

An Interview with  
JUDITH A. LINDNER

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Conducted by Thomas J. Misa

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Abstract

Judith Lindner graduated from Northern Illinois University in 1968 with a degree in mathematics. Taking a job at Bell Laboratories in Naperville, Illinois, she worked initially in a computer-aided design group, doing assembly-language programming, and then in managerial positions including merit review and team recruitment. The interview describes Bell's affirmative action committees and workshops as well as its distinctive corporate culture.

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Misa: My name is Tom Misa. It's the 15th of December 2015 and I'm talking today with Judy Lindner. We're doing a set of interviews for the Sloan Foundation to try to better understand the experiences and careers of women who worked in the computing industry during the 1960s, 1970s, 1980s, and 1990s. Judy, I wonder to start if you could take us back to your childhood or education, maybe grade school or high school years. Do you recall any hobbies, or activities, or subjects at school that were of special interest to you that might have lead you toward the later pursuit of a technical profession?

Lindner: Sure. I loved mathematics, so that's always been a big part of what I enjoyed. And also, when I was elementary school age, I used to love to do a lot of these like encoding puzzles that you would get in crossword puzzle books. You'd have something that was encoded and you'd have to figure it out. So I always enjoyed that and you know I think that relates quite well to coding and logical thinking. My brother would be given models to make and he hated to make them but he loved to play with them. I just absolutely loved putting together these plastic airplanes. I loved the following of instructions and the logical putting of things together and I think that relates to computer programming. [Laughs.]

Misa: Yes. So you and your brother had a tag team there.

Lindner: We did. [Laughs.]

Misa: Were there other family members, or friends, or members of your community that took some interest in your puzzle solving or model building and provided a supportive environment when you were growing up?

Lindner: Well my parents were very supportive. I don't really remember anyone else that was very encouraging of that. I had an absolutely wonderful math teacher in the first couple years of high school who was very encouraging to me. But other than that, I can't think of anyone else.

Misa: Where was it that you were going to high school?

Lindner: Where did I go to high school?

Misa: Yes.

Lindner: Amundsen High School in Chicago, for the first two years, and that's where my math teacher was. And then my family moved to a suburb of Chicago and I changed to a different school.

Misa: But you had at least those two years where your high school math teacher ended up being supportive and encouraging.

Lindner: Yes, very much so.

Misa: Was there a group of girls at the time that formed a bit of a cohort or peer group or study group or something like that?

Lindner: No, not really.

Misa: Just mostly the teacher.

Lindner: I was one of the few girls that really was very interested in math at that time.

Misa: Were there any other subjects in high school that attracted your special interest, besides math?

Lindner: Well I did always enjoy language arts and writing.

Misa: Language arts and writing.

Lindner: Right.

Misa: You said you'd moved for the second two years to a suburb of Chicago. What options did you consider for continuing education or training beyond high school?

Lindner: Well at that time — this was back in 1961— most options for women were you can be a teacher, you can be a nurse. When I was considering going to college I actually went and I started to major in journalism, but then I switched to math. I was in math and accounting, actually, and was thinking I'd either become an accountant or a math teacher.

Misa: And where did you go to college initially?

Lindner: Northern Illinois University.

Misa: Northern Illinois.

Lindner: Yes.

Misa: Were there teachers there that were supportive of somebody like yourself, with some real serious interest in mathematics?

Lindner: Yes, I had a woman professor there who was very encouraging.

Misa: And again, was there a cohort of women who shared some similar interests or aptitudes or connections to math?

Lindner: Not really. I was pretty much the anomaly. [Laughs.]

Misa: Do you remember having any contact with computers, either in high school or college? Of course, this is early in the 1960s, that'd be a pretty rare experience.

Lindner: Yes. Actually, I was thinking back about it. In college the only exposure I had was in my accounting program, not my math program. I did a minor in accounting, and I believe I had a class in FORTRAN or COBOL, probably COBOL. And I had a class where you actually worked with patch panels and wire patch panels, and that was pretty much it in terms of any kind of computing.

Misa: You said it was common for women to do work in teaching or nursing, and you were also doing accounting. Was there any sense that people could make a career out of computing?

Lindner: Oh gosh no.

Misa: No.

Lindner: No, at that time it was not a career that you heard much about at all. Actually, the only times I would hear about that was in association with accounting, not so much

with anything like engineering or computer science. It was more keypunching and doing things like that.

Misa: Keypunching, particularly, was something that was a bit more clerical and a lot of women worked as keypunchers all over the place.

Lindner: Yes.

Misa: Did you end up graduating from Northern Illinois University?

Lindner: Yes, I graduated with a degree in math.

Misa: And what year was that?

Lindner: That was 1968.

Misa: 1968, okay.

Lindner: Yes, I had taken a three-year break after my first year in college because I didn't have enough money to continue, and I worked actually in accounting as an accounting clerk to get enough money so I could go back to school.

Misa: Sounds like it worked out really well, then, because you were able to finish up your college years then.

Lindner: Yes.

Misa: What kinds of things did people consider with a degree in math? Did you actually think about working as an accountant?

Lindner: When I interviewed out of college, I interviewed primarily for accounting type jobs, but there was a recruiter who came and did interviews from Bell Labs. At that time they were interviewing people with mathematics backgrounds. And they were hiring and planning to train people in computers, and that's how I got into Bell Labs.

Misa: Sometimes Bell Labs did these central interviews in New Jersey, but this sounds like they were actually doing interviews at Northern Illinois. Was that correct?

Lindner: Yes, they were doing on-campus recruiting.

Misa: So that was basically local universities, talking with math majors, and looking for people they might be able to train as programmers.

Lindner: Yes. There were actually two tiers of interviews that were going on at that time. One was primarily for people in engineering. They would interview and hire people with engineering degrees, typically, or some with math degrees, and then they would send them on what was called the Graduate Study Program for two years. They'd pay for their master's degree. And they were also interviewing people with bachelor's degrees to become Senior Technical Aides. And those folks they would not send on for a master's degree. And quite often, those folks were women; I'll be rather blunt about that. [Laughs.] And the people in the Graduate Study Program quite often were men.

Misa: So it was the STA career slot that you were hired into, is that correct?

Lindner: That is correct.

Misa: Could you say a bit about your arrival at Bell Labs? Did they do programming courses? Did you do on the job training? I'm interested in getting a sense of your [experience].

Lindner: It was primarily on the job training. The organization that I was hired into was a computer-aided design organization and even the staff that they [already] had, they were just beginning to be doing any kind of programming and development. So when I got there they really didn't have a lot of training for us. We started out reading IBM manuals.

Misa: Oh boy.

[Laughing.]

Lindner: Trying to learn how to program from those. So it was definitely learning on the job.

Misa: Computer-aided design is very common now. This was the late 1960s; computer-aided design I think was quite new.

Lindner: It was very new. The first project that I worked on was they were trying to take schematic drawings and we were trying to automate that process so that they didn't have to be drawn by hand. So the first project I worked on you'd almost call it a precursor of a touch screen. It had sensors on the x- and the y-axis, and then it had a little pen that would spark and so you could have located on this tablet various schematic symbols like AND gates and OR gates, and whatnot. And then you could touch those with this little spark pen to determine what AND gate or OR gate you wanted, and then you'd touch the place on the schematic where you wanted it to be, and then we would program that and you would ultimately get a printed schematic from that.

Misa: Was it something like a light pen? You called it a spark pen.

Lindner: Yes, it was like a light pen but, as I recall, it actually had an electrical element to it. It wasn't just the light but I'm a little foggy. It's been quite a while.

Misa: So this is a way, then, of being able to manipulate and to move around logical symbols — AND gates, OR gates, whatever — and then create [pause]

Lindner: Create the schematic drawing.

Misa: Create the schematic drawing from there. That sounds actually [like] that could be very exciting. Who else was doing this at the time?

Lindner: What was that?

Misa: Looking back that must've been an exciting time because you're moving things around. So many people, when they interacted with computers, they were interacting with a keyboard or teletype machine or something like this. This is graphical.

Lindner: Yes, it was. It was very innovative. It was very new.

Misa: Were you involved mostly with the manipulations and doing drawings, or were you doing some of the coding and programming?

Lindner: I was doing the programming.

Misa: Can you say a bit more about that, please?

Lindner: Well, it was assembly language programming. I can't recall a great deal about it. I remember doing a lot of flow charting to do the design of the software, and then from that I was implementing the programming assembly language. Other than that, it's kind of hard to remember much about it.

Misa: So the tablets themselves would be a peripheral device that would be connected to one of the IBM mainframes, is that it?

Lindner: Yes.

Misa: It's one of the things that people needed to do is invent computer languages so that it was easier to interact with computers for different purposes. But if you're still doing assembly language programming, it's very close to the machines, a very detailed type of programming.

Lindner: Yes.

Misa: In the work group that you were in, can you say roughly how large that was and if there were any other women involved with this programming work?

Lindner: Well, the supervisory group that I was in was probably eight to ten people, and there was one other programmer like myself, who we were actually hired on the same day or came to start work on the same day. She had a mathematics and physics background, but we were the only two women who were on the technical staff.

Misa: So two in a group out of eight, nine, or ten.

Lindner: Right. And then we were part of a larger department, the total computer-aided design department, which was probably made up of four or five groups of the same size. And as I recall, we were the only two women in that entire department and probably in that entire laboratory, which was probably five departments' worth.

Misa: Oh, so that wasn't common to have two in eight or nine, so you were two out of this much, much larger group.

Lindner: Very much larger group, yes.

Misa: Do you remember any interactions with your male coworkers or with your supervisor? Were they supportive?

Lindner: Yes, I would say they were. Yes. Several of the men that I worked with, I felt like they were very welcoming and very supportive.

Misa: Did I understand correctly though [that] there wasn't formal training, it was mostly on the job? You said you were reading these IBM manuals, so this was very practical, very hands-on, not a classroom setting.

Lindner: Exactly. I think we had a couple of classes in logic, essentially, AND and OR gates, that type of thing. But in terms of the programming, we really had very little, if any, formal training. I did go on to get my master's degree in computer science while I was working there, but I started those classes probably after I had been at the Labs for three or four years.

Misa: My understanding is that Bell Labs, particularly, had a strong preference to have its technical people gain master's degrees. My understanding also is that people who were hired as an MTS got rather generous support in terms of tuition and time off from work. Was that a benefit that Bell also extended to you?

Lindner: The STAs, we were given what was called tuition reimbursement and we could get I think a couple hours off a week to go to classes. So the first year and a half of my master's program I did on the tuition reimbursement program, and then I was promoted

to Associate Member of Technical Staff. And then after that I and one or two other women, we pushed to get the graduate study program. We kind of were trouble makers, in some sense. [Laughs.] I eventually was given graduate study program support so that I could finish my master's degree. So I had some time off and I had full graduate study support, and was promoted to MTS at that time.

Misa: So actually, you were one of the people that started out as an STA, then you got promoted — if I understand correctly — to the Associate MTS, but then you got promoted to full MTS.

Lindner: That is correct.

Misa: So at that point in time, the MTS is the category that really counts, in terms of being considered a full member of technical staff, and so being able to access the benefits. But also, I suppose the status and prestige, basically the recognition that that level of career accorded something that was important for you.

Lindner: Yes, very much so. It was a time where women were very much trying to push ahead and succeed in their careers. So there was a very strong support group of women at Bell Labs and we were all trying to be as successful in our careers as we could be.

Misa: Can you say a little bit more about that support group?

Lindner: Gosh, by the time that I was going through this process of becoming an MTS, there were maybe, 10 [or] 15 of us at Indian Hill who were pretty actively pursuing our careers. And we used to get together outside of work [in] the rap group kind of setting where we would share experiences and help each other out. We were very close knit group for quite a while.

Misa: That sounds like a really great source of support to have. Now, my understanding is that there were some opportunities for networking that people could have as part of a Bell Labs employee group. Was that at all something that you took advantage of, or was this more of an outside of work source of support?

Lindner: It was much more informal and it was outside of work. The one area where many of us got involved that was within Bell Labs, and was supported by Bell Labs, was within the affirmative action program. At that time, Bell Labs was very strong in having affirmative action, and in trying to promote both its minority community and its female community, and provide the management and the staff with a better understanding of the abilities of the women and minorities, and try to find ways in which to support them within the environment. So that was a very strong aspect that was within the company.

Misa: That was part of Bell Labs processes and procedures.

Lindner: Yes.

Misa: Did you have formal committees, or different kinds of reporting, or different kinds of activities to support affirmative action?

Lindner: Yes. Typically, each laboratory would have an affirmative action committee, and once a year there would typically be an affirmative action meeting. And that was something that I was very active in. I would give talks at meetings; a lot about how the culture of Bell Labs affected women and minorities differently, and might work to our disadvantage. So that was something I was very active in.

Misa: Could you say more about how the culture might've interacted in some less than harmonious way with women and minorities? I know it's going back but it's basically how to change an established maybe male-dominated culture. It wasn't even necessarily intended to be white male dominated but I think Bell Labs was and it sounds like Bell was making an honest effort to change itself. So of note and interest, to understand that process from the inside as you experienced it.

Lindner: Right. And they definitely were trying to improve things. I can think of a couple of funny little anecdotes. Women were always afraid to talk at all about their family life outside of work, or any responsibilities that they might be carrying that were difficult in providing both roles, you know, balancing work and family.

Misa: Right.

Lindner: But women tended always to be very honest about what was going on and if they would have to say, I've got to take my child for a dental appointment, or I have to do something like that, they'd always be very honest about it. And I remember one of my male peers at the time, he took me aside and he said, 'When I have to do this I just look at my watch and I say oh my gosh, I've got another meeting, I've got to leave now.'

[Laughter.] So there were these differences where men would carry out their responsibilities to their families, but they would not make a big deal about it or would even hide it, so there were differences like that.

Misa: Yes.

Lindner: And also I think Bell Labs was an extremely competitive environment. The old merit review process was where you ordered lists of employees from top to bottom. Very competitive. And I don't want to be terribly stereotyping but the women in the organizations tended to be more cooperative than competitive so they weren't always viewed as strong as their male peers, but they were just as effective. What used to be a conflict a lot of time was that the merit review process rewarded appearance as opposed to effectiveness, and so the things that were the more male characteristics were rewarded, and women's characteristics were not as rewarded. And so a lot of what we were trying

to do with affirmative action was to say don't look at style, look at effectiveness. And you have to realize that a woman's style or way of working may be different than a man's but their effectiveness is no different. And so there were things like that, that we were trying to help people understand. So that was some of it, if I could characterize it.

Misa: That sounds like a really important cultural change then that Bell was wrestling with, and it sounds like the women were pushing that along.

Lindner: Yes, very much. While that was a very good thing, it was an additional burden on the women who were there because we were always asked to 'tell me what you women want.' [Laughs.] And you always had to be very careful about balancing that so that it didn't overshadow your work contributions or alienate anybody, so we were always a little bit walking on a tightrope.

Misa: And by the way, you're also supposed to be doing technical work in addition to all these other kind of cultural, affirmative action, promotion things. You've got your technical contributions to do. Do you remember it being a bit of a challenge or were there supervisors who got the idea that this brutally competitive merit review needed to be made a bit more broad? That's a pretty difficult thing, I suppose, to talk about.

Lindner: Yes it was. There were some people that were very, very willing who tried to be open minded and understand things. I found very, very often it was the men who had

daughters that were teenagers, and they were concerned about their daughters' futures. And so they were the ones that were a little bit more forward thinking.

Misa: They probably got either some lobbying at home or just were concerned about their own daughters and how they might fit in.

Lindner: Yes. I remember a couple of people that were my superiors that would ask me to give their daughters a tour and act as a role model for them. I remember having that happen a couple times.

Misa: Well it sounds like you've had the experience of being a role model, but you really didn't have other women, if I understand correctly, as role models, as supervisors, or department chairs, or into the management at the time.

Lindner: No, none at the time. In fact, I was one of the very first women to be promoted to supervisor, and then one of the very first women to be promoted to department head. So there weren't many role models in those positions for us.

Misa: Can you say a little about either of those promotions? That was again a major cultural step for Bell Labs, but also an important professional step for you.

Lindner: Yes it was. The promotion to supervisor was in the realm of support staff, so if you consider the computer-aided design, and the running of the computation center, and all of those kinds of things as support staff functions, as opposed to within Indian Hill we were switching system development. So my first promotion was in along this support staff side to supervision. But then my department head at the time, felt that I could be promoted to department head. When I reached that point, I needed to make a transition to the switching system side of things and I had to prove that I could also handle supervising groups of engineers in the main line work of Bell Laboratories. So a lot of women were in more of the support side of things, but not very many women were in the technical side and I know that there was — I found this out later — there was a department head who just didn't think I should be promoted because I wasn't an engineer. So my department head at the time said well let me transfer her to you as the supervisor in switching system call processing so you can see what she can do. So I had to move into the technical side and work for someone who didn't support me, in order for him to see that I should be promoted to department head, and then I was promoted to department head. So there was a kind of a, you know, women were sort of channeled into the support functions and not so much into the mainline switching system work. And so I was one of the first women who made that step.

Misa: That sounds a little bit like trial by fire, though. All of a sudden you get switched from a supportive department chair to somebody who's got doubts for whatever odd

reasons. And then you're put into a position where you have to prove yourself against a supervisor who might not be so sympathetic.

Lindner: Yes. But, you know, my supervisor who transferred me over there was very confident and that made me feel good, that he would be confident enough to say go work for so-and-so and you will show him. [Laughs.] We always had that saying that women have to work twice as hard to be seen as half as good, and thank goodness that's easy. [Laughter.]

Misa: It still doesn't make it fair, but okay. It sounds to me like people had a general idea that there were career paths. You mentioned, for instance, that working on the switching side was really important, that that was the — if I can use the phrase — real work of Indian Hill, was the switching systems.

Lindner: Yes.

Misa: Did people have the idea that there were career ladders and paths, trajectories if you will, that they might be expected to follow? If they were lucky and proved themselves to be solid in a supervisor role that there was an obvious path up?

Lindner: Could you state that again? I think I missed the first part of what you're saying.

Misa: I'm trying to inquire whether there was a career path for somebody like yourself, who started out doing technical work but then moved into supervising engineers, you said. At least somebody had the idea that having experience on the switching side, as opposed to the support side, was an important, maybe even necessary part of an employee's career development. Was there a career track or path that you could see?

Lindner: Well typically at that time, most of the people that came into Bell Labs, most of the men had engineering degrees and then they would go up through the technical side. There were hierarchies within the switching system world, where if you were call processing, you were working at the guts of the system, the important part, but then you'd also have diagnostics and different things. So if you wanted to, it was easier to progress up the ladder of promotion if you were going up through the actual call processing part of the business, right? So there was that whole technical career path. But then there were, you know, lesser career paths. I hate to say that because there really weren't — they were just as difficult — but if you were in the computer side of things where you were developing compilers or support tools or running the computer center, that was kind of a side path. It didn't have quite the same prestige as the switching system side of things. I don't know if that's answering your question.

Misa: It is because there's not a single path but there's several different paths, and that's helpful to try to get a sense. And in some ways, you were also pioneering the role of a technical and managerial woman. You said that there were several different paths or

trajectories that people may have followed and that's very helpful to clarify. Can I ask you a question about hiring or recruiting? What kinds of people made for valuable parts of the work groups that you were involved with supervising?

Lindner: What kinds like in what sense? You mean what kind of backgrounds, or . . . ?

Misa: Yes, so of course they all had to have certain kinds of technical skills, but did they need to have in addition to that, team skills, or people skills, or communication skills, or some other set of attributes or characteristics that you, as a supervisor or later as a department chair could identify and say oh, that person's really going to work out? So it's a question about your hiring and recruiting, what kinds of people were you looking for? What kinds of characteristics would you look for in your interview or trying to form a team?

Lindner: Ah. I actually was involved in doing a lot of interviewing and recruiting on campuses as I moved up. When I was in a supervisor position I did a lot of interviewing and I would always look for those people that — and this is counter a little bit to what other people looked for — but I looked for people who had had a broader set of experiences, weren't just extremely narrow, so I looked for people who had other extracurricular activities besides their technical skills. I didn't just look at people who had high grade point averages. It was really important to me that those people could communicate well so when I'd interview, it was very important to me to see somebody

who was relaxed and confident and able to communicate well, who had some kind of teamwork types of experiences in their background, because those things became so extremely important in the work environment; to be able to work on a team and not to be kind of a lone wolf. So those were things I looked for, and I think they tend to support someone being more successful in the environment.

Misa: I think a lot of computing and engineering programs in the past 10 years or so have really tried to do much better with teamwork, but during these years that was fairly rare that you would get that as part of somebody's formal classwork. So you're really looking for what? Extracurricular activities or sports?

Lindner: No, I would look to see if they'd been involved in other things, clubs and so forth, and had some leadership positions in those clubs, for example. I didn't look just strictly at the grade point average. So I was looking for people who had already demonstrated that they could be leaders or members. In fact, one of the things that I was involved in, actually just before I left the Labs, was a study that was being done. I don't know if you've ever heard of Robert Kelley, who wrote the book *The Gold Collar Worker?*

Misa: Oh, okay.

Lindner: He had been hired by Bell Labs to come in and help understand the culture, and understand how we could develop people to be more successful at a culture. And I worked with him on a team where we did a lot of research, essentially, trying to understand what made people be successful in that culture, and what things might be changed in order to help them be successful.

Misa: That's just fascinating. Can you share any of the insights that you had there?

Lindner: A lot of them were the things I was just talking to you about, the things that I looked for were people that could work well on teams and could communicate well, present their ideas well. But a lot of the culture, the things that we were studying were some of the disparities between the people that were viewed as successful and how effective those people actually were. So there were some of the issues of the appearance versus the real impact of a person. So there were some of those issues that we looked at. Certainly, some of the other things we identified were people who were able to take initiative. You know, who would look beyond just the job that they had and would be trying to improve other things. Those were some of the things. Not remembering a whole lot right now [laughs.]

Misa: Were there any parts of this work that you were doing with Robert Kelley that focused on the Bell Labs and this merit review that was hyper competitive? Was that one of the topics that you tried to tackle during that process?

Lindner: We certainly talked about it. At that time, things had been changing a little bit and I can't remember if it was before this study and I think it was. But they finally moved away from trying to do the absolute rank order list to just three categories: high performers, good solid citizens, and then low performers. And so they had been moving away from that and I think that was definitely one of the things we talked about a lot, with Robert Kelley.

Misa: That's something that Bell Labs would have an interest in doing, I suppose, to let people know that they were a high performer, and then of course, let people know that they were a low performer. Whether somebody is number 17 or 21, that's kind of whatever, that's like inside baseball or something.

Lindner: Right. That was a brutal process because I was part of it as a supervisor and department head, and it was just ugly.

Misa: So what did people do? Assign points or something? Because you could rank the people that you were managing, but then you'd still have to put those against the other department heads.

Lindner: Right, then you'd have a big meeting and you'd all sit down together and you would argue it out.

Misa: Oh gosh. [Laughter.] All to make sure that number 17 was number 17, and number 21 was — or whatever it happened to be — yes.

Lindner: It was a terrible process. And also, another thing that was part of the culture within Bell Labs was that the only real recognition you could get was if you went into supervision. You got promoted to department head, you know, that was the career path and you got farther and farther away from your technical skills. By the time I left after a 20-year career, I was technically obsolete. I couldn't program anymore. But one of the things that did get introduced in recognition of that — you know not all people should be supervisors because they were not good at it. They created this Distinguished MTS position so that if you wanted to have recognition instead of getting it by going into supervision and management, you could go up this Distinguished MTS ladder.

Misa: Okay, a dual track.

Lindner: Exactly.

Misa: And was that part of trying to change the culture within Bell Labs? Because it seems like it's a bit antithetical that everybody continues to get ranked, even though what they're doing is getting ranked on supervisory skills more than technical skills. That would be very hard to develop an objective rank order.

Lindner: You're right. It was so subjective at some point because you can't measure a lot of things.

Misa: Were there any characteristics about somebody that you recommended for a Distinguished MTS position?

Lindner: Were there characteristics, you say?

Misa: Yes, what kind of a person or what kind of an ideal Distinguished MTS —

Lindner: They would've made a significant technical contribution, come up with some technical innovation, have had a lot of patents, written many many papers. Those would be the kinds of things. So it's very much like an academic recognition process, in some sense. A little bit of a publish or perish kind of a thing.

Misa: Just thinking about it, would this be something that would be for two percent of the MTSes or 10 percent?

Lindner: I'd say closer to two percent.

Misa: Two percent, so it really is distinguished; it's an honor more than an expected promotion then.

Lindner: Yes, absolutely.

Misa: Can I go back to your interviewing? You said you did a lot of on campus interviewing?

Lindner: Yes.

Misa: What schools did you go to?

Lindner: I interviewed, oh gosh, all over the Midwest. I remember recruiting in Iowa. I remember recruiting out East. Generally schools that had good computer science or engineering programs. By the time I was recruiting there were more computer science programs and I think we did some recruiting at Carnegie Mellon and places like that.

Misa: You were in essence recruited by a local recruiter; did that continue? My understanding is that Bell Labs had a rather centralized [system with] interviews at New Jersey, that's what other people have told me. But you were hired by local recruiter from the Chicago facility, and then also, you're doing interviews in the Midwest.

Lindner: Right, and I think it may have been a little bit different for MTS than for STAs when I was interviewed. I don't have the sense that everyone had to go back to New Jersey to interview. It may have been the time that before Indian Hill, everything *was* in New Jersey. My recollection was that people would be interviewed from all over the country at Indian Hill, and I don't know if what you're speaking of was maybe before my time. I don't know.

Misa: There could be both New Jersey centered as well as Indian Hill recruitment. The important thing is from your experience, both hiring as well as recruiting, that not all Bell Labs hiring was done at Holmdel or one of the East Coast Bell Labs facilities. So it's just a point of clarification. I appreciate that.

Lindner: Right.

Misa: Would you care to continue the narrative of your career? You said you ended up being promoted to a supervisor position, but also into a department chair position, that's fairly high up the hierarchy, I believe. When you were a department chair, you were responsible for a pretty good sized group?

Lindner: Yes. I think my department may have been 100 people at the time I think. Yes, I think I had about 100 people working for me.

Misa: And what were the responsibilities of the department?

Lindner: The department that I had was responsible for support tools, so we developed the compilers and those kinds of tools in support of the 5ESS. So I had people who were doing the compilers, were running the laboratories, were not developing switching system software.

Misa: It sounds like you had a bunch of people who were doing computer programming, or software engineering, systems analysis type of work in your department.

Lindner: Yes.

Misa: Did those terms mean anything special? Programmer, systems analyst, software engineer?

Lindner: You mean did they mean distinctly different things?

Misa: Yes, was that a different kind of person, or a different kind of work? Sometimes people make the argument that software engineering came through [in] maybe the late 1960s and in some way had a big impact on computing. I'm curious if that may have been the case or not.

Lindner: You know, that's not ringing any bells with me. The only thing I can think of in those terms was you could be a programmer or you could be a software engineer, or a software designer. There was the systems-type people [who] would be developing the larger concept of the program and doing the design, and then the programmers would be coding to that design. That's the only distinction that I can think about.

Misa: So you called the people doing the higher level design software designers or software engineers?

Lindner: Right, and then the other folks would sort of be programmers.

Misa: Implementing the overall architecture, the larger level concepts.

Lindner: Exactly.

Misa: Higher level concepts.

Lindner: Right.

Misa: Okay. I wonder if it would be a good time to step back. You talked about a lot of affirmative action in women's oriented networks within Bell Labs, and outside of Bell Labs in the 1970s. Of course, the 1970s is the decade where in the United States the

women's movement was very strong. Did that have a big influence on you or your colleagues?

Lindner: Oh absolutely. Absolutely. And I think that was a big factor in many of us trying to move into management and have successful careers. Quite honestly, I probably would have been happier staying as a technical person because I really enjoyed that work. But because there was a lot of emphasis on women succeeding and getting ahead, I moved into management because of that to some extent. But it was a very strong factor for very many of us at that time.

Misa: A real spur or inspiration for you to be maybe a bit more management-oriented than you otherwise would've been.

Lindner: Yes. I think in my case and maybe some others, as well.

Misa: Sounds like your local network was really important. Were there any other regional or national networks that you also participated in?

Lindner: Because Bell Labs was in many locations and we did have quite a bit of communication between the women at various locations, so in that sense it was national. But outside of Bell Laboratories I wasn't really involved.

Misa: Do you have any sense that the women at Indian Hill were more active or aware of these issues than maybe Holmdel or some of the other facilities? Or was it something that women's issues and women's concerns were quite broadly spread across Bell Labs?

Lindner: I would say it was fairly broadly spread, but so many of the women that I know who moved on to other parts of Bell Labs had started at Indian Hill. So people were then quite successful and moved into New Jersey, into some of the other, Murray Hill or Holmdel. So I don't know if I could say that Indian Hill was more active but certainly from my perspective that's mostly what I saw.

Misa: A couple of people told me they thought — compared with the older and more established facilities that Bell Labs had out East — that Indian Hill was a relatively new facility basically organized in the mid- or late-1960s. So the cohort there was also younger people. And then there's also a cohort, I guess, from Whippany that got moved in when Bell's military systems work was being closed down. So it may have been that the culture was less formal, less established. I don't know, but that's what a couple of people have told me.

Lindner: That sounds very plausible. I'm sure that places like Murray Hill, which was extremely research oriented, it was not development, and it was an older culture, and a lot more people working very independently, whereas Indian Hill was much more development than research and much larger teams of people working together. And that

may have been that because it was newer, also, that it didn't have as much entrenchment, I guess.

Misa: One of the things that's interesting about this set of interviews, I've learned so much about your individual technical experiences, your experiences as women, but I've learned quite a lot about Bell Labs, too.

Lindner: [Laughs.] Probably more.

Misa: One of the key things that I learned early on talking with Joyce Malleck years ago, is that Bell very carefully kept secret that 1ESS, 2ESS, all those switching systems were really stored program computers. So when you were doing work on these ESS systems it's important to remember that those were computers. Bell had this 1956 consent decree that said Bell could do its own telephone switching, it could do its computing for military service applications, but it couldn't do commercial applications of computing. So even the name ESS was carefully chosen to make sure that nobody thought that this was a computer, that Bell was going to do something that would have violated this consent decree. So this is your career and it was just astonishing to me when I finally learned this and oh, all these years ESS to my mind is something like those mechanical switching arrays, clanking back and forth.

Lindner: Right. [Laughing.]

Misa: Judy, this has just been so marvelous. Are there any other topics that you'd like to make sure that we include in the recording today?

Lindner: You know, I think we have focused an awful lot on Bell Labs as opposed to the actual computing, and how we got into it, and interested in it. I think sometimes something that gets missed is that programming and the solving problems with computers is, for me, it was like solving mysteries and finding answers to things. I mean I know what you were saying about today, young women are not going into computing and they're not going into STEM programs. I keep trying to think about how we can get them more interested and I always want to go back to what was it about computing that I loved, and it was that aspect of precision and logic, and solving problems, and kind of the mystery of it. Being able to do things and I wish I were better at expressing it and better able to share it with young women. I recently saw on our local news in the Upper Peninsula of Michigan which, as you know, is extremely rural, one of the high schools had started a coding class. And there's some program out there that high schools can get to teach coding and they were working extremely hard to get the young women involved in it. And they were being very successful, and that made me feel good. I wish I had a better answer, but I do think all the emphasis on STEM programs and STEM education is I think starting to have some impact if I have actually seen something up in the Upper Peninsula of Michigan. [Laughs.]

Misa: But it's important to register your own [interest]; it's almost like a psychological engagement. This is something you found fun to do, it captivated your mind. Enough stories like that maybe somebody may wonder if something like that could happen to me.

Lindner: It was so mentally stimulating, you know you could work for hours solving problems, and that it could just absorb you. I wish I could convey that better.

Misa: Well the fact that your engagement is now duly recorded, it may have its impact in the world. Well, Judy, thank you so much for your time. [I] really enjoyed our conversation.

Lindner: You're very welcome.