. It was the second year they gave such an award. The first one had been won by Paul [R.] Halmos, a very distinguished research mathematician, who won the award for teaching, as well. And then in '96 the Mathematical Association of America chose three people in the United States for the award, and I was one of those three. It was a great honor.

I had other honors as far as teaching. The year before, I received the Northern California Math Association of America award for distinguished teaching in Northern California. I also won the Phi Beta Kappa teaching award for Northern California. The one that also was very significant to me was the UCSC Alumni Association's Distinguished Teaching Award in 1984. At that time, UCSC was giving one award a year to someone on the campus for distinguished teaching. I was the sixth person to receive it. That was a great honor for me because that award was one in which the alumni, who perhaps had had you as a teacher, made that choice. And I had great respect for the five professors who had preceded me in receiving the award. All of them were also excellent researchers.

The professor who received the award, the year after I did, was John Dizikes,[7] in history. I felt great that I could present him with the award. It so happens that when I was an undergraduate at UCLA, John was a graduate student there in history. I tried to get him as a teaching assistant when I took *United States History* at UCLA but I couldn't get him. He was so popular and so good as a teacher that his sections filled up very rapidly. I had someone else who was quite good but I couldn't get John. Then later on, we connected at UC Santa Cruz, and we could share some of those stories.

Reti: A very beloved teacher, John is, for sure.

Improving Math Learning and Teaching

And so now let's talk about the Math Academy at Santa Cruz High School and your work advising students.

Landesman: Yes, I became more and more interested in how students learn math and what we could do, as you know by what I've told you, to improve math learning and teaching and get students to be more proficient prior to coming to the university, and to get teachers to be more knowledgeable in the subject matter. All of this was something that could help the university. If you get students who are more prepared when they arrive, you're better off and they're better off.

One thought I had at the time was, why don't we go into two of the local high schools and see if we could start what we called a math enrichment program. It

[7] See Cameron Vanderscoff, Interviewer and Editor, *John Dizikes: Reflections on a Life of Teaching and Learning at UC Santa Cruz, 1965-2000*. (Regional History Project, UCSC Library, 2012). Available in full text at https://library.ucsc.edu/reg-hist/dizikes

ended up being called the Math Academy. We went into Santa Cruz High School and into Watsonville High School. When I say "we," I was doing some work with Diane Siri, then the Superintendent of schools in Santa Cruz County. Diane, herself, had actually been trained as a math teacher. I don't know if people know that. I also don't know how many years she taught math but she was trained as a math teacher. Diane and I had worked on some other education-related projects together. I met with her and I said, "Why don't we start a math academy at both Santa Cruz High as well as Watsonville High?" We did, and, to my knowledge, they are still in operation today, more than twenty-five years later. So I'm very pleased about that.

At both Santa Cruz and Watsonville High, students in the Math Academy do extra work in their math classes and are taught by really fine teachers. Many of the participating students, as well as their parents, have said that this has been a stepping stone for admission and entry into some of the best colleges and universities, including MIT [Massachusetts Institute of Technology], UC Santa Cruz, and others, where these students come very well prepared in mathematics.

Reti: Good. Great.

Do you speak Spanish?

Landesman: No. I speak some French, some German, and I know Latin. [Laughs.] And I can speak Hebrew. I can get by, minimally, in Spanish, mainly because of my knowledge of French, but I never did take a course in Spanish.

Reti: I just wondered because you'd done so much outreach to different underrepresented communities—

Landesman: Yes.

Reti: —and you'd be talking with parents who are Spanish-speaking.

Landesman: Yes. They understood me. I understood them. And the little Spanish I needed, worked.

Reti: Okay.

Leaving UCSC for Academic Systems Incorporated

So in 1994, you chose to take advantage of the VERIP.

Landesman: I did.

Reti: Voluntary Early Retirement Incentive Program. What was the reason you decided to take advantage of that offer?

Landesman: How that happened is rather interesting. I loved UC Santa Cruz, and in my mind, I thought I would stay on the campus for a much longer time. I had been at Santa Cruz for twenty-eight years.

Bernard Gifford, who had been the dean of the graduate division of education at UC Berkeley, read some papers that I had written on the use of technology for the teaching of math. Much was based on what I had done with regards to the modules I'd made for teaching calculus and pre-calculus, as well as some of the work with Ron Henderson. Gifford, a real visionary, with an excellent

understanding of the potential use of technology for teaching and learning, was starting a company outside of the university, with another person. The company was going to address some of the issues in education concerning achievement in mathematics and writing that were prevalent in the United States. In mathematics, there were students coming to college who had not achieved what they needed to in the very elementary courses of pre-algebra and algebra. Some of those students had to repeat and take these courses three, four, five times. And the more they took them, it didn't get any better. In fact, it often got worse. This was all documented in a study by the Math Association of America.

The decision by Gifford and a colleague was to start a company that would produce interactive computer-assisted learning materials to help these students achieve in mathematics and writing. Gifford learned about what I had done, called me in'93 and asked if I would be willing to come in and consult with them as they start the company. Soon after, he met Miriam [Landesman] and was very impressed with what she had done to help students succeed in such courses, and he called her in as well.

So I began consulting with Academic Systems in '93. And then when the VERIP was offered in '94, Gifford persuaded me to take it—and I didn't need much persuasion. It was very exciting, what we were accomplishing at Academic Systems. It represented, at the time, some very innovative ways for teaching and learning. Gifford said, "Why don't you take that VERIP and come on in full time with us, and let's really make a go of this."

I gave it a lot of thought, and at the last minute, I signed the papers. I was shaking when I signed them. I resigned at UCSC and I went in full time at Academic Systems. I directed the math program as we built computer-assisted, multimedia courses for the teaching of basic skills in mathematics, in particular, pre-algebra through college algebra.

I stayed with the company for about six years. It was then sold off. By the time I left, I was an executive vice president of the company. Our learning materials were being used mainly in community colleges, as many as 300 community colleges throughout the United States, because that's where students who had not met these math requirements were enrolled. We actually had, I'd like to say, a very positive effect on thousands of students who went through and learned the mathematics that they needed, in a very unique and innovative way.

Most of the learning of the basic skills was primarily done in a very interactive way on the computer—with faculty members assisting students, but playing a very different role than usual. The faculty members, rather than being, quote, "the sage on the stage," had to change their mode of the way they taught, and they became, in many ways, professional helpers who were available in the lab or the classroom to assist the students, to answer questions, etc., as the students were learning the basics on the computer. For some faculty, this new role did not work. They could not make the transition from what they had been doing in a traditional mode for many years. But for some others, it was incredible to see the changes that came about. It reinvigorated them, and in many ways got a number of them into a teaching role that they enjoyed. They had been doing the same

thing for so many years, and this new approach was a real eye-opener for them, especially when they saw that their students were achieving.

And the teaching and the learning of the mathematics was highly interactive. It had assessment built in. It had interactivity, as far as students trying different problems. It provided feedback on where a student had succeeded and let them know where they hadn't. It was a very well-thought-out program that we spent years working on. A very exciting endeavor with Gifford at the helm.

By the way, that's where—I mentioned a connection with Tom Lehrer. At one time, we needed a small musical jingle, I guess is the word, for something to introduce some algebra. And I persuaded Tom to actually write and record what was needed. As was expected, he did a superb job, and I got a chance to get in the studio and do some recording with him, which to me was very different and very, very exciting.

Reti: So were these completely individualized modules of instruction, or was there group work among the students as well?

Landesman: There could be group work, yes. Basically we looked at the curriculum in each of the courses we were teaching, and we broke down the curriculum into modules or lessons. We carefully studied the major textbooks that were being used. We broke down the lessons in a way that would be in concert with the key textbooks, and we wrote our own texts, as well, to accompany the video modules. The texts we wrote reviewed the key concepts that had been presented on the computer, and also served as workbooks in that they had worked out examples and problems for the students to try on their

own. We also built in assessment. And we had evaluation of the assessment. There was also a section that had applied problems. We even had a built-in help line, where we had four different, quote, "fictional" characters, each of whom had a different way that they learned mathematics. One of the characters learned best by seeing things in a visual or pictorial way. A second character really wanted to see a proof of how things were done. Another character liked more of an algorithmic approach. And still another character wanted an alternative explanation. A student could click on any one of those characters to get help and to identify with the character whose style of learning best suited their own style.

So it was extremely well thought out and we had the resources to do what was needed. We likely never would have been able to do that at the university. Gifford had the understanding and the vision—and in addition, the resources and support from outside funding to support the work—which turned out to be an excellent project for helping students break through a learning barrier that they had not been able to previously achieve after multiple attempts.

Reti: And this is all before online learning.

Landesman: It was, in many ways, the genesis of interactive, multimedia, computer-assisted learning. Today, there are a number of different models, such as the Khan Academy—and they're doing some interesting work along these lines, but in many ways, we were years ahead in such endeavors.

Reti: Yes, you were.

Landesman: And in a very interactive way as well. A lot of work and a lot of insight and a very rewarding experience.

Reti: Did you miss classroom teaching?

Landesman: I definitely did, but, at the same time, I was now teaching in a different mode. I know I had a positive effect on many, many students who I had, in the traditional sense of my teaching at UCSC, but in many ways I may have had an even greater effect because literally thousands of students were using these interactive computer-assisted learning materials. Of course, these materials were directed to students who were at a very different level than the students I taught at the university. I know also, that in an indirect way, the learning materials produced by Academic Systems benefited the university because the students who achieved by virtue of using these materials, now had a far greater chance of being UC-eligible.

In my early days at UCSC, I often taught many courses in elementary calculus. Later on, as I became more senior, I taught less of the larger elementary courses and more specialized courses in the major. I often felt that at the university, math and science departments didn't acknowledge appropriately those faculty who taught the large, basic introductory courses in calculus, physics, biology, chemistry, etc. If you did an excellent job in teaching those introductory courses, you were not only helping the students learn the material, but you were encouraging them to continue in math or science. As a result, they became the majors, and consequently a department was in a better position for receiving funding as well as FTE's.

The Collaborative for Higher Education

Reti: Absolutely. Really gratifying. Okay. Well, why don't you tell me about the Collaborative for Higher Education?

Landesman: Yes. In the year 2000, an idea that had been floating about for a while suddenly came into being. There was an agreement made among the three higher institutes of education in the local area that they would form a "Collaborative," working together to promote learning and teaching of math, science, and technology. The formal initial meeting took place at NASA Ames [Research Center] in Mountain View.

Reti: When you say "this area," you mean the Bay Area?

Landesman: The South Bay area. It was a collaboration that included UC Santa Cruz, San Jose State University, and the Foothill-De Anza community colleges. Each institution was already making plans to have some connection with NASA Ames, to have perhaps physical space there, and to engage in research and related activities at NASA Ames. So a natural consequence was the pooling of efforts and resources and working towards the common goal of helping students and teachers and promoting research. The agreement became known as The Collaborative for Higher Education. Many of the proposed activities would be related to the research and educational endeavors that were happening at NASA Ames.

Reti: Was Chancellor M.R.C. Greenwood involved with this?

Landesman: Greenwood was. She's the chancellor who I believe signed the contract for UC. Michael Tanner, the executive vice chancellor at UCSC, and whom I had worked for as the associate academic vice chancellor, was at the initial meeting. I, too, was at that first meeting. Subsequent to that meeting, Tanner called me in and asked if I would be the education director of the Collaborative. They had already hired someone to administer the Collaborative, but they needed someone who understood education at the levels they were envisioning in mathematics, in science, and in technology. I agreed to take on that role.

I then began working collaboratively with San Jose State University and with the Foothill-De Anza community college district. In particular, at Foothill-De Anza I worked closely with Martha [J.] Kanter. Martha Kanter had been the president of De Anza College and then went on to become the chancellor of the Foothill-De Anza community college district. In recent years, she was the undersecretary of education with the [President Barack H.] Obama administration.

Reti: Oh, that's why that name is familiar.

Landesman: Yes. I met with Martha on a regular basis. I also met with Maureen Scharberg, who was professor of chemistry at San Jose State University, and then went on to become the director of education there, as well as an assistant vice president. All of us were interested in a common goal: Let's see what we can do to help students achieve in the sciences and to help teachers increase their skills. And as a result, I found myself not only administering the educational

components of the Collaborative, but bringing in and obtaining outside funding for projects that I, myself, got involved with.

One such project was called NESPA, NASA Explorer Schools Pre-Algebra. NASA was directly involved with a number of schools—typically middle schools—throughout the United States, somewhere between fifty and one hundred; I can't remember the precise number. And these schools taught math using the applications related to NASA projects. Some of the people at NASA who worked in their educational division and I started to look at where many of the NASA Explorer Schools were needing assistance in particular areas of the mathematics that they were teaching. Where were students facing the greatest challenges? We found that there were a number of concepts in pre-algebra where students needed help. We modeled a course, placing emphasis on the math concepts needed, and linked with NASA's mission of traveling to other planets and the exploration of outer space. The project was funded and was called NESPA. Students not only learned the math that was causing them difficulty, but at the same time learned some of the science associated with NASA missions.

Reti: That sounds fun.

Landesman: It was a very interesting project. I loved working on it with colleagues at NASA Ames.

Another project I worked on was the Collaborative for Higher Education Teacher Institute, CHETI. We created and organized a science and math project with the Franklin-McKinley School District in San Jose. We brought in many teachers from throughout that area, in that school district, and we worked with them on

their math and science skills. Maureen Scharberg played a key role on the science component and Miriam Landesman and I played a major role on the math component. We met with the teachers during several summers and had follow-ups throughout the school years. By the conclusion of the project, we had made a real difference in the mathematics and science knowledge base of the teachers and it was reflected in their subsequent teaching and achievement by their students.

I also organized and directed several projects in the East Side Union High School District in San Jose at Yerba Buena and James Lick High Schools. One such project at Yerba Buena High School comes to mind. At that high school—the percentage of students who were Hispanic was at least 50 percent, and yet when we looked at the Hispanic students who were continuing in math after, say, Algebra I, it was 10 or 15 percent. I mean, very low. It did not at all represent the percentage of students that made up the ethnic group at the school. In order to address this, we created a program that was funded by CAPP, the California Academic Partnership Program. CAPP funded me on a number of similar type projects. What we did on this project was to create a link between the physics and the math courses at the school. We identified a top teacher in math and a top teacher in physics. The students would go to the math class and learn the math. Then when they went to the physics class, the physics they learned was directly linked to the math they had learned, and conversely, so that they were seeing connections between the two disciplines. And each of the courses were being taught by the two top teachers who were working collaboratively to effect the plan.

The plan worked and had an incredible impact on the students. By the time the project had completed, in three years, the 10 or 15 percent of students in the ethnic group had increased to 60 or 70 percent, and those students continued on from Pre-Algebra to Algebra I, from Algebra I to Algebra II, and to the next course after that. We also provided summer internships in private industry in the South Bay for those students, including internships at Symantec and at NASA Ames. I obtained outside funding to pay for those internships, so that the companies themselves did not have to do so. The impact these experiences had on the students and on their parents was incredible. In fact, at some of the meetings that we held afterwards at the school, where the students presented what they had worked on in the summer, it literally brought tears to the eyes of the funders, who were deeply moved by what had been accomplished by these students. It changed their whole perception of what they thought they might do as far as their careers, and they continued on in math and science. It was just wonderful, absolutely superb.

And still another project within the Collaborative was called BIN-RDI, the Bio-Info-Nano Research Development Institute. And typically, as with the other projects mentioned, as the education director, I would not only administer the project, but almost all of the time, take part in the actual project, itself. A number of these projects came about during the years 2000 to 2005. And then I was about ready to say, "I've had a few careers"—

Reti: [Laughs.]

Landesman: —"since I took the VERIP at the university."

Reti: Yes.

Science-Math Initiative (CalTeach)

Landesman: But then, not long afterwards, the Science-Math Initiative, Cal Teach, began up at the Office of the President. The premise was to encourage and support more students early on in their careers at UC campuses to consider careers as highly-qualified secondary math or science teachers. We needed that so badly because if we didn't have first-rate teaching at that level, we would not produce students who were adequately prepared to attend the university and to pursue careers in the sciences and engineering.

They called me in at the Office of the President and asked me to participate in CalTeach. I agreed to it under the conditions that it be part time, that I did not want an office there, and that I would not have to attend too many meetings. I also asked them, "What are you doing with community colleges?" There hadn't been much thought about them.

So after some discussion, they put me in charge of working with the community colleges in the state. At the time, there were 112 or 113 California community colleges. There still are, plus or minus one or two. I made the argument that if one wanted to encourage students to be secondary teachers of math and science, there would be a higher probability of finding such students among those who start off in community colleges, for a number of reasons, one being that these students might also want to go back to their communities, and become teachers there.

Reti: So the idea is that they would then transfer to UC, but then they would pursue an education degree, a teaching degree and go back and teach at the secondary level.

Landesman: Absolutely correct. I ended up doing quite a bit of traveling around the Bay Area, bringing in community colleges. I also made contact with a number of community colleges outside of the Bay Area. At one time, I had as many as twenty-eight colleges throughout the state who were participating, one-fourth of the community colleges. But more often, it was between eighteen [and] twenty-two colleges. Locally, some of the colleges were Foothill-De Anza, Chabot [College], Monterey Peninsula [College], Evergreen Valley [College], San Jose City College and Ohlone College. In Southern California: Pasadena City College, Santa Barbara City College, Ventura College, etc. Some of these colleges were easier for me to recruit because I had worked in their districts and they knew me.

I then brought in outside funding. That eased the burden on the university. The idea was to have students, when they were freshmen, spend six or seven hours a week in a school classroom to start to get their hands a "bit dirty," and see what it's like to be a teacher in the schools.

Reti: So they would be in their first year at community college.

Landesman: That's right. And for doing this, they typically received a stipend of five or six hundred dollars per semester. They might start off in a classroom strictly as an observer. They then might work with some students who needed extra help. And eventually they could get up and give a talk on some topic in

math or science. In many cases, we saw a real change in college students' attitudes. Many said, "You know, I never thought I might want to be a secondary teacher of math or science, but now I think I will." Some said, "I don't think I want to do that full time, but I might consider it maybe some time in my career or maybe part time." And some said right away, "That doesn't interest me."

So, while I was working with the community colleges, UC was working with each of its campuses. They continue to do so today. By the way, when I started with CalTeach at the Office of the President, I was given the title: Associate Director of Intersegmental Relations, whatever that means.

And then I became the director of the Aurora Project, which was the community college component of the Science and Math Initiative, or what we often call CalTeach. CalTeach continues on the UC campuses. At UC Santa Cruz, Gretchen Andreasen, an earth scientist, directs the program. She's been doing it for about ten years and doing very, very well. I'm happy to say that my wife, Miriam, and I have started a small fund to help assist that program.[8]

Reti: I'm just wondering if there was any resistance from, say, parts of the University of California, who think of UC as being this research university, and might be opposed to UC becoming so involved in teacher education.

Landesman: The interesting thing that happened at the onset, is that the Governor, other officials in the state, and people at the university were all aware that in California, we were facing a crisis in that we needed to produce teachers

[8] This is the Edward and Miriam Landesman Fund for Future Teachers of Math or Science. See http://news.ucsc.edu/2011/10/review-fall-2011-cal-teach-fundraising.html

that were highly qualified to teach science and mathematics at the secondary level, and the university had to address that challenge.

Now, does everybody in the university suddenly jump into this? Heck, no. But what I did see was the following: When I went to meetings at OP, deans from each science and math division from every one of the campuses of the University of California would attend. And often, they would also bring some faculty members, as well. We always could find one or two or more professors at each campus who were interested in participating in CalTeach. That's all we needed. When you try to get everybody, you don't have a chance. What is important is to try and keep those who aren't interested from stopping the efforts. But as long as you have a few people that are interested in participating, you have a chance for success. I learned that early on, and it usually worked.

Now, I had less of that challenge at the community colleges because, of course, the community colleges have a different mission than does the university, and most often, the people I worked with at the colleges were quite happy when I explained the goals of the Aurora Project and I provided the funding.

Reti: I can certainly see the connection—if you don't have math literacy in the state of California, the entire engine of research and everything comes to a halt.

Landesman: Absolutely.

Reti: So it's certainly in UC's interest as well. It's just I can imagine someone saying, "This is not the job of the University of California. It should be Cal State and the community colleges to be teaching remedial," blah, blah, blah.

Landesman: But we weren't teaching remedial! We were addressing a critical issue that faces California. We needed to motivate, recruit, and support college and university students early on in their academic careers, so that they might choose to be highly qualified secondary teachers of science or mathematics and UC needed to take the lead in doing so.

Reti: I understand.

Landesman: And it happened. And it's still continuing. I'm pleased to say that we have made some very good progress.

The Future of Math Education

By the way, along those lines, if I were to talk—for just a minute or two—about the future of math education.

Reti: Yes, yes, please do.

Landesman: I have given it a lot of thought over the years and I'm convinced that we would do better in elementary schools, as far as math and science education, if we didn't expect a teacher at the elementary school level to be a teacher of everything. I believe we'd be far better off if we could have specialists in math, and in science, and they would come in when the students had to learn those subjects—more or less what you do in junior high school, or middle school, as well as high school, where you have a teacher who teaches you math, or one who teachers chemistry, or physics, etc. I think in elementary school it would be really to the advantage of students and teachers if we began to segment the teaching that way, so that a teacher who feels really comfortable and has been

trained and understands the math would come in and teach the math. And the same with science. Our expectation that every elementary school teacher knows every subject and should be teaching every subject, I think, is outmoded. And that likely would imply that we do away with the multi-subject credential.

Reti: Interesting. Is this something that's been explored?

Landesman: I haven't kept up on it in recent years. However, I do believe there's been some exploration of it. But where it stands, I don't know. Would it cost more? I haven't sat down and figured that out, or worked it out on paper. It might not cost more, because if that "specialist," say, was teaching math or science in the school, he/she could be teaching it, not only in one grade; but could be teaching it in a number of grades. So I'm not sure it would even cost more. But I know it does mean a shift in the existing way things are currently done.

And one thing I've also learned over the years [chuckles]—and there've been many now—as much as one thinks that in education people are open minded, liberal and open to change, it is not the case, not the case at all. Very difficult. UC Santa Cruz, in some sense, is an example, where it was easier to go back to the norm and what had been done for centuries at other institutions. So it's not easy to make changes. But I continue to believe that there are always opportunities to make some scratches, but to make big dents, it's not so easy, not so easy.

I do not consider myself to be a pessimist, nor have I given up on trying out new ideas. I believe if you have enough willpower and wish to make some changes,

you can do so. But you have to be very realistic and not get disillusioned by thinking you can do more than is possible.

Reflections on UC Santa Cruz

Reti: Yes. Well, that takes us back to the campus. At this point in history, looking at UCSC—you've lived through a lot of shifts in the campus' approach to its organizational structure, and size, and all kinds of other things. Do you have any thoughts on the way the campus is now? I know that you don't teach there anymore but you certainly have kept in touch to some extent. I know you attended the fiftieth anniversary festivities this past April.[9]

Landesman: I think that UCSC is a marvelous place. I'll always think that. I think it's different than what McHenry and Kerr envisioned. I've heard it said, as a general remark, that McHenry would be extremely happy at what it is today. I think he'd be extremely happy with *many of its* aspects, but not extremely happy with *all* aspects. I think he and Kerr had a vision that did not totally come to fruition, yet what did come into being is a superb campus of the University of California, which is something to be very proud of. Is it what McHenry had in mind initially? Not exactly. But it does still retain some of those early visions. It has a very high proportion of undergraduate students who receive an excellent education. It consists of colleges within the campus. It has some major graduate programs and excellent ones at that, in almost all of the disciplines.

[9] Alumni Weekend 2015 included a dinner for founding faculty, to which Ed Landesman was invited. For a listing of the events which took place see http://50years.ucsc.edu/alumniweekend2015/events/

Often, still, unfortunately—it's very difficult to shed some of the initial false perceptions that people on the outside have about the campus. Even today, there are those who think that UCSC is primarily a liberal arts campus and give little or no credibility to the outstanding research and teaching taking place in math and science.

Reti: If you look at the Science Citation Index, our research record is phenomenal.[10]

Landesman: Oh! It's incredible. And credit is due to many, many of the faculty, including some of the people who came here initially, Thimann of course, being among them. We should be very proud of what we have achieved.

I think it was very wise that in recent years, George [R.] Blumenthal, an existing faculty member on the campus, was chosen as chancellor. I would have never guessed that George would be chancellor when he first came to the campus, at Oakes College. Not that he wasn't capable, but often you visualize certain people as being on track for future roles, and in particular, as a chancellor. I always saw George as a scientist very much dedicated to research and teaching. I learned later of his dedicated work and leadership in the Senate and his continual contributions to the campus and to the university, which made him an excellent candidate for chancellor.

In recent times, I haven't had much contact with the everyday workings of the campus. But I do know that George has done a great deal to foster the town-

[10] In 2012 UCSC was ranked second in the world for research influence and among the top fifty universities in the physical sciences. See http://news.ucsc.edu/2012/10/research-influence.html

gown relationship. That has never been an easy thing to accomplish, and consequently, he deserves much credit for that.

Am I glad that I came to UC Santa Cruz and that I spent the majority of my career here? Absolutely. Without any doubts whatsoever. There were many people on the campus who had a great influence on me. One reason was because of the college system. It was so unique, in the sense that we not only had colleagues and friendships within our departments, but we were able to get to know colleagues in other departments, which for me was also the basis for engaging in interdisciplinary research with Ron Henderson in education.

I am sorry—I've mentioned this before—that I did not make similar connections with people in physics, and engineering. While I did serve on the committees that instituted engineering on the campus, I would have liked to have done research with some of the engineers. Pat Mantey and I got close to that, but it never really took shape. And in physics—there were definitely people in physics that I would have enjoyed working with. I've often thought that, in general, faculty do not take advantage of the opportunity to collaborate with colleagues in interdisciplinary research, especially at a campus like Santa Cruz.

Along similar lines, as I may have mentioned earlier, I don't think we spend enough time teaching students how to work collaboratively with others in both the same and other disciplines. When you get out there in the real world, you're typically not just working by yourself, but most often working with others. We need to put greater emphasis on collaboration in the teaching and learning process.

To conclude, I can say the following: I came to the campus because it was going to be top-notch in research, teaching, and service and was going to place a great deal of emphasis on high-quality undergraduate education. The campus achieved all of these goals and in addition, instituted top-notch graduate programs. I always tried to make worthwhile contributions in all of these areas. I feel extremely fortunate to have spent the major part of my career at UCSC.

Reti: Thank you so much, Ed. It has been really a pleasure to spend this time with you, and hear these stories, and your thoughts about UCSC and everything you've done since you left UCSC.

Landesman: Well, thank you. I appreciate having had this opportunity.

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