An Interview with

KAREN COATES

OH 512

Conducted by Thomas J. Misa

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Karen Coates Interview

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Abstract

Karen Coates grew up in rural northwest Washington state, then graduated from Mills College (Oakland CA) with a degree in mathematics. She describes lessons learned in running FORTRAN programs at nearby Cal State Hayward, a summer internship at IBM, and then work with UC Berkeley's Laura Gould that led to computer-science teaching at Mills and at Stanford University. Continuing her computer science education at Northwestern University, she met many Bell Labs women working there on master's degrees and applied herself for a job at Bell Labs. She began work at Bell Labs Naperville in 1974 as a Member of Technical Staff assigned to 4ESS then moved to the Computation Center and worked on the Bell Laboratories Network, an early packet-switched network. She describes working at Bell's Murray Hill (NJ) facility with Bjarne Stroustrop, during the time he developed "C with Classes" which evolved into C++. Returning to Naperville/Indian Hills, she took up managerial positions in the networking project and then in switching-system applied research. She relates her experiences with the 1970s women's movement and the supportive network of women colleagues. She left Bells Labs in 1985 and moved to California, where she worked for a subsidiary of TRW on military intelligence systems; a communications company called Octel; a startup venture; and a health-care enterprise celled Omnicell. She describes subtle transformations in gender discrimination in the 1980s and in Silicon Valley.

Misa: My name is Tom Misa. It's the 14th of December 2015, and I'm talking today with Karen Coates. This is part of a Sloan Foundation set of interviews trying to better understand the experiences and careers of women who worked in the computer industry during the 1960s, 1970s, 1980s, and 1990s. Karen, I wonder if you could take us back to your childhood and school years. Were there any activities or hobbies or subjects in grade school or high school that attracted your attention and that may have inclined you toward the later pursuit of a technical career?

Coates: I had a strong interest in math in grade school. I went to a very rural school with 40 kids in eight grades, so a very small school. And the teaching was not top-notch. In fact, there were a couple of years I had the same teacher, fifth and seventh grades, and she primarily taught math. [laughs] So I got lots of practice at that, and I enjoyed it. My father had only an 8th grade education, but he had a natural gift for math, and that was something he and I could do together. By the time I was a sophomore or junior in high school, I worked at a Washington State shellfish laboratory. It was the only professional organization in our community, and everything else was pretty much logging or fishing. I was able to get summer jobs there doing data collection and analysis. I think that also may have encouraged me to go into something more technical.

Misa: Where was your high school?

Coates: Port Townsend High School, so out on the Olympic Peninsula in the state of Washington.

Misa: I know the territory pretty well. [Laughs.]

Coates: I also lived down by Forks, well, between Forks and Port Angeles, also.

Misa: Oh my gosh. You may have lived in Joyce.

Coates: No, I really lived in Beaver. There was a ranger station there. The closest neighbor was more than a mile away from our house. There wasn't really a name for it, but it was probably 40 miles from Forks, so closer to Forks than Port Angeles.

Misa: Okay. Small world, sometimes.

Coates: Yes it is.

Misa: The shellfish lab provided you with some contact with science, and university, and research.

Coates: Yes, there were a number of university students in the summers that interned there so I did have exposure to those folks, all men. But a lot of the work I did was in the basement in Olympia, looking at old data sheets. My project was to determine the value of water to the fishery, specifically the shellfish industry. And of course, that's a pretty hard thing to do. Industries could tell the state what the value of water was for them but

the fisheries department had a little more difficulty. I had ended up talking to a lot of fishermen about what happened in years that the production went down. Gathering this data, because it just wasn't recorded anywhere, was a fun summer job for a high school kid. I definitely had exposure then to professional people in a technical field.

Misa: Did they encourage you to study science, or math, or engineering?

Coates: Not particularly. They were just happy to have somebody do all this drudgery work of digging out data and summarizing it for them. They could then determine if they could use it for assessing the value of water but I didn't get any particular encouragement from them. I think my parents, although not educated, were very strongly in favor of education. And I was lucky to have a father who had very high expectations for women. It never occurred to him not to, in fact. He treated my brother and I pretty much equally, and he expected my mother to be able to do absolutely anything and pretty much, she did. Whether it was fishing, or hunting, building the house, community leader, hosting political candidates — and so much more. She was a high energy lady with excellent organizational skills. She was on the school board and a strong advocate for rural schools in the state school association. So I grew up in an environment that just encouraged education.

Misa: But also encouraged you to think like your brother would in the sense of being able to do a great variety of activities.

Coates: Yes.

Misa: When you were finishing up high school, what kinds of options beyond high school were you considering?

Coates: I actually had in my mind I would either go to the University of Washington or Western Washington State College. That was the limit of my horizons and visibility to colleges. I went to high school in Port Townsend, which was 40-some miles from where I lived and the first three years my mom drove me. And then my father had a serious accident right before — a few weeks before — my senior year and I actually ended up finding an apartment and living in Port Townsend that year. My father was in intensive care for almost two months before he was able to come home, and then my mother had to stay care for him, so I remained living in the apartment   I had a great uncle that taught at Seattle University, and he was in music. He knew about Mills College in Oakland, where Darius Milhaud was resident composer and he thought I should apply there. So I did, and given my father's accident, we didn't have a lot of funds and Mills offered me a full scholarship so it was cheaper than going to Western Washington State College. [Laughs.] And so I ended up going to Mills College, not because of any wisdom or wanting to go to a women's college. I was fairly narrow in my view. [Laughs.] I lived in a very simple community and hadn't really thought much about that, so just lucky [that] I ended up at Mills College in Oakland with the goal of majoring in mathematics.

Misa: In mathematics. So the great uncle that was interested in music, was interested in the institution more than you becoming a musician yourself.

Coates: Well, he married into the family. He had the talent. What he didn't know was that not only did I not know anything about music, but I had absolutely no talent whatsoever — maybe negative — so it wasn't a field for me, that's for sure. [Laughs.] But anyway, for all the wrong reasons I ended up in the right place for me. A very curious thing as an aside is that I was, in effect, on an affirmative action program, which sounds weird, a woman going to a women's college on an affirmative action. But it was affirmative action for rural students, with the thought that even though I certainly excelled at the schools where I'd been before, I would not be able to compete with students who came from prep schools and highly resourced high schools. They said it'll take four years to catch up but Mills would support me to realize my potential. You know this is the 1960s in the Bay Area, and diversity and all the things that happened in the 1960s was a major emphasis. So they were trying to find many points of view and they considered rural students to be one of those. So I came into an environment where they were going to support me. I think they did it for all students, but they were particularly attentive to those of us who were on the program where we probably had the capability but we didn't have the background yet to compete and succeed in this environment.

Misa: Prior courses, or study skills, or something.

Coates: So I had a very supportive group of teachers, and two of those who took a lot of care in supporting me were the math professor and head of the math department, and the head of the philosophy and logic department. [I] was highly influenced by them. Mills did not have a computer science program but the math professor started one course in FORTRAN and I of course took that course. They didn't have a computer at the college in those days so we had to drive to Cal State Hayward and use their computer once a week. I learned some very important things because of that; not only to really review my code and my design well in advance because you only had one shot a week at actually compiling and running it, right? You had to be careful. The other thing I learned, though, and this turned out to be so important in my career, was collaborating with other people and helping them and cross checking each other, and talking through designs, and so forth. In retrospect, I was so fortunate that I ended up in this environment without the instant gratification of compiling and running my programs so that I learned these other skills. So that was a wonderful thing that happened.

Misa: Interesting to think that people are programming on a keyboard; it could be social but it tends not to be. But this was a more social environment. Were you punching out cards or something like that, that you'd need to review?

Coates: Right, yes. We had a machine to punch cards and then we'd take those cards to Cal State Hayward. And of course in those days the compiler was still on cards too, so you'd load the compiler onto the computer and then follow it by your own punched cards. It would punch more cards to create the binary deck. [Then] you'd load them with your

loader, you know, old time stuff. But I learned a lot I guess from how things work that way.

Misa: That's great. You said Cal State Hayward was the computer facility.

Coates: Yes, it was. And then I think it was just after my sophomore year, I had a very good friend whose father worked at IBM and he told me about this program where you could get jobs and get placed in facilities for summer jobs. And so I applied and I got placed in a facility in Everett, which you probably know where that is [pause]

Misa: Yes, north of Seattle there.

Coates: . . . and it was far enough from anybody in my family that I had to live in an apartment. But I worked for a grinding wheel company, where they wanted to be able to build bigger batches and make different kinds of grinding wheels from them, rather than each one being custom. So they were looking for ways to optimize their business and they needed programmers. It turned out there was one guy who knew some FORTRAN but he wasn't really an experienced programmer either. But I had this incredible IBM machine, very modern for those days, and I was in essence the only real programmer. Since I didn't know anybody, the whole summer, seven days a week pretty much, I lived with that computer 12-13 hours a day. [Laughs.] And I just had a ball even though I didn't have anybody to collaborate with, other than learning about grinding wheel formulas.

Misa: Now this was a customer of IBM, is that right? Not an IBM facility in Everett.

Coates: Yes. Very odd that they would have left me there by myself without instruction or guidance, but they did. And I tell you, I just had a ball and I learned so much because I think that summer was when I truly fell in love with computing.

Misa: Do you recall what IBM computer that this grinding wheel company had?

Coates: I'm not positive.

Misa: Might've been a 650, 1401 if it was transistorized [pause]

Coates: Oh yes it was transistorized. I thought it was a 1620, but that might have been what we had at Hayward. I have forgotten what it was, but it was a wonderful new computer, and it essentially was my personal toy to learn, and it just was great.

Misa: [Laughing] That wasn't a usual experience for a summer job, but sounds like it had a pretty big impact on you.

Coates: It did, it was a great experience for me.

Misa: That was after your sophomore year at Mills?

Coates: Yes, it was after my sophomore year and so I went back, of course, to Mills to continue. I ended up with a math degree but I started doing independent studies with my professor. And then in my senior year Mills had a January term, and I spent my January term at Stanford, and they had something similar that was [also] a one-month program. Then [I] had exposure to real professors with computer science, needless to say, and I just learned a ton there. And so when I graduated from Mills, I applied to IBM and was offered a job, which was great. But what happened was there was this NSF grant for colleges in the Bay Area to collaborate together and essentially use Stanford's facilities, but have remote capability. And my professor talked to me, my math professor who had been so supportive, and said would you be willing to come and work for me for a year and write the grants to participate in this NSF grant. Would you write our portion of it, and then work with Stanford to get the computing facility set up here and get everything working, and help me work on some new courses. Because I had been on full scholarship, I felt completely indebted to my college for giving me this education and support — and indeed I was able to catch up by the time I graduated — and I said sure. So I then worked with people from Berkeley, and USF, and Cal State Hayward, and Stanford, and so forth in writing this grant, and then setting up the facilities, which turned out to be just a little card reader. Remote connection and of course some terminals. When the little card reader would go ker-chunk, ker-chunk, …; it was so slow it was just amazing, but you know, POTS lines.

Misa: Right.

Coates: But in any case, we set that up and then at the same time, I started working with Laura Gould, a professor at UC Berkeley, and she taught a course in SNOBOL. She was really catering to humanities studies, and of course, Mills had very strong humanities programs and so I took her course. She was again, just so supportive in trying to further my education. So then, during the January term at Mills the year after I graduated, when I was mostly working on making things work with Stanford, I taught a course in SNOBOL at Mills. I had four full professors and then a number of students in it, but I taught SNOBOL and how to use computers in humanities, as I'd learned from Laura Gould. I loved teaching, and it worked really well. The following year my math professor was going on sabbatical and she said, you know, you were very successful teaching, why don't you take my courses for one year because it's hard to get somebody to do just one year. Her courses were the computing courses but also differential equations, and numerical analysis. But these are the courses that I had done well with in college anyway, so I taught her courses the next year as an instructor. And then I developed a lot more computer science courses. [laughs]

Misa: At which school are you teaching the courses?

Coates: At Mills. And then I developed a bunch more courses so when my professor came back, she couldn't handle the computing and math courses that I had taught plus the new ones I'd developed, plus her courses that I hadn't taught, like physics. So she said can you work part time? That's all the budget we have, can you keep teaching these

courses for me part time? I loved teaching so I said yes. And then I found a job teaching at University of San Francisco, also part time. Again, specializing in the computing for humanities students.

Misa: Now, computing in humanities was the specific focus?

Coates: Well, I also taught the FORTRAN courses and the computing skills that the math students [needed], helped them specialize for numerical analysis and differential equations,. I had a lot of other things I was doing, but the thing that was not yet well known was how to introduce people in humanities to computing, and how it could be useful in their field. So that was what I was able to do at University of San Francisco; that's how I got that job even though I was really relatively inexperienced. And that all, again, came from Laura Gould having taught me. Also I directed some students in independent studies at Mills, as well as teaching some courses, and I realized that I had taught them everything I knew. I didn't know any more so I decided to go to graduate school with the objective of becoming a teacher of computer science. So [I] went to Northwestern University.

Misa: Northwestern.

Coates: Yes, for graduate school in computer science now, I finally made the transition official from math to computer science. It was an interesting experience, needless to say, for many reasons. But for one, this was the first time there was an environment that was

predominantly men. [However, because of the Bell Labs Local University Part Time program which was primarily provided to women (the young men with their BAs were most often placed in a full time one year master's program called One Year On Campus at MIT or Stanford) there were also several women in some of my courses.]

Misa: How did it happen that you went to Northwestern?

Coates: Again, I got a really good scholarship. I wanted to go somewhere outside the Bay Area. I mean coming from Brinnon, and the Hood Canal, and from the Olympic Peninsula, right? Major rural into the Bay Area was quite a huge growth experience and I wanted to go somewhere else. I looked at Cornell, and Ohio State, some of the programs that were pretty strong in computer science in those days. But I liked the Chicago area— I was learning about cities so I chose Northwestern. And I got a very good scholarship, so that was nice, to help out. So I went there and got my master's degree in computer science, but in the process I found that in my classes that a number of students were women from Bell Laboratories in Naperville. As I was living in a little tiny studio apartment sharing a bath with this guy next door, and living on bean sprouts, effectively, 200 bucks a month or something. In any case, I saw these women working part-time and getting paid a lot more, having a good time, and they were great people, I really enjoyed them in the classes. So as soon as I got my master's I applied to Bell Laboratories and was given a position there as a Member of Technical Staff, in the 4ESS program. So that's how I got engaged with the Bell Labs opportunity.

Misa: That's a very sensible story but it's got a couple of very interesting twists to it.

Coates: Yes.

Misa: Thanks for relating that. Many Bell Labs women had a bachelor's degree in a technical field, and a couple of them went to Northwestern, right at hand, well regarded program. They weren't there as a poverty-stuck graduate student, they were getting tuition reimbursement and sometimes even some additional support. So they were basically doing this because — you know this well — Bell Labs had this idea that all the staff members needed master's degrees and they had a real incentive to bring that about.

Coates: Right. And I was fortunate that I was already had my Masters and was hired as a Member of Technical Staff   Most of the participants in the Local University Part Time program had to come in first as Senior Technical Associates and — even after their master's degree —as an Assistant Member of the Technical Staff. Those (mostly men) participating in the One Year on Campus program were given the MTS title.

Misa: Right.

Coates: Bottom line these were the days where almost all women went to local university part-time at Bell Labs, and almost all men went to one year on campus at either Stanford or M.I.T. These were very different roles that women and men had at Bell Labs in those days, those were some of the challenges.

Misa: When did you begin work at Bell Labs?

Coates: 1974.

Misa: 1974, okay. Can you say a bit about work? You said you were hired into the 4ESS program.

Coates: Yes. It was a great job. As you mentioned, Bell Labs was one of the premier organizations, the problems you had to solve were very, very difficult. These were very complex systems and I learned more about how to build reliable software than anything I would've ever learned in school. It was just an incredible opportunity for me, and I happened to have an assignment where you needed a strong background in formal languages, as in the computer sense of formal languages. Most of the people that were in my department were guys that came up from engineering and didn't have that abstract language capability, so I was able to have a really good job. There was a university professor from Bloomington who was working with me so it was just an incredible, advanced technology and complex problem situation. I couldn't have asked for anything better.

Misa: Just to try to understand the technical work better, what parts of the formal language were relevant to the 4ESS program?

Coates: We specified the Maintenance screens in a formal language, and were able to create an engine then that developed the internal code; I mean an automatic generation of code. And in addition, we were able to use the engine to generate test programs automatically, so that I could test my code. So in terms of computer science, this was state of the art stuff, and much fun to learn to do this.

Misa: You said that your experience at Northwestern was one of the first times that you were in a male dominated environment. How did you find the environment when you came to Bell Labs for the 4ESS program?

Coates: It was certainly male dominated. There were a few people like Barbara Hornbach, who you've already talked to. She was there. She was my mentor, actually, to get me going and I was fortunate to have a good male office mate. The unfortunate part was I had a very bad boss [laughs] who was explicitly sexist and racist, and in general was not a well man, to tell the truth. But in any case, for that reason because he was so explicitly sexist it was just terrible. I moved from 4ESS — which I loved doing the work — but I moved from 4ESS to the computation center, where they'd been working on the Bell Labs network, which was a project to interconnect AT&T entities like the manufacturing and the operating companies into a network created by Bell Laboratories. A lot of the networking at that time was like DECNET from Digital Equipment or SNA from IBM and very oriented toward the computing industry, and we wanted to do something that really understood that we were a telecommunications company. A couple of people — Yvonne Shepard, she was the one that recruited me down there, and Dana,

well her name was Becker at the time — I don't know if you're going to talk to Dana, I know you're going to talk to Yvonne.

Misa: Yes.

Coates: Recruited me into this program. Again, it was doing state of the art architecture work and a small team doing an awful lot of coding, and a boss that was a really good guy. And the Comp Center had a lot more women. They may not have been the majority, but there was a critical mass, I think that's the key.

Misa: The Computation Center.

Coates: A critical mass of women and they couldn't do the job without us, right? [Laughs.] That was pretty amazing and I loved the environment that there were many women and we supported one another, and so forth. And they were very talented women so it was a great experience to be in that environment. Even though I loved the work in 4ESS, and I loved the project and the complexity of the work, the technical part, but the environment with my boss took some of the joy out of the work.

Misa: Doing networking in the 1970s must have been a very exciting time.

Coates: It was a very exciting time. State of the art, you know we did some good work, we published a lot of papers, worked with a lot of people in the industry, and brought

some of the brand new broadband technologies into Bell Labs. It was really engaging and we had a strong team.

Misa: So the goal was essentially to build something that would be a network connecting all of the various AT&T facilities, and to wire them together in a way that would then facilitate telecommunications, not just sending packets of data or something that would be fairly simple in terms of its data structure.

Coates: It was a packet network dealing with many different data types and providing packet communications at the lower levels and an application interface at the higher levels. I think it was to understand that rather than looking at it from the computer side, to look at it from the communications side and develop a data architecture that had that independence. In fact we dealt with IBM systems, UNIX systems, whatever was available or being used in the Bell System. It was our job to make our software pretty much run on all those computers. It was written in C, and if they had a C compiler it would run except at the very lowest levels we had to do a little bit of tailoring. But this was very different than what DEC did and what IBM was doing, which was how they were embedding all this stuff into their operating systems. It was to make it something that would run on any computer. But take advantage of the communications infrastructure. So it was fun.

Misa: How long did that work last? It sounds fascinating.

Coates: Let's see, I probably worked on that project myself for around four years, but I was a manager by the time that I transferred to another organization. I actually had another very good experience I should tell you [about]. I told you I thought I might want to be a professor so I was in the Ph.D. program at Northwestern taking courses, not taking many at a time because I had a more than full time job. But I was trying to keep going in my academic program and I was able because of some of the work that I was doing, get an internship in Murray Hill, which is where the research facility is, and worked with Sandy Fraser, on something called DataKit, which was at the very lowest level of very high speed network. So it was research and my part was to look at how mixed traffic types would work inside that network. I got to spend a year in Murray Hill with all these guys doing research, again, a great opportunity offered me by Bell Laboratories. All that was again inclusive of communications and what was happening in the world, and was just a great thing.

Misa: You said it was more research oriented, what was the working environment like? Supportive? Was it mixed, men and women?

Coates: There was another woman. [Laughs.] I think there was only one other that I can remember in the particular directorate that I was in and actually, it was a very difficult environment from that perspective. I probably shouldn't name names, but some of the very well-known Bell Labs famous people wouldn't even talk to me. It was not a very supportive environment at the time. My boss was fine. He was supportive. Bjarne Stroustrup, who developed C++, he came in to Bell Labs just a couple of months after I

had gone out there to start my internship, and they didn't pay any attention to him either. And so I didn't take it too personally in that sense. But I was able to work with Bjarne, he was lonely too. I was working on simulation of some of these mixed traffic types, and Bjarne had worked with Simula in England and he developed a compiler for me called C with Classes, which became the foundation for C++. Then when I went back to Indian Hill and Naperville, Illinois, after my internship was completed, within a year or so I finally decided I would be willing to go into management. I really liked the technical stuff but I decided I was going to go into management. I went into management first within the Bell Labs network project, and then I transferred over to the switching system applied research organization at Indian Hill. And my team was the first users of C++. It was a challenging experience because it was so new and buggy but you know, that's part of what we were intending to help with. So Bjarne, I kept track of him for a while, needless to say.

Misa: Yes. That's really quite an experience. Can you say a little bit about your transition and promotion into management?

Coates: I had a pretty supportive boss at the time of my promotion. The years at Bell Labs were a sometimes a struggle for me as a woman. I think the years in which we did a lot of workshops with management to try and make them understand what the environment was like for women and what they were missing out on because of that helped improve the environment. We were expected to go to these workshops and talk to these executives or management people about their behavior, essentially, and what we

didn't like about it, and what was destructive to the environment, and that's not stuff they wanted to hear. It was a very emotionally difficult thing to do, for me at least, and it took a lot of time. You had to keep doing your other job full time as well. But in that process, there were some people that got the message. And the person I worked for I think at least was trying very hard to be fair to everyone and I think that was great. And so I started in management into the group where I had been working as an engineer, so I knew the system backwards and forwards, and it was [laughs] an easy transition in that sense. And I already had my support group there. So it was a good experience.

Misa: These workshops that you're talking about, was that part of the affirmative action initiative that Bell Labs was engaged in?

Coates: Yes. But you know the approach was to use the women that were experienced — with the help of a professional facilitator —to use the women who were experiencing this environment to explain their pain to the managers. A very vulnerable kind of position.

Misa: That's true.

Coates: So it was very draining but I think it was an important part of Bell Labs making progress on their consent decree.

Misa: The 1970s was when affirmative action laws and practices really take hold. You look back and think oh, this was an easy period but no, you're saying that it had some significant emotional cost.

Coates: Yes. And on the other hand, one of the really very wonderful things that came out of it is that the women bonded. I mean we were going through this together and so particularly as we became managers, the women managers met at least once a month together socially and drank a lot of wine and supported each other. [Laughs.] And those people are my dearest friends to this day.

Misa: With some Bell activities there were these informal groups that Bell permitted and even encouraged, so that you could have a lunch time group or something like that. But what you're describing is something that was beyond or outside of the Bell Laboratories environment or working hours. Is that correct?

Coates: Yes, right. This is something that we had some people that were really strong at pulling us together. Mary Holt, I don't know if you talked to her. She comes to mind as one of the real catalysts for bringing us together. But there were others and Yvonne Shepard, who you haven't talked to, was just a great leader. As I recall Mary Holt, Yvonne Shepard, and Judy Lindner were all very articulate and skilled at dealing with management – they were key people in making formal proposals to management. It took a lot of courage and skill for them to take that leadership role. But many of us shared their views, and we all participated sometimes formally and sometimes informally. We

got together, we bonded — even before we were managers, a lot of us met outside. We played racquetball together, and then we'd go out, and it was just understanding that we needed a support group, that this was a difficult time. Maybe someone has told you this, that this past August we had a reunion, and we picked up just like we'd never been apart.

Misa: Can I ask a slightly broader question about these same years? 1970s of course was the [decade] when the women's movement for many people was a very important source of inspiration and organization. Was that a source for your group, or yourself as well, the wider women's movement?

Coates: Absolutely. I mean I'd been very much a part of that in Oakland at Mills College. The women's movement was very strong at Mills College back in the 1960s, so the whole women's movement made a huge impact on me.

Misa: Could you say a little about how you saw yourself as being part of a national movement, or did you link up to NOW or some of the other national women's groups?

Coates: To be honest, I actually supported those groups financially but I didn't really engage as much because I found my job was certainly more than 40 hours a week. It was a lot of hours and so I didn't get out and do a lot of that kind of activity. I did in college, but I didn't do it as much when I was working at Bell Labs.

Misa: You were staying in the trenches, I think is a fair statement. If you're doing all these management meetings, and this was important work to be done inside, that's probably enough for anybody's expectations.

Coates: Yes, I think so. One of the things that's interesting now about this 'Lean In' movement, the Sheryl Sandberg thing, is that so many of the things there were exactly the same things we experienced except that they're just at a higher level of management. The same old stuff but just at a higher level of management.

Misa: Can you share an example?

Coates: Well, the glass ceiling, the expectations that these aren't for women, that they've hit their level. You're probably familiar with the 'Lean In' book? And the importance of women working to support each other is a big part of that.

Misa: Couple of people have told me that at Bell Labs in the 1970s, that the affirmative action issues, and the minority issues, and the women's issues were very tightly focused. There were very specific concerns that people took time and effort to communicate to supervisors and to management. And they said in the 1980s, women's issues became somewhat more diffused and a bit more difficult to raise effective advocacy for it. Did you experience anything like that, that there was a shift in the 1980s?

Coates: I think there was and I think for one thing, is that the rules about discrimination were pretty explicit and beginning to be enforced. So the discrimination became more subtle and less obvious. Women could then go to the One Year On Campus program. I mean, really incredibly obvious things that were happening in the 1970s, by then they knew they couldn't do that. So I think that it was harder to get your hands around it because it just wasn't as explicit.

Misa: Would you be able to share or describe any of the more subtle forms that that discrimination might have taken?

Coates: I think it starts with assignments, who got the flashiest assignments, and those kinds of things. But how do you say you were being discriminated against? There were a lot of peer things still going on, too. Exclusion. But again, how do you prove some of that. It wasn't as institutionalized stuff. Systemic, but not institutionalized, if you understand the difference.

Misa: Yes.

Coates: So I think that's what made it a little harder to get at. A lot of it was peer related, too, not just management, but it definitely still was management. There were some tough nuts to crack there.

Misa: So peers, in the sense of your relationships to coworkers, not just to your supervisors or your bosses upstairs.

Coates: Yes. Men thought they were being discriminated against if a woman got promoted. That they deserved it but women were getting promotions was because they were women not because of talent. [One thing that actually shook me up was when one of my female colleagues and friends came by my apartment and said that her manager wondered if she would like to be a manager and if I thought she could do it. The reason that I was shocked was that she was a star technical performer and had star leadership skills. I couldn't imagine a more qualified person – but it was clear that she wasn't certain of that her self. This meant 2 things to me – one there were those subtle "you're not a good as the guys" sentiment lingering in the environment and two, as women we needed to be conscientious in making sure we were consistently supporting each other.]

Misa: Judy was telling me about the transformations in the Bell Labs merit review. Did you have any experience with that?

Coates: I think that as women became mangers, especially when we became a critical mass — I don't know if we ever were a critical mass while I was there — but I think at Indian Hill we felt like we were. I think that actually changed that process a bit, in terms of at least fairness. It was still people ranked from one to N kind of craziness. I mean that part I don't remember changing while I was there. However, if a female manager was in the room, she could be vigilant to insure that women's contributions were recognized and

that there was fairness in the reviews. I left Bell Labs in 1985. They were looking to promote me to department head, and the position was in Piscataway. I'd lived in the Chicago area for 13 years and was open to a move.

Misa: That's in New Jersey.

Coates: Yes, it's in New Jersey. My internship year in New Jersey was fabulous. Of course, I went into New York every single weekend. But I thought you know, if I'm going to move, I'm going to go back to California. I loved California and it's just a much [more] liberal environment. I mean, DuPage County was pretty conservative so as a place to live it wasn't my cup of tea. And so I said, I'm going to quit and go back to California. So I did, I got a job in California and I moved back to the Bay area.

Misa: Was that within the Bell System or was that outside?

Coates: No, this was outside. I went to work in California in 1985 and I just retired a couple years ago, so I went to three or four different companies during my time here. But I initially started out in a company called ESL, which was a subsidiary of TRW, and it was working on developing systems for the military intelligence systems. It was certainly cerebrally the most exciting work I have *ever* done; it was really cool. Very, very interesting [and] very, very complex work. But I found the government work to be frustrating at times. Number one, I had never been in the military and I didn't have any exposure to the military. I was lucky to have in that job a sales guy a consultant

interacting with the government agencies, but he was an employee of ESL, who was black and he was very helpful to me. I mean we would do two-week tours and go to 20 different military facilities, and understand the issues that those intelligence divisions had, and the agencies, as well. So he was terrific at getting me trained, and so that was a good part. I had a poor boss who didn't like women at all, and he kept trying to stick me with non-technical problem areas. I remember one was a young lady whose father was Assistant Secretary of Defense and she didn't have any technical background but wanted a position for a year or two. So my boss stuck her with me and made it clear that if things didn't work out, that would be my job, right? And so I thought oh great, I've got somebody who's got absolutely no ability to do technical work and I've got to make them useful. Well it turns out she was a gold mine because she understood the intelligence business, had lived it her whole life. [Laughs.] So she taught me more than I could ever imagine. Then she was also very articulate, she could talk to these generals just like she was one. She was a great speaker and I happened to have a very good technical team that we put together, and we had more demonstrations — it was an advanced research kind of thing — but we did more demonstrations literally than the company had ever done of a system, that we put together, a demo system. Made *big* bucks for the company and we even did a presentation to the Joint Chiefs of Staff - the guys with their telephones at their position at the table ready to deal with a crisis, and it was unbelievable. I did a very short presentation to start it, and then I turned it over to my young lady, to go through the demo. Of course I had a guy operating the equipment, but she was gold. [Laughs.] It worked out great. At any rate, a good experience again. However, after three years of dealing with a demeaning boss, and the government processes were sometimes so

arbitrary, I felt I should change to a different environment. What I found in the government work was that they were some of the most dedicated, most brilliant people I'd ever met; and then there was this bimodal thing where it wasn't a normal curve, it was like bimodal and there was this other group who were just duds and they were making a lot of the decisions about contracts. And of course I had to get my own contracts funded and all that. It was slow, and it was a lot of beaurocracy, and it just wasn't me. So I left there and went then to Octel, which was a fast growing company developing voice mail systems. So again it's communications — everything I've done was in communications. So I went there and worked there for seven years. And then did the startup world, including one where the CEO and the best engineer and I started it and built it up to a working system, but it was a telecommunications system right at the beginning of the 2000s, when the telecom market crashed. Well that wasn't a success, but in any case it was certainly exciting. I had lots of fun and a good environment to work in, in the Bay area. So that was all good news, and my boss trusted me, and so it was a good thing. I ended my professional career at a company that did health care. I wanted to do something completely different. This company was called Omnicell, and they built equipment for hospitals that managed pharmaceuticals that go from the loading dock, and the big carousels of drugs in the pharmacies in the basements of hospitals, to the cabinets on the nursing floor, to carts that you pushed to the bedside, to ensure safety in many dimensions. Of course the software is very complex and there's lots of it. To do all that and also it was a very difficult hardware because you had to have secure cabinets and drawers = very mechanical engineering oriented stuff.

Misa: Right.

Coates: Not my area of expertise, but it was important to ensure security and safety. Anyway, I had a great CEO and a great boss, very, very supportive, so a good environment there.

Misa: Well Karen, you've had really an astonishing career within Bell Labs, but then subsequently beyond that.

Coates: I've been lucky and I really believe the strength of the women that have influenced me have made the difference, and maybe still do. [Laughs.] I thank a lot of women for the good fortune that I've had in my career, and when the times were tough, to help us all together get through it.

Misa: It's quite a story that we've been able to cover in the last hour or so. Are there any other topics, Karen, you'd like to make sure that we include in this particular conversation? Or questions I might've asked but didn't?

Coates: It sounds like you've talked a lot about mentoring already with people. I don't know the answer to why there's been a drop-off of women in technical areas. I think one of the things that I know as I got out of Bell Labs and understood is that the use and complexity of software in businesses really increased substantially in the mid-1980s. It was coming along on a steep curve, but I mean it really escalated, sort of like what maybe

databases are doing right now. Big Data went from almost nothing to a huge industry, overnight. I think there were a lot of things in the mid-1980s with companies, their growth, and computing, and those companies were managed by men; all men. I mean there were just almost no women in executive positions still in those days. Just as when we worked at Bell Labs in the 1970s and the emphasis we put on recruiting, making sure every female was interviewed by a female and that they understood the good things and the bad things. I don't think that was happening in the 1980s, and to some degree, it's not happening today in many places. I have a lot of friends in industry here, and they say this emphasis doesn't happen in their companies, so I think there's a lot of things that where there has been no affirmative action, *per se*, as a real strong directive anymore. And so there's not so many programs that do specific things to counter bias. [In Silicon Valley, there are diverse cultures. Many of the technical people (men and women) were raised with different roles and expectations for men and women. This adds another dimension of complexity to behavior in business. One thing that remains an issue seems to be the sexual attraction issue – it seems that many men in particular feel that they can use their power of position to try to gain a sexual relationship. This is really destructive to women in business.]

Misa: One woman said that the frustration was that in the 1970s, affirmative action was very real, it was very palpable, we knew what the issues were, but then affirmative action became something like a checkbox. So everybody was required to have their affirmative action statement and check the box, but it didn't necessarily have meaning. It was something [that was] just pro forma. So that doesn't mean it has impact on peoples'

decisions, their thinking, their criteria, it's just a checkbox that you have to fulfill but it loses some kind of bite. That was at least one observation.

Coates: I think that's a good observation.

Misa: So it's funny the things that you learn. You don't necessarily learn solutions but myriad different subtle ways that things can slip, even. Instead of going forward they slip and that can be just as effective as some big cataclysmic change, maybe.

Coates: Yes, that's right.

Misa: Well, Karen, thank you so much for your time and thanks for extra effort in getting our phone call to work, too.

Coates: Okay. Thank you and good luck.

Misa: Thank you.