Oral History Interview of
Ernst Kiesling

Interviewed by: Andy Wilkinson
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Lubbock, Texas

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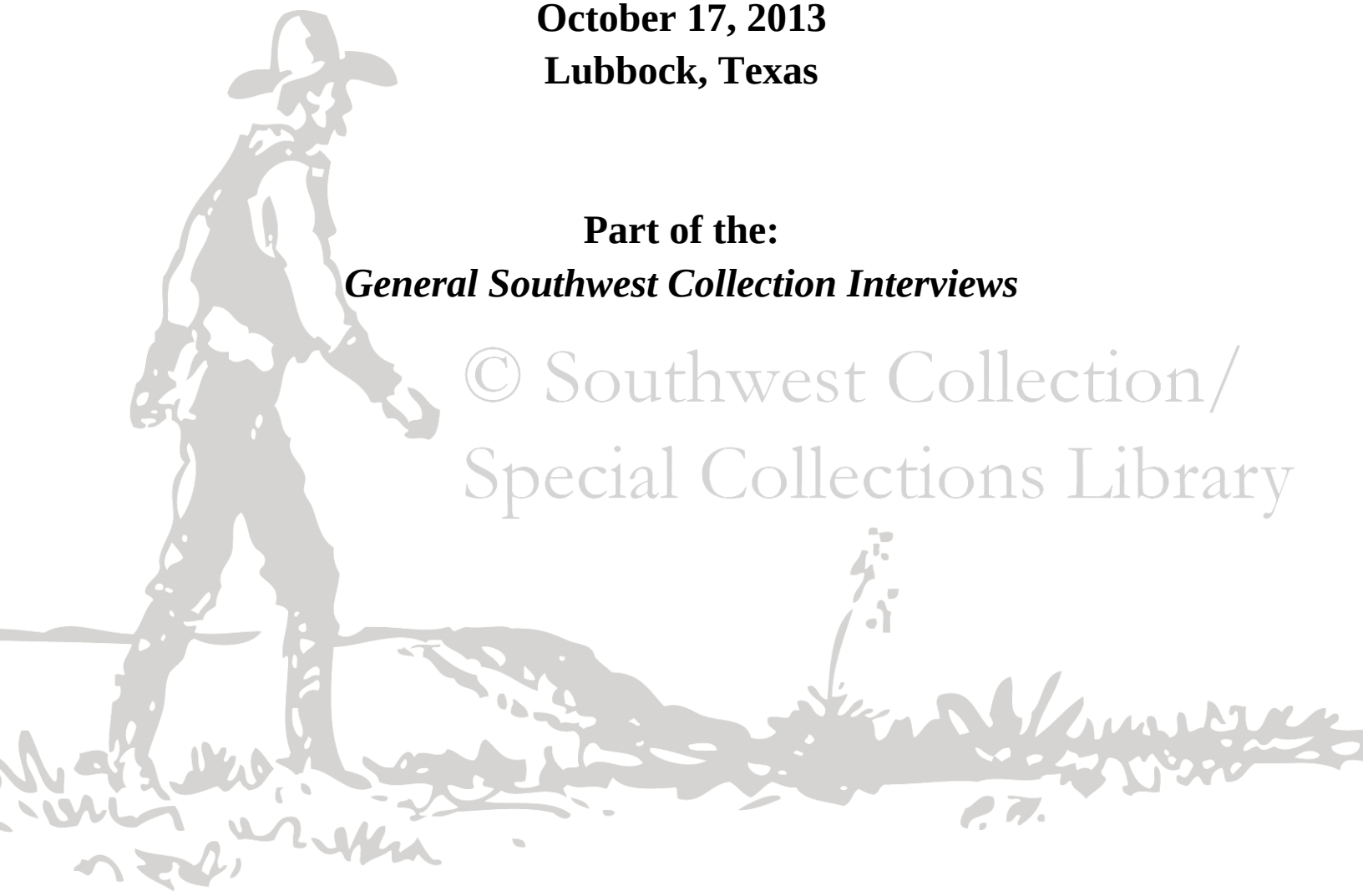

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Transcript Overview:

This interview features Texas Tech engineering professor, Ernst Kiesling. Kiesling discusses growing up in West Texas and attending Texas Tech to study engineering. After developing an interest in teaching, Kiesling attended Michigan State University to pursue graduate studies before returning to Texas Tech for his academic career. Kiesling has been heavily involved in research related to above-ground storm shelters and details his involvement with such projects in the interview. Kiesling also discusses effective leadership and how teamwork was instrumental in his department's success.

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Andy Wilkinson (AW):
And I'm going to say for the recorder that it's the seventeenth of October, 2013, Andy Wilkinson with Dr. Ernst Kiesling in his office here at Texas Tech.

Ernst Kiesling (EK):
Very good.

AW:
Let me start by getting your date of birth.

EK:
April 8, 1934.

AW:
And where?

EK:
I was born in Central Texas, near San Angelo on a farm and ranch.

AW:
Really? Closest to San Angelo, or—

EK:
More toward Wall and Iola, down in that area, east of San Angelo.

AW:
I know that area. Bill Holubec is a longtime friend.

EK:
Real good. We're just I guess a mile or so from them.

AW:
Really?

EK:
From their home place.

AW:
His wife and my wife grew up together here in Lubbock, so that's how I got to know Bill. So your family was a farming family?

EK:
Yes. That was the home place, and then Dad kind of branched out in the farming and ranching area and has property down closer to Brady at Melvin, down in that area.

AW:
I know Melvin.

EK:
I am not sure what motivated him to do that, but he had property down there. His family's—virtually all his ancestors are all gone now, but have a nephew that lives on the home place, so it's still going out there. It's a good area. Are you from that area?

AW:
No. I'm from here, but I travel all over the state and other places. I make a lot of trips down toward Austin. I'm a musician and writer, and so—actually how I came to the Southwest Collection was to build our archive of music and art people. So we spend a lot of time going down to Austin, and I go through Eden and Brady and I drive—I don't know how many times I've driven by Melvin, and I've never drive through it. You can see it from the highway.

EK:
Yes. You didn't miss much. There's not much there anymore.

AW:
I'll bet that's right. So you were cotton farmers when you grew up?

EK:
Yes, cotton and grain and sorghum. I graduated from San Angelo high school in 1951. I just thank the Lord for leading me the way he did because when I graduated from high school, I had no intention of going to college, I thought I was going to be a farmer and rancher. Got out there on the farm, I graduated on January, I was only sixteen at the time. Looked around there on the farm, and decided there wasn't much going on right now, and I saw that school bus go by that took kids to San Angelo. So I thought, Well, I'll try college for a year. I thank the Lord for that, because 1951 was the first year of a seven-year drought that they had in that area.

AW:
Yeah, at one time, a fellow named Waddie Mitchell, a cowboy poet and I had the rights to Elmer's book, *The Time It Never Rained*, to do a film script.

EK:
It's a great book.

AW:
And that's your country?

EK:
That is. So many things were true to life in that book, or are true to life in that book. But I wonder where in the world I would be today if I'd gone into farming, because I would have just hit a bust for seven years in a row. I don't know how the farmers survived there, but Dad survived that, and lived quite a ways beyond that.

AW:
Were you irrigated?

EK:
No, we personally didn't. My brother had some irrigation farm over closer to Wall. Few people do have irrigation down there. That project out east of San Angelo where they draw water out of I guess South—South Concho, I guess that's where it is. Anyway, they put a big area adjacent canal out east of San Angelo, but I don't think it's been nearly what the corps of engineers expected it to because they just haven't had the rainfall for twenty years down there. This year's been an exception. My understanding is that there's a deal with the city of San Angelo where now they're running a treated effluent down that irrigation pipe, and San Angelo's getting some of the freshwater, so that's a good deal.

AW:
Is that—is than an issue with the higher nitrogen content? Is that an issue for the farmers?

EK:
Not for the farmers, I don't think.

AW:
I know it is for drinking.

EK:
Yeah, I think so, but I think that farmers can use it, and it depends upon how thoroughly it's treated, I guess. I believe they can use it for irrigation just as we do here on campus, I guess. We use underground water for irrigation, and it has a pretty high nitrogen content, I think. They have to treat it before we can drink it.

AW:
Did you start at Angelo State?

EK:
Yes, I did. I went actually two and half years there at Angelo State and transferred some credits to Texas Tech, and then in 1953 came to Texas Tech and majored in mechanical engineering. So my undergraduate degree is in mechanical engineering here at Texas Tech. And I almost immediately started teaching upon graduation, I went to work in the oil patch, and that was not satisfying to me, and I wasn't—I was single at the time and away from friends and so forth, and came back, and I had graded papers when I was an undergraduate for Mr. Murdough, head of the CE department, and came back and visited with him one weekend, and he asked me if I'd like to teach, and I said, I'd never thought about it. He said he was short-handed, and I needed a change and wanted to get back to the placement office and interview there. So I took that teaching job, taught for a semester, but it turned into a career because I quickly got hooked on teaching, and that then necessitated doing graduate work, so I left twice to do graduate work at Michigan State University and was attracted there because of their program in applied mechanics, so that worked out very well, but my whole career has been essentially here at Texas Tech.

AW:
So you were here between the master's and the doctorate, you came back?

EK:
I came here with a bachelor's, started teaching with a bachelor's degree—

AW:
But after you got—

EK:
Right, and then I left once in '58 and '59 to get a master's degree, came back and taught four years and then went off for a PhD. I had an NSF, National Science Foundation faculty fellowship for a doctorate and went back to Michigan State and got a doctorate and completed that in '69, then went to—no, I'm sorry, I went to 1966, then went to Southwest Research Institute in San Antonio, and got some research experience, and that was an excellent experience. Then in 1969, Keith Marmion, Dr. Keith Marmion was chair of the civil engineering department, and he died from complications following surgery at a very early age, so the chairmanship of civil engineering came open, and I applied for that and was chosen for that. I think the fact that we—I was familiar here and they were familiar with me furthermore—the department at that time had a new doctoral—or graduate program, master's program, but had no research to support it, so I had kind of a mandate to develop a research program. Being in a research environment, I think that was in my favor, too.

AW:
Because you were pretty young.

EK:
Yes, I was I guess thirty-three or –four and became chairman of the civil engineering department and was chairman for nearly twenty years. That was a marvelous experience, had good faculty. It was kind of a pioneering effort because we had virtually no research program, no involvement in research, but we had a young faculty that was poised to do research and capable people. Then the Lubbock tornado hit just the next year. I became chairman in 1969 and the Lubbock tornado was 1970—

AW:
May eleventh.

EK:
That's right.

AW:
I was a young police officer in Lubbock, going to Texas Tech at night.

EK:
That's interesting.

AW:
It was quite an experience.

EK:
So that put an opportunity in our laps that faculty, group of young faculty members got out there and saw all these damaged buildings and looked at the literature, and there was virtually nothing in the literature that would give guidance to a designer of buildings for wind resistance. So they simply took a lot of pictures and documented them as buildings and started analyzing those. That's the first time a say, a comprehensive or learned report was done on a building damaged from wind. That got a little bit of visibility and traction, got a little bit of support from the National Science Foundation, a little bit of local support for a so-called Institute for Disaster Research. So that gave us a start of the wind engineering program, one thing led to another, we got a little bit of visibility and started getting a little bit of funding there and then—so that was really the birth of the wind program at Texas Tech, and I think to a great extent, the birth of the wind engineering efforts as far as resistant—building resistance to extreme winds. Research had been going on at other places before that in, say, looking at the relationship between wind speeds and pressures on buildings, but so far as what to do in designing a building or actually figuring the wind loads on buildings, I don't think much had been done. It was a pioneering effort in the area or the field of wind engineering. Furthermore, it was a pioneering effort here at Texas Tech, because there had been no research done in civil engineering to speak of here, a little bit in water

resources, but nothing in structures or wind engineering area. So—and that group of young faculty, that was primarily doctors, Mehta, Miner, McDonald, I think you've talked to some of them, and myself and Richard Peterson over in geosciences.

AW:
I've talked to Dr. Peterson.

EK:
But they—that group of faculty in civil engineering hung together for twenty years—nearly twenty years. It was 1988 when Dr. Minor left and he was the first one who left and of course Mehta and McDonald both finished their careers here as I have done. So it was a—it just continued to grow. I'm amazed today as I looked in the literature at the number of publications that were done by that faculty here and referenced in the literature. It's been a very rewarding and marvelous experience. Each of us took different areas of responsibility. Dr. Mehta had a long history of involvement and achievement in the building codes area. He was chairman of a building codes committee, first in American National Standards Institute and later became a civil engineer over at ASCE, the American Society of Civil Engineers effort. He stayed active in that throughout his career, guiding building codes, and made tremendous contributions there. Dr. McDonald became active in the nuclear regulatory commission in designing nuclear power plants for wind resistance and stayed with that pretty much throughout his—or continued to contribute to that throughout his career. Dr. Miner pioneered in window glass design because the one thing that gave a start there was a hurricane that affected the city of Houston, and a lot of window glass was broken, and the wind speeds were less than the designed wind speeds for window glass, so he started researching what's causing these failures and what can we do about it, made tremendous contributions there, led to the creation to the glass research and testing laboratory here. So he made tremendous contributions there. I was interested in the housing area, and took special interest there. Again, opportunities were just laid in our laps because we—that report for the Lubbock tornado got some traction and so we started doing post-storm documentations—

AW:
In other places?

EK:
In other places. We've now looked at about 175 major storms, I think, and documented damage to them, and y'all have that—

AW:
I just got a list in fact a couple of weeks ago.

EK:
Big job over your head. So we started documenting storms, and I believe it was 1972, tornadoes hit Hubbard, Texas and Burnet, Texas the same day, probably the same tornado or storm cell. And I went with a team and went to Burnet, Texas, and there was one house that we visited that had the roof blown off and two or three walls destroyed but right in the center portion of that house, in the kitchen, was a pantry, a small pantry that still had all four walls standing, and I don't remember for sure whether it had a door on anymore and a roof—but anyway, that little pantry would have provided some protection for people, but that's when the concept of the above-ground shelter came into focus because we reckoned that one could very economically—in a small room like that—harden and stiffen the structure to provide a high degree of protection for very little cost, and so that was the birth of the concept of the above-ground storm shelter. The first publication of that was 1974 in *Civil Engineering Magazine*. We developed some models—we knew nothing about—we could handle analytically the design for the wind resistance, design to resist the wind-induced pressures, but that was a structure's problem, and the structural engineering is well-developed, but we knew nothing about the debris-impact resistance or what the criteria should be, so one of the early jobs was first of all, to determine what is the wind speed in a tornado, what's the maximum wind speed, and that team that I mentioned pioneered there again. I looked at those damaged structures, and they could figure out analytically what wind force would have caused the damage that was caused or if there was little or no damage, the wind speed was not above a given amount. So they came up with recommended design wind speeds for tornadoes and then looked at the kind of debris that's generated and where it came from, what its speed must have been and came up with a design criterion for debris impact resistance. And that was developed pretty quickly after we got started and those criteria have remained intact and still use pretty much the same criteria today. So those were some of the earliest contributions of the Texas Tech people. With the debris impact resistance, we couldn't handle that analytically, so we had to do some testing there and didn't have a way to launch those missiles. First attempt was here on campus and we put some guide wires down the tallest building on campus, which was architecture, and did some drop tests of two-by-fours on—built some typical wall sections or beams, set them down at the edge of the building, and through guide wires dropped two-by-fours on that wall section and learned a lot about debris-impact resistance and what would work and what wouldn't. We couldn't get the design speed there—

AW:
Yeah, because it would only get to go so fast because of gravity.

EK:
So we added some mass to it to give us the same energy at impact. Turns out I don't think that's a very good—

AW:
Doesn't equate?

EK:
No, doesn't quite equate. It taught us a lot about what would work and what wouldn't, and finally we built some models over in the lab, plywood models, basically. Didn't have doors that would work so we created a sliding door that would be missile impact resistant. Finally, I think Dr. McDonald and Dr. Smith from over in industrial engineering, Elton Smith developed a launcher in the laboratory for launching the two-by-fours, so now we had a test process that we could use and it was used extensively. So we developed this model or this concept of an above-ground storm shelter and tested it. Through the years, developed several model designs for storm shelters, and those are still used today. They're pretty much the ones that are in the FEMA 320.

AW:
Yeah I think—I've looked at that before, trying to think about how to retrofit my old 1950s house in Lubbock with one.

EK:
Well, it can be done. Probably a better alternative today is just buy a manufactured shelter and set it in place, it'd be less expensive than trying to modify your existing building, but it could be done, certainly. Through the years, we developed a number of designs, looked at building materials that are most commonly used such as concrete blocks for example and developed a design using concrete block, reinforced concrete though that's not used very much in residential construction, and then that plywood model. It took basically five layers of three-quarter-inch plywood to make sure that we stopped that missile. And that made an awfully thick wall and was very labor-intensive to build, so we substituted instead of—started using a layer of steel plate and two layers of plywood and that made a thinner wall and more economical. And that's still one of the designs that's in FEMA 320 today. Those designs have been modified to be larger than what we originally designed and done more sophisticated structural analysis on them using finite element methods. So a lot of development has occurred there, but FEMA has really gotten behind it now. The concept was pretty well dormant because even though we had some model designs and we let a few people know about them and a few people built shelters, but we had no way of really communicating so the concept was not well-known until 1997, when the Gerald, Texas tornado hit. And that's just north of Austin, you know where Gerald is. That was a rural subdivision that was affected, and even Gerald does not have a building code so much less the little rural subdivision out there. Houses were very, very, poorly built, lightweight houses, and most of them—or virtually all of that houses—were destroyed, and most of the people who were at home were killed in that tornado, so it got national visibility and Dateline NBC went to Gerald, Texas and did a documentary and met up with some of our researchers in the field and said, "What could have been done to save these lives?" And were introduced the concept of the

above-ground storm shelter, so they came to Texas Tech to learn more about it and filmed the debris impact test facility and that was good for their television ratings because it was very photogenic. So they included that in their documentary a little bit on the above-ground storm shelter and did demonstration tests of debris impact resistance and put that in their documentary and that got national visibility then for the first time for the above-ground storm shelter. FEMA saw the public interest that was generated after that many television stations came to Texas Tech and filmed the debris impact test facility and talked about above-ground storm shelters. So with the help of the media, things really got moving then. FEMA saw the public interest and saw the wisdom of doing more there and published the first edition of the booklet, FEMA 320 and included those prescriptive designs that I was talking about there. So that gave a big push to the concept of the above-ground storm shelter, but that was not until 1997—well, 1999-98 when that first edition of the FEMA 320 was published. Then in 1999, a severe tornado hit the Oklahoma City area. The first shelter incentive grant program was implemented there. So now we had a program to partially fund the shelters, created demand for them, and had a design guide in FEMA 320 to guide the design of the storm shelters. They required that in order to receive funding in that shelter incentive grant program, that the shelter be designed by a professional engineer and had a and had been tested for debris impact done at Texas Tech. If you build according to those FEMA designs, then they didn't have to have it tested. But if it was—now demand was sufficient to track some manufacturers of shelters, since their prescriptive designs were not published, they are approved—they had to be tested at Texas Tech for debris impact resistance and have and engineer's seal on it. Well, we asked for design drawings when we tested something because we needed a record of what we had tested, and furthermore, looked at those designs and most of them left much to be desired because for the first time, engineers became involved in housing design with storm shelters. Very, very few architecture engineers were involved in housing design, much less did they know anything about storm shelters for those increased criteria. So there were a lot of problems. There were some pretty conscientious manufacturers who obviously were trying hard to do the right thing so we called a group of them together I guess in 2000 and asked, "What do you think we can do to improve the quality and consistency of the shelters?" and that was the birth of the National Storm Shelter Association. So the first meeting of those people was held here at Texas Tech and formed the National Storm Shelter Association, had a lot enthusiasm, about twenty people, I guess, that were engaged in one way or another in the business and formed the National Storm Shelter Association. Our objective was simply to foster quality in the storm shelter industry. That has become a pretty vibrant organization. I've spent virtually my career developing then the storm shelter and the National Storm Shelter Association, and we've come a long way, and I think have a very good program today not only to test and look at the design of storm shelters to assure that they're in compliance with the standard, but then we put a seal on the shelter, an NSSA seal, that tells the consumer that this has been tested and verified to be in compliance. So I think that's going very well. My involvement continues to be with the National Storm Shelter Association, so that's kind of an

overview, and I ran off this—it states simply the history and the steps that I just talked about on the storm shelter industry.

AW:
Couple of questions. One is—and you and I talked about it I think maybe before I turned on the recorder, and that is it struck me as something very interesting that several of you from different parts of the university have worked together for a long time and very successfully. I did some interview a year or two ago with people who'd been part of the electrical engineering department at Tech when they were doing the Crosbyton Solar Project, which was very interesting, and at the time when that department had some—I don't know if you want to call them rock stars in electrical engineering—but some pretty well-known people. It's quite a different story, organizationally, for that experience versus what has transpired and lasted over here. What's the difference?

EK:
That's a very good question and I think you're very astute to recognize that. I think the relationships among the faculty is what did it, that core of people in civil engineering hung together, they cooperated, they had a high level of trust, and worked together very, very well. They covered for each other when they needed to be absent and so forth. Electrical engineering, Russell Seacat was the chairman for a long time, and he was revered by his faculty. But I—and I was—he was chairman of electrical engineering while I was chairman of civil engineering. I always viewed—and this is simply a personal opinion—I always viewed the electrical engineering department not necessarily as a team, but as a group of highly capable individuals who simply were collected there. I saw little interaction or cooperation among the faculty, but they had some real, as you pointed out, real stars over there. Sharp people and they're still the same way, attract very good people. But I never saw the teamwork there in electrical engineering that I saw in civil engineering, or not just civil engineering, but other people, particularly with atmospheric sciences joining in. So it became an interdisciplinary team, but they hung together for twenty years and then some of them forty years. Mehta, McDonald and myself stayed here, Minor was the first one that left in 1988, so that was nearly twenty years. And he went to University of Missouri Rolla and started a program there, particularly in the glass testing lab, so he continued to make contributions. But I view that as the difference. We never had, at that time, never had the—some of the tensions or controversies in the department that electrical engineering did.

AW:
There also seemed to be a lot of tension between electrical engineering and the administration. And that—at least electrical engineering people report that, the folks that I was interviewing. A lot of that had to do I think with fundraising and who controlled funds once they were raised. Did you run into that—something you've had to navigate through?

EK:
Somewhat different philosophies, yes. I remember when I brought Joe Minor here. Joe Minor was a research engineer at Southwest Research Institute, and that's where I got acquainted with him. He was the first person I hired when I became chairman. He did not have a PhD, so we were able to attract him here to Texas Tech because it gave him the opportunity to work toward a PhD and he went all the way from instructor and research associate to a Horn professor in his career here in a pretty short period of time, so he was obviously a capable person. But then when it came time to hire him into a tenure-track position, I ran into some opposition and primarily from Russell Seacat in electrical engineering because they didn't want—they didn't think we should hire our own graduates. So we had to overcome that, Dean Bradford supported it and allowed us to do that. But again, I view the same basic difference as in the philosophy and then the teamwork, I'm a strong advocate of Stephen Covey's work *Seven Habits* and he points out reasonably, I think that effectiveness depends upon relationships, and relationships are based on trust. That is so evident in this team of people in wind engineering, particularly in the civil engineering department, that core of people, because the trust level was so high and they cooperated so much with each other, whereas I always viewed electrical engineering as simply as collection of highly-qualified independent people that did not—

AW:
They were a little bit competitive within their department.

EK:
I believe so.

AW:
That's what I picked up.

EK:
One or two giants there—Marion Hagler was always a sort of a leveling agent and he was very successful. Christianson and some of those people were very independent and oftentimes critical of each other or the administration. That's the difference that I see. I think today different situation. I think I'm just so impressed with the faculty that we're attracting to Texas Tech. When I came to Texas Tech and started teaching, there was one PhD in the college of engineering. Well, I guess Dean Bradford, but he wasn't teaching. But Gus Oldberg, over in chemical engineering was about the only PhD we had, and gosh—

AW:
That's a huge change from then to now.

EK:
Right. So I think today we're attracting very, very good faculty, and I believe that our faculty compares favorably with just about any in the country and have retained, I think, a whole lot of the pioneering spirit, willingness to work together more than is true at a lot of places. Tenure and promotion policies have a lot to do with that, because we place so much emphasis today on publication and on research dollars brought in. You mentioned earlier, did I experience any pressures? Yes. In the early days, I—since we had no research, we put a high premium on research proposals and what you generated in that regard. I remember some graduate reviews when we were severely criticized for not having enough publication in the refereed literature. But you can't publish refereed publications unless you have something published, so we had to develop a research program before. I remember some criticism from the graduate dean and others about our rewarding people without a lot of research dollars and so forth. Mentioned the Crosbyton project, that of course led to a big blowup because one of the young rock stars there I think had federal money that was probably—received some political favors to get that funding, and again, I'm speaking my personal opinion here, but I think he took advantage of that and essentially defied the administration because he had—

AW:
Had his own money.

EK:
Had his own money and had what he felt was a mandate from the federal government to do research and did it his own way, and I think offended a number of people and that led to his dismissal from the project and then Russell Seacat had such loyalty to his faculty that he resigned from the chairmanship of civil engineering over that. So I think that was a real landmark event so far as electrical engineering is concerned.

AW:
There's no question about it, and that's a landmark event. And also, the other thing that strikes me about that that's different about the story here is that the—it also, it rose and fell based on the outside political climate. In other words, one of the things that I picked up on is that they were dealing with DOE, which had only part of part of the people in DOE were interested in distributed generation. Many more were interested in generation in large solar forms, or as we see today, the difference between wind turbines and wind farms, versus everybody having their own turbine or every farm having their own turbine. So when their—it seems like they lost that external avenue as well—

EK:
Yeah, I think so. It's a good analysis. I could not see the efficacy of that whole approach because I was interested in solar water heating and built some houses with solar water heating and

passive solar energy. And to me, that was sensible because it's very inexpensive, very little capital outlaid to begin with, and not very sophisticated equipment, had a good supply, good storage for the heat and the water heater, very economical and competitive, and use it year-round. So I could see the effectiveness and the efficiency and cost, low cost of solar water heating for example, whereas that was a terribly expensive process over there to build that sophisticated equipment—

AW:
Very complicated, it seemed to me.

EK:
Focus the energy on a collector and then boil water and produce steam; all of those steps were inefficient and I just could not see that. I remember talking to the principal investigator of that project about that and how can you be competitive? He says, "Well, we can't today, but if you look far enough down the road, it might become competitive." I think at that time, they were saying it could produce electricity for twenty-five cents a kilowatt-hour or something like that, and you could buy it commercially for six.

AW:
That's a lot of difference.

EK:
He was right, he said, "If you project far enough into the future, it might become competitive," and yet I think it probably lost local support because I think those people over at Crosbyton expected they were having a low-cost energy supply. And it was not going to supply a big percentage of their energy, and it wasn't going to be very economical. But I'm amazed today to see some huge, huge solar farms doing just that. They usually have movable mirrors rather than—

AW:
That's pretty complicated, too.

EK:
But they have a large array of mirrors focusing sunlight on a collector to produce hot water, to produce steam, to produce electricity, and I'm amazed that that has caught on the way it has. It must be more competitive than I think it is.

AW:
I don't know much about that. There's another analogy that strikes me though, and that's the difference between the wind farm generation of electricity versus distributed generation. The

comparison to the shelters that you've researched and developed, and you're talking about each household having a shelter versus having a community shelter—

EK:
Yes.

AW:
I guess the first thing that really made me think about the difference was when I was interviewing co-op, electric co-op managers, who don't like wind farms, but are not at all opposed to distributed wind because of the effect that it has on the operation of their business, that they can—if an individual has wind energy, they just—that affects really only their usage, not whereas if the farm turns on and off, it has an enormous impact, and I was thinking about the idea of your shelters. If individual homes have them, then you have a very different cost to a community after a disaster than you would if you tried to do it on a community-wide basis.

EK:
There's a lot of interest now, just recently in community shelters. And of course, the whole concept as we've talked about, of the whole emergence of the shelter industry has been in the last couple of decades, because until about '97 or '98, there just wasn't much going on. Now, particularly with the events in Moore, Oklahoma last year and some kids being killed in schools, there has been a lot of interest in community shelters, particularly for schools. So we're seeing a surge of interest in that topic. But I think you make a good point. I believe that housing improvements, innovation in housing, is most successful when the individual buys into it and takes responsibility for the quality and for the innovation itself. You can upgrade building codes and help the situation, and I'm an advocate of that, but there needs to be some incentive for the homeowner because otherwise simply trying to comply with the law and cannot see the benefit to himself of making the capital investment to improve the situation—if you can convince the homeowner that it's a good investment on his part and he becomes personally involved in the improvement innovation, then I think innovation will succeed.

AW:
Has your—throughout this time, have you given any thought to adding to your team of people from social science to look at those very issues?

EK:
Indeed. In fact, you make another very good point, because our problem right now—we know a lot about improving buildings for wind resistance and how to protect people, but implementation is the problem. So I think we have a need for social scientists to tell us how do we motivate people to implement what we already know? And I often draw a comparison with the automobile industry because I hear a number of reports that so-and-so was killed in a rollover accident, they

were not wearing their seatbelt. Here's a technology that they already own, that they're sitting on, and yet killed themselves because they did not utilize it. So it's not surprising that people would not spend several thousand dollars to build an individual storm shelter because they think the chances are small of being hit and they're correct, and furthermore, even if they are hit, few people are killed. We kill four, five, six hundred people a year in storms—

AW:
And that's—do I remember—am I remembering correctly that we kill as many or more from lightning?

EK:
Yes, that's correct. Many of them were rom lightning and furthermore, we kill over forty-thousand people a year in traffic accidents, and yet—

AW:
Half of those involving alcohol.

EK:
Yeah, and yet when you realize that somebody is sitting on a technology that they already paid for and is very reliable and don't use it, it's not surprising that they are having trouble implementing storm resistance.

AW:
When you were growing up, did you have a storm shelter?

EK:
Goodness, no. It's a miracle that I survived. We lived in an old house, frame house that was literally—it didn't even have a foundation. It was sitting on big stones. The house must have been fifty years old when I lived there, it was just a shack, very substandard. They simply put a wooden beam on—set it on rocks and built a house above there. It wouldn't have taken any kind of a tornado to totally destroy that house, yet the whole family grew up there. So, no, I had nothing then. It's a miracle—speaking of seat belts—it's a miracle in several ways that we grew up because I had children by the time we did my doctoral work at Michigan State, and we often drove that with the kids, somebody sleeping on a pallet in the back of a station wagon.

AW:
I don't know how many miles I've made on one of those pallets myself as kid. For some reason, growing up around—we lived on a farm north of Slaton when I was smaller and we moved to Lubbock later on. We had a storm shelter. The first thing that we did when we moved to Lubbock was my dad dug a storm cellar in our backyard. And I—and I don't know why it was

just a thing in that community that everyone had either a root cellar or if it was just as storm shelter, they'd call it a "fraid hole" or whatever. But it was almost like it was a custom in that area. I've often wondered how did that custom come about and why have we lost it here in town. Since I've been back in Texas after moving back here, I've never dug a storm shelter in my yard. I've never done the things I grew up with, so the whole notion is very interesting.

EK:
Well, it is interesting. Again, implementation is a problem. I think it was very common—I didn't notice as much in the San Angelo area, but my wife is from the Wilbarger County down in Vernon, Texas and people there all had storm cellars. Some more sophisticated than others, but it was more common there. Children hated them because they were fraught with snakes and spiders. Then more advanced families would either put a basement in their house or build a concrete-lined storm shelter. We still see some of that today. But it is interesting how a concept catches on in a community because there are a couple of weathermen in Oklahoma that have said that the only safe place in a tornado is underground, so the notion of an underground shelter is dominant in Oklahoma. In doing post-storm inspections we find that probably well over half and probably three-fourths of the shelters that are there are underground shelters built through the years. Some people still say that's the only safe place, much to my chagrin because I spent my career developing the above-ground storm shelter and making sure that it's safe. FEMA has put a lot of resources into that, into the safe rooms or above-ground storm shelters. But despite all of that, some are still saying—and some people still feel that that's the only safe place, is underground.

AW:
Well, they've never had to dig somebody out after a tornado, you know? If you can survive one underground, but you could also be in that thing for a long time.

EK:
That's right. There are other disadvantages. The making it ADA compliant and wheelchair-compliant is a problem, so that's one of my major concerns with an underground shelter. I realize you can build one to provide safety, but I'm getting to the point where stairs are harder and harder for me to traverse. We know of one situation and more for example where a family had an outdoor, underground storm shelter in the back yard or somewhere, and the family went to it, but the mother and her grandmother chose to stay in the house because she could not traverse the stairs. They all made it, she was fine, but I think that's what we face. First of all, I favor the storm shelter that you can reach without going outdoors, because if you even have to go outdoors to get to it, it's not a complete solution. It may take a greater—if you don't go early enough, you can face a greater risk.

AW:
In fact, I think we had two fatalities here in Lubbock in '70 between the house and the storm cellar in the country club addition.

EK:
That's right. I don't know for sure where she lived, but when—Mrs. Kulp, her parents lived here in Lubbock, I believe, and they had—one of her parents at least was killed because they went to the back door to go out to the cellar and just as they were leaving, the wind caught them and killed one of them at least. So yes there—so I am a strong advocate of building a shelter. And even today, this idea of an underground shelter, University of Oklahoma president just recently let out a request for a proposal to design shelters to house all of the University of Oklahoma population. Specified, I think underground shelters, and I think probably a lot of advices prevailed and I believe they're now doing a study—in fact, Dr. Smith here is involved in the study of determining the level of safety of existing buildings on the University of Oklahoma campus because most campus buildings would provide a pretty high degree of safety or have a place of refuge within them. So I think more studies will be done, but the first letting of the notion was that we're going to build underground shelters on the University of Oklahoma campus to house the whole population. It can be done, but that's an expensive situation, making those accessible and ADA-compliant and so forth is a real challenge because you just about have to have a very, very extensive system of ramps or elevators with an auxiliary power source that makes them available and so forth.

AW:
Yeah, because that's the other issue, you know you're going to be without power if it's that big a storm. Hardly any community has underground wiring and you still have above-ground generation and transfer stations.

EK:
So it'll be interesting to see what happens there, but that notion of being underground again has infected—the administration at the University of Oklahoma.

AW:
We did a—art and music project one time that I was part of, the precursor to the Buddy Holly Center, the art center over on Avenue P, just off of Avenue Q. I think at one time it was a Girl Scout building, a really old building, but we paired up musicians and artists to do a thing about when the storm comes, what's—because the tornadoes are such a ubiquitous part of the culture out here. More than one of the art pieces had to do with people who weren't about to go underground—because it was something that never occurred to me, having grown up in a farm household where we didn't ever think about—we went down when the storm came up, but how—what a number of people, how big that number was of people who were more afraid of

going down underground than they were staying up top. So I think that's kind of interesting. What do you see in the future, especially now with the sort of attractiveness of the wind turbine and wind generation for energy as being part of the wind institute, the wind program here?

EK:
Well, the wind program here is kind of fragmented because there is a wind energy component and a wind education component and then a—sort of a disaster mitigation component. The National Wind Institute headed by Don Schrader has—his interest, personal interest, is primarily in mitigation of extreme winds, wind characteristics and so forth. Andy Swift of course has the energy education and that's going well, he's housed in this building, too. He's an associate director of the National Wind Institute. But then there's a lot of effort in wind energy that's not focused here—

AW:
You mean on campus?

EK:
Yes. And again, I'm stating some personal opinions here from observation that should not be published, I guess, but I think we made some strategic decisions—we went to the state and asked for a large appropriation for wind energy and got it, eight million dollars, I guess. That had the provision that we have some new faculty hires, but also stated that they needed to be from out of state. I guess the intent was to attract new talent—

AW:
And not rob A&M and UT—

EK:
No, I think probably just to attract new talent to the state, and that sounds good. But now what happens when you hire a high-powered faculty member, pay them half as much as any of the most capable people who are here and then just simply plunk them down at Texas Tech. As I said before, effectiveness depends upon relationships and how can you expect that person to be productive if he has no relationships, no acquaintance with the faculty, and there's some perhaps jealousy to start with because they're making more money than anybody here is making. And we've hired some of those people—I don't know what they're doing, frankly. But they have good funding in the wind energy area and probably I think the one person that I know, the first one who was hired has an interest in fluid mechanics and doing wind tunnel work and so forth, so I'm sure good science is developing, but I see little interaction with other faculty here, and I don't know what's going on. So I think we've kind of shot ourselves in the foot to some extent, had very, very good funding. With the mitigation area, it's just the other way, we had good funding for many, many years, Dr. Mehta was very effective in promoting research, had

contracts with the National Science Foundation, had the IGERT program which funded the doctoral program. For ten or twelve years there, we were working hard to simply perform on those big research projects and we did not prepare for the day when funding would end and had nothing to replace it with, and that's even plaguing us to this very day in terms of the doctoral program, because when we had the IGERT funding, we brought in four or five new doctoral students a year, paid their stipends for three years probably, and faculty didn't have to worry about hustling money for them. But then when that IGERT funding stopped, the faculty is basically expected to hustle the research to bring them in. But the faculty, as I see it, by and large, cultivates a graduate student through undergraduate school and has relationships with them and attracts them into their programs, so they're still doctoral programs in civil engineering and mechanical engineering and atmospheric science and so forth, and the faculty are more accustomed to attracting students and supporting those students than they are of accepting a wind engineering student from afar that they don't know anything about. So I think that program has some real challenges to survive and prosper. I'm sure solutions will be found. Again, I think the whole picture of wind here is kind of fragmented at the moment, with some people with good funding in the areas that our faculty has not been working with. We have outstanding facilities, again, thanks to Dr. Mehta largely because he focused a lot of the money out of the—we had the large line item that was run through NIST—National Institute of Standards and Technology—and he intentionally invested a lot of the money in facilities and most of it out at Reese because he said that would give us the capability to do research that we wouldn't have otherwise. So we have outstanding facilities for wind engineering and wind science. But I don't know what the future is. I think certainly ways will be found to capitalize on that. I believe there is widespread acceptance and enthusiasm for Dr. Nellis, the new president, and just I guess this month, hired a new vice president for research, so it will remain to be seen how that goes, and the chancellor's announced his resignation, so that's going to be an impact. Off the record I guess, I think Chancellor Hance has been superb in fundraising and so forth, but maybe a little bit too hands-on insofar as running the university and designing programs. So I think we're going to see some changes there.

AW:
Yeah. I don't think I've ever heard anybody talk about the chancellor except in those terms. I mean, seems like a constant issue with what is a chancellor's role, and I think a lot of—when they go out to find chancellors, those are people who are pretty dynamic in terms of running things. It's an issue. The other thing that I was curious about, and just your opinion, I don't know if there's any fact that can be applied—it strikes me that wind is—wind energy is—I don't want to say a fad, but there's a whole lot of popular interest in wind energy that—I've been doing some oral history interviews in wind energy as well. I guess I was like everybody else. I thought, well this is a no-brainer, this is something everybody wants to do and we should support it, until I learned about the difficulties, particularly in how to integrate that into the grid system and also the difficulty in engineering, particularly those large bladed turbines for reliable long-term

functioning. I was really shocked at learning that some of the—particularly the earlier wind farms—the percentage of downtime that they had not related to wind, but related to the turbines. I wonder if it's—you get into trouble hooking your wagon to the star that's a comet and not a star. So—but on the other hand, it strikes me that you and Dr. Mehta and McDonald have built a program that does have a really great legacy of teamwork that maybe will prevail. Am I being too optimistic?

EK:
No, I think not. It's a little different situation with a mitigation area, I think that affects the individual, and it's easier to get people involved in that with the energy—energy area with wind energy. You have to compete with people simply being able to turn on a switch. Furthermore, I think the economics is not altogether sound. That is, I don't think we would have seen the resurgence of—or the burst of interest in wind energy had it not been the federal supplements, I don't think they could have competed otherwise.

AW:
I think there's no question about that.

EK:
When the supplements are gone, it's going to be questionable—

AW:
And plus, we're in a period of time and what looks to be an attractive period of time of very low natural gas cost.

EK:
That's right.

AW:
Which makes generation through that really cheap.

EK:
So I think there are questions about—and I can't imagine what's going to happen twenty years from now to all these windmills that we're seeing, because they don't have a life of that period of time. Just talked to a doctoral student here a week or so ago who's working at—and we had a seminar by a doctoral student that's working on sensors that would look at the wind surges coming in—

AW:

To affect the torque flows on the—

EK:
Exactly, and would rotate the blades and so forth to minimize the wear and tear on the windmills—it's complicated (laughs). I think he said that right now, the value of that addition is forty thousand dollars or something, and if successful, it would extend the life of the blades, and I didn't realize the longevity of the blades was that much of a problem, but I think they're starting already to experience some failures of the turbines and the blades after only five or ten years. So I think the reliability and longevity of those is going to be a problem. Distribution and storage of energy is always a problem. We've seen that tremendous surge of interest down in the area all the way from Post, I guess to Ballinger, that whole corridor through there. And I think that's because a power company was far-sighted enough to build transmission facilities and connect it to the grid.

AW:
I did several interviews with some of the earlier Cielo Texas company that was not a utility, but did those first lines down there and you're right, that having a place to connect was—

EK:
I think there is an area up here in the Panhandle that has better wind characteristics than they have down there in Central Texas for that. And I believe they just are now—that's what T. Boone Pickins was trying to do—build a transmission facility, but he coupled it with water transmission and that did not sell very well.

AW:
No, and I heard him talk a little over a year ago in Amarillo, and he'd already abandoned both wind and water for natural gas. He made—of course, he's a convincing person—but he made a convincing argument about the extensive supplies that we have in the United States of natural gas, and about how it could be used in fueling truck fleets, and the idea that people would drive cars, but over the road to hauling and that sort of thing. And then in the wind energy, I can't tell you how many wind farm projects on the books are waiting for the completion of this scheduled switch at Clovis, you know, where it takes the power in from a wind farm and can then send it out to the different grids, it doesn't all have to stay in ERCOT or the Southwest Power pool, that they can actually move it because they convert it to DC and then back to AC. But having that connection seems fundamental to the economics of these wind farms here in the Panhandle.

EK:
I'm not close enough to that to really understand or predict the future there, but it's a very different situation with the mitigation aspects and with the—seems to me that that's little question about the economics or the continuing demand for it, whereas with the energy, I think

we have to continue developing nuclear energy from what little I know about it, but we've undergone some tough times here in the States, but I believe that's coming along faster again now if we don't have a big problem—

AW:
Another disaster? Yeah, it's—I'm with you. Seems like it makes sense. Let me ask you one—well, first of all, is there something I haven't asked you that I should have?

EK:
Well, I feel kind of guilty because I've been very selfish in talking about storm shelters—

AW:
No, no, that's great.

EK:
That's my area of interest, and that's why I've dominated—but since I was here from the beginning with the wind engineering program, I am willing to talk about other people's interests, too, and certainly people that have made tremendous contributions in the areas that I've talked about, so I'm willing to talk more about those if you're interests cover that. I feel I have kind of let shelters because that's where I've spent my career.

AW:
Well, but that's what you should be talking about. Now, the question I had was, what got you interested in engineering coming off the farm?

EK:
I tell you, I'm almost embarrassed to tell you—I look at my whole career, whether it's being in engineering or coming up with the concept of the above-ground storm shelter, or any success I've had is simply a gift from God. That is, I think, the good Lord just laid the opportunity in my lap. Who would've thought that I would've ended up in engineering, or that I would've went to work for Mr. Murdough as an undergraduate student and graded papers for him, and he would offer me a job to teach that would've led to a career. But the way I got into engineering—I saw that school bus go by and my dad went with me and we went up to the junior college to talk to the fella, and a guy named Burl Abel was the dean of students then he later came to Texas Tech. Told him I wanted to enroll, okay, he would help, What are you going to major in? "I don't know what I want to major in." He said, "Well, we've got a pre-engineering program, why don't you try that? Are you pretty good in math?" "Yeah, I'm good at math." "So why don't you try the pre-engineering program?" (laughs) So I did, and I've never looked back. Came to Texas Tech, didn't know which branch of engineering, but again, mechanical engineering kind of appealed to me because I was interested in automobiles and modifying them, so I majored in mechanical

engineering—then I would do a lot of things differently, I guess, if I'd planned it and had to do it over, but then again, visiting with Mr. Murdough that weekend and being offered a job to teach and that leading to a career coming up with a concept of the above-ground storm shelter, I didn't make a whole lot of post-storm visits with the team, but in those early days I did go with them when we went to Burnet, Texas, and that's when the inspiration for the above-ground storm shelter occurred. So all along my career it just seems to me—I thank the good Lord every day for the way he's led me to opportunities and blessed me along the way. Marriage, the same way, had an aunt living down in Vernon, Texas, and in her congregation was a young lady that was coming to Texas Tech as a freshman, and I was coming here as a junior, so she—since she was my aunt, she was acquainted with me, and she was acquainted with this young lady in the congregation and said, "Y'all ought to look each other up." And we did and I couldn't ask for a greater blessing there. So I can't take much responsibility for any planning in my career, simply had opportunities laid in my lap and took advantage of them. It's just amazing. So I'm not a very good advisor for young people.

AW:
Well, you know, recognizing the opportunity is a big deal. I think most of us have lots of opportunities, but recognizing them, it's a big part of it.

EK:
And I guess again, a couple of things in the Covey philosophy that means so much to me, one of them that I've mentioned that relationships depend upon trust and trust—or, effectiveness depends upon relationships and relationships on trust—trust and trustworthiness, that's developed by repeatedly practicing good habits and being reliable. So I think that has probably helped me more than anything in terms of my effectiveness as an administrator, and I'm proud of some of the achievements there. But simply being able to relate to people, I guess, has been—it's certainly (laughs) not my intelligence or my cleverness that led to any success, I think simply trust in relationships and the ability to relate to people. The other thing in the Covey literature that means so much, and if I had anything to change I would change those things, but it's this balance between production and production capability. Long-term effectiveness depends upon not only the productivity, but maintaining that productivity over a long period of time, and I've neglected that. I've spent virtually my whole career doing things and have not cultivated my personal technical development and so forth. The other fellows in this team went the other way, and in the early years, I took the easy way out, so to speak, and I said, I'll manage this department, and I'll do the paperwork and stuff for the department, you guys do the research and the technical work and the publications. I think it worked out well for all of us, but I did not maintain my expertise, I do not have the publication record that some of those people have and so forth. And that's simply because I guess I felt more comfortable in doing the paperwork and the stuff that I knew how to do than to invest a lot of time in the other. But we've made tremendous progress for that twenty years here. The things that I'm most proud of—first of all,

of course, the whole wind program because that started right after I came to Texas Tech as chairman of the civil engineering department, just within the first year. That went from zero to an internationally-recognized program, and I can't take credit for that, but I was here when it began, then the Murdough Center, the Murdough program for ethics in engineering began here, and I—Jimmy Smith was a member of our faculty, he got caught up in it—in fact, I guess you could say he precipitated that flare-up in electrical engineering. He was acting dean at the time. We developed the Murdough program for engineering ethics, the dual-degree civil engineering-architecture program was developed during that time. So all of those programs have flourished and gained international recognition. So I'm—I look with a lot of pleasure on what's developed here at Texas Tech and having been a part of it and not taking responsibility for it but being a part of it along the way. So I can give good advice to young people to plan and do these things, but I can't say, "Do as I did," because I certainly didn't plan all of that.

AW:
Well, if you wouldn't mind an observation—two observations. One is, it strikes me that you did develop the personal side quite well, I mean, I haven't heard anybody else talk about the idea of trust and relationship in teambuilding. The second thing is that what would be different in the story of [unintelligible] in that time period if they'd had an Ernie Kiesling. That just would be my observation, so I think—you know, the teamwork, the team is—if you believe in team, that takes putting yourself not out in the front—

EK:
Well, that's one of our challenges here at Texas Tech. I think that we really haven't made much progress in, is interdisciplinary research, because—and there's so many things tied up with that, but I think the emphasis everywhere is on interdisciplinary work because it takes input from multiple disciplines to solve complex problems, and yet we don't have very good policies or programs to foster interdisciplinary research, or interdisciplinary work. Our tenure criteria depends so much upon publication and individual effort, and they do not encourage necessarily cooperation, there are real problems with, say, assignment of student credit-hour assignments and so-forth, in other words, try to develop an interdisciplinary program and draw faculty from these departments and immediately questions arise as to who gets credit for this and how do we credit the department for it, so—and we can develop—try to talk to—for quite a few years in the doctoral program, a leadership course, and wanted it to be a—have an interdisciplinary nature so that I could better attract people from different disciplines to teach in that program, but rather than having than having them listed as civil engineering courses, the question always rises, what does civil engineering have to do with leadership? Whereas if it had been an interdisciplinary course, I think we could've attracted more faculty and more students. But there are problems with that, and it depends a lot upon individuals, particularly deans, as to whether they will work to develop policies to encourage interdisciplinary research or not. Right now, we have some deans who do and some deans who don't.

AW:
Yeah, it looks like the structure of contemporary universities with the idea of deans is pretty vertical, and teamwork takes pretty horizontal—

EK:
That's a very good statement.

AW:
But you know, Andrew Vernooy, who seems to be some of those who likes interdisciplinary things, suggested a book to me a year ago, and I'm trying to think of the author—starts with a B—it's one of his professors, civil engineering. The book is called *The Tower and the Bridge*, and it's about the development going from wood to stone and then from stone to steel, both in bridges, and then in vertical buildings.

EK:
That's interesting.

AW:
Well, the thing that really interested me was—I mean, we were talking about a concept that he had explored when he was at UT, which was it turns out in bridges and highway projects, the most efficient structures were the most economical and most aesthetic, and that they were all related, you know, that if you have too much money, you tended to build things that weren't as efficient and weren't as pretty. I thought that was an interesting notion. In the book, there was a lot of discussion about the teamwork between the analytical and the experiential side, about how people who had experience in building with concrete, for instance, craftsmen, that the greatest successes were where that was linked with the analytical side, but he was looking at it as an historic—as an historian—and I think there was a—and you would the Germans would be like this—but it was a European group that was all analytical, and then you had the Spaniards who were all experiential, and when they got together, they actually did better work. What you've been talking about in terms of teamwork seems to make a lot of sense in that you have those different points of view that when you add them together, you come up with something far greater—

EK:
Well, I had so many aha experiences, and I became a facilitator for the Covey Leadership Center and attended quite a few conferences there and read quite a bit of their material, and I had so many aha experiences that explained to me why certain things in the past had worked and why other things had not worked in my career, or simply in the university. But I think that one of the profound things is the one that we've talked about and that is trust needed to make teamwork work, and it's not just trust in major things like patents and so forth, but I think in an

interdisciplinary team, one is reticent to even express an idea unless there is trust in that team, because for fear of being ridiculed or put down or something else, so the matter of trust is probably more important than intelligence in those interdisciplinary teams. So I think one of the frontiers in our education is to cultivate teamwork and so forth. My—I can get pretty philosophical there, but I think the need for leadership education is great because we spend so much time throughout the educational process in teaching skills and techniques and so forth, and dabble a little bit in what I consider management, but almost no emphasis on leadership. How do you lead, and how do you manage a team like this? And that's what I think the Covey material does, is covers the leadership rather than management. In fact, I think the two terms are often confused because I think people feel as long as things are running smoothly, they're doing a good job of leadership, when really they may be doing a good job of management in making it run smoothly, but they may be going in the wrong direction.

AW:
Or going no direction.

EK:
So I guess one of the most rewarding things to me in my career was the participation in leadership education, and I just value so highly the Covey material there.

AW:
How did you get involved with the Covey—

EK:
Interesting again, the opportunity was laid in my lap. I was over here in the College of Engineering as associate dean for research, and tried to figure out what to do to develop research—we had a so-called research foundation, and I was directing the College of Engineering arm of that, trying to figure out how to lead in that area, and the announcement of a workshop came to my attention, and the Covey Leadership Center was doing a workshop in the Dallas-Fort Worth area, and I had just brought *The Seven Habits of Highly Effective People* book, and that's what this seminar was about, so I signed up and went to that workshop, and it was a fantastic experience for me. I had so many aha experiences in that workshop. So I became interested in the subject, and then that led to continued involvement in attending more workshops, they did a workshop on the principle centered leadership, for example, and that's another book that did the same thing, and families—for families and so forth. I studied it and became a facilitator—I don't know if you're familiar with the way Covey works, but he develops—that program develops a facilitator at a company and they furnish videotapes and stuff to that facilitator, but then facilitator is interested in—I mean, his challenge is to teach everybody in the organization.

AW:
I'm a little bit familiar with it. Don Dyal at the library has—

EK:
That never caught on here at Texas Tech. Well, it caught on somewhat. I did some workshops here, and Covey requires that you—that the organization buy into it, so I tried to gain some traction here. I finally got the dean of engineering to sign off and say, "yes, we'll participate," so I ran it more or less myself with permission from the dean of engineering and offered some faculty courses here, but I could not get the university to sign the agreement. I think there are always legal questions and always suspicion of anybody that wants to have an agreement with the university. I could never get the university to sign on to it. Dean of engineering finally did and I did a few workshops through the College of Engineering then. But did a workshop for the faculty and Carrie Billingsley—did you ever know her? I don't know what the department is called, but it's a department here at Texas Tech, not an academic department, just a department that's concerned with compliance with federal regulations and so forth. Anyway, she was impressed with the Covey material, too, and she approached Kent Hance and got an agreement for the university, and so she ran the program from there on and did quite a few things. But anyway, it caught on somewhat then at Texas Tech, but I—and I believe the College of Engineering—I mean, the College of Education is using the Covey material in several courses, so it has caught on more and more.

AW:
And I know Dean Dyal over at the library offers it on a voluntary basis for you if you're in the library system.

EK:
When? Lately?

AW:
Well, since I've—I'm trying to remember the last time I saw something about that—

EK:
That's great, because ten years ago or so I did a two-day workshop for the library for some consulting engineering firms here, so I've done a lot of teaching in that area and always found it very, very rewarding. I do not have the credentials in that area to make it attractive to the university to get involved, and then there's' also some competition from the college of business, one or two individuals over there who feel that their college has a monopoly on—

AW:
Management?

EK:
Management, but they consider leadership a subset of management. I see it just the other way around, but anytime I've tried to do something at the university level, I run into some opposition from there. I don't have the—they have the Hunts and other people over there with the credentials in leadership or management. So I never really amounted to much at the college level in teaching leadership, but I have taught once in the honors college a group of undergraduates, and that was very rewarding. I've taught that leadership course at the graduate level in the wind science and engineering program, and then taught quite a few workshops to different departments and groups on campus and off and always found it extremely rewarding. It's kind of reading the Bible—every time you go through it, you see a little different emphasis than you did before. One time, this idea seems most important, and the next time I do it, another idea seems most important.

AW:
I thought the Peter principle demonstrated that leadership was more important than management because managers get promoted to leaders and that's usually where the train wreck happens.

EK:
Another philosophical thing here at the university I think in choosing our leaders, we often use the wrong criteria. We look at the individual's track record for attracting research and writing publications and so forth, then we put them in leadership positions based on that, rather than looking at the productivity of the unit that they headed, what kind of leadership did they provide there. I don't know of any foolproof way to do that, but I think we have hired and promoted a lot of people to leadership positions that were strong personal leaders, but could not lead a group very effectively.

AW:
When I was in police work twelve years, and the last—or half of that time I was with a really brilliant organization at the time in Colorado that was new and trying all manner of—we would try something, if it didn't work, we'd get rid of it and try something else. And that was very unusual in police business, which was—tended to be very rooted in custom and what have we always been doing and that sort of thing. We required a college degree, which was also very unusual in the 1970s, but we found out very quickly that a college degree and the type of degree had absolutely no relationship to how good a police man or woman—in fact, if they—if you had to pick a degree plan that turned out the best cops, it was history, education, or English. The people who had specialized in law enforcement or criminal justice were absolutely useless, because the truth was, we didn't know much about those topics, they were just handy and—but a person who studied one of those other fields had a broader view of the world, and that made them a lot better cop. And it was a very interesting thing to discover, that what we needed was

not—in that kind of work, we didn't need a specialist, we needed a generalist. And we only found that out by going in another direction.

EK:
Well, I guess there's some companies that in hiring engineers, for example, they would rather have a person with a bachelor's degree than an advanced degree because—and they'll train them in what they need to know in terms of leadership, make managers out of them first and then leaders eventually. But that's very interesting.

AW:
Well thanks. I don't want to exhaust you or wear out your good graces, but it's been a great interview.

EK:
Well, I think it's the best interview I've ever had, I've really enjoyed it. I think I probably gave you a lot of stuff you can't use, but I really enjoyed visiting with you, and I've been impressed with your insights and depth of understanding.

AW:
I'm a good listener.

EK:
You're very, very astute. I've really, really enjoyed the interview and would welcome anything in the future. I—how can you use this?

AW:
Well, we—one of the—one of the great things about an archive is that you collect things. One of the bad things about the archive is that you just collect things. Somebody needs to put it to work. I'm struck by the fact that this experience that you and Drs. Mehta and McDonald and Minor and Peterson and others have had over here, somebody needs to write this down. I mean, and write it down not just in terms of just a chronological history, but in the very way that you've talked about it, in terms of the teamwork and interdisciplinary bent of getting atmospheric scientists together with engineers, various kinds, and seeing not only their interests, but the information and the skills they can bring to the problems, collect it. Because to me, it's more important, I think in the long run than the specific accomplishments—how ever important they are—the way that you came about them is really interesting. That's something somebody could learn something from.

EK:
Well, that's music to my ears. I so wholeheartedly agree with you that that needs to be documented because I think the accomplishments of that small team of people are just phenomenal. The longevity plus the teamwork is what is critical to it. I don't know who would read it, but there's so much value to having that—

AW:
Well, I think the people who would read it would be the people who are interested in teamwork and leadership as much as anything else.

EK:
In fact, it would seem to me some—everybody from new faculty to new administrators ought to be interested in that because I believe that a number of people in key administrative positions do not really understand the importance of nurturing teamwork and say holding a team together; they would tend to, again, collect a group of capable individuals without really a thought of—I believe that's happening right now with the hires that we talked about because they just hire the people with outstanding personal records and put them down here in the university without much thought or orientation or discussion of how—what are you going to do and how are you going to do it. So I think it if were read by administrators, it could be valuable.

AW:
Well, let's keep that in mind. I just finished one book project, and I'm thinking pretty seriously about doing something based on this. I started thinking about that in doing the electrical engineering interviews because it seemed to me like there was a brilliant moment wasted or missed, something that again, Seacat had taken something, made something out of nothing in some ways, but the—you know, there were flaws in how it came together that ultimately undid it, whereas the very first thing I saw here—well, I had—I taught in the honors college for a short time, of course on art and sense of place, and one of my earliest students was a young woman named Crystal Maker who got a joint degree in civil engineering and architecture and then went into wind engineering and is now working down in Houston. I remember her talking about the experience she had in getting a degree as an undergraduate in two different schools, two different—you know, entities. I thought at the time that that was interesting and very—if I were a student again, an undergraduate, I'd want to do something like that, where I had—had a chance to learn something in different areas, it all connected. That's a great story. That to me is something that makes a lot of sense and would be worth digging into.

EK:
Well, and I mentioned earlier that if I had to do over, I'd do it differently. I majored in mechanical engineering and I never used it and then got involved in civil engineering, but I guess if I had a do over, that dual-degree program is very, very attractive because it takes two different,

very different disciplines and merges them basically, and I think for a person who's interested in the building sciences area, it's the strongest degree in the country, I think because it's not an architectural engineering degree, it's different. It's both architecture and engineering integrated so that you can become registered as an architect or as an engineer or both. Vernooy's degree is in architecture—has a degree in architectural engineering and he's one of the most intelligent people I know. But again, I think the virtues of that dual-degree program are just outstanding.

AW:
And to me, it's an example. You can do—there's so many other things that we could do that way. And I just recall the name—Donald Billington wrote that book on *The Tower and the Bridge*. You would enjoy it.

EK:
I'll try to find it.

AW:
If you have trouble, I've got a copy that I'll be glad to loan you.

EK:
Billings?

AW:
Billington.

EK:
Billington, Billington.

AW:
The Tower and the Bridge. I'll send you the citation for it.

EK:
Good. Well, I'm intrigued by your insights and obviously deep insights into what goes on in a university and what doesn't go on. It's just been a very interesting and rewarding interview as far as I'm concerned.

AW:
Well thanks. I'm sure there'll be more things to cover as I get with some of the other folks, and I'm going to say thanks one more time and end this.

End of interview.