PROFILES OF SWE PIONEERS

ORAL HISTORY PROJECT

Betty Lou Bailey Interview

November 4, 2005

Anaheim, California

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Betty Lou Bailey

When Betty Lou Bailey received her bachelor's degree in mechanical engineering from the University of Illinois in 1950, she was the only woman in a graduating class of 700 engineers. During her long career at General Electric, she held positions as a testing, design, and systems engineer in GE's Large Jet Engine Department, Gas Turbine Department, and in its Valley Forge Space Technology Center, where she worked on the NASA Nimbus weather satellite project. She received master's degree in engineering from Penn State in 1967 and became a registered professional engineer in Ohio and New York. She holds a patent for a variable exhaust nozzle. A member of the Society of Women Engineers since 1951, she served on the Society's executive committee and became a Fellow in 1985. She was the first woman member of the Engineering Society of Cincinnati, and eventually became the chair of its guidance committee. She also served on national committees for the National Society of Professional Engineers, the Engineers Joint Council, and the American Society for Engineering Education. Bailey was born in 1929 and passed away in 2007.

In her 2005 Profiles of SWE Pioneers Oral History Project interview, Bailey explained how she became interested in engineering, her experiences in college, her long career at General Electric, and her involvement in SWE.

BETTY LOU BAILEY

DR: Okay. This is an interview with Betty Lou Bailey, for the Society of Women Engineers on November 4th, 2005, in Anaheim, California. And the interviewer is Deborah Rice.

So thank you, Betty, for being here.

BLB: Oh, you're welcome.

DR: And can you start by describing your family background, and what it was like to grow up in the 1930s and '40s in Chicago?

BLB: Yes, all right. I have four siblings that were all older than I. And so my oldest sister and her husband are the ones that suggested I take engineering. My father was an engineer.

Interestingly, my oldest sister just died recently, and I was on the phone with her two older boys. And so I asked at that time did you know that your parents were the ones that suggested that I take engineering?" Well, Charlie, who is number one son, said, "Yes. My mother told me." And number two son said, "Oh, I never heard that." And I said, "Well, you were a little guy." And I thought about it afterwards, he was probably five when this happened, so he was out of the picture.

DR: So this was when you were entering college that they suggested it?

BLB: Yeah. I was between my junior and senior year in high school. And so then I thought about it a few months and decided, yes, I would take engineering, or at least try it. And then I came home and told my dad that I had decided to take

engineering. And I wasn't sure what his reaction would be, so I told him when he had a visitor so I knew he wouldn't explode. (laughter)

DR: That's funny.

BLB: So it turned out he liked the idea. And partly I think it was because my brother had not taken engineering, and partly it was that he had seen women doing what was regarded as unusual things during World War II.

Now, getting back to when my sister died and I was on the phone with two of her sons, the number two son, you know, understood the family. And so his reaction was he immediately asked, "What did your father say?" (laughs) And he had actually been critical of some of Helen's desires when she was growing up.

DR: Helen was your sister?

BLB: Yeah, yeah. And Bud knew that. So I told him that I thought that our father had changed because of time passing, and different experiences; and I explained about Clark had not taken engineering; and he'd seen women doing things that were unusual during World War II. Actually, my oldest sister, during World War II, taught welding. And her husband Paul had sold welding machines, so she had learned from him much of the technology. And actually, she had to learn how to weld in order to teach people. (laughter) But she was a person who was upset because when she taught various people welding, they had tests which produced welds, and then the welds were graded, that the people had made. And some of the women were good, and better, and some

of the men were quite good, and some were just so-so. But she said the men all were placed first before the women, regardless of their scores.

DR: Interesting.

BLB: However, in the situation during the big defense buildup, why, welders were scarce, so everybody got placed. So it didn't matter, ultimately. And I think this is one of the things, too, that has favored women over the years, that engineering has basically been a place where the jobs are relatively easy to come by. And of course, the training is quite specific, so that if you have, say, four offers instead of six, you know, a comparable grade-point average in your college background, you're not really hurting, because you still have a pretty decent choice of the jobs.

And the other thing that occurred to me as time went by is that the companies that are open to women tend to be companies that are open to new ideas. And if you are an engineer, male or female, you generally would prefer to work for a company where new ideas are welcome, so that they don't respond to your new idea on how something should be done on one of their products with, say, an automatic veto. And so that, to me, when you think about it a little, is somewhat of an advantage to being a woman. Of course, I date back to before the present laws about considering women and minorities, and that sort of thing — and it has helped.

I remember in the early days of SWE, one of the things that women who were members who were looking for a new job would come

to conventions and meet with people. And they would try to get the names of the engineering managers for companies that they might be interested in, so that they would bypass the human relations people who, before the laws changed, they often were the ones that would automatically put your resume in the waste basket. And where the engineering managers often, especially if they already had one or two women, would be more receptive to your application, and would actually read it, so to speak. (laughs) So that's part of what the women engineers were about in the early days, because mostly people had managed to get into some sort of a job that used their engineering.

DR: Well, stepping back a little bit to your childhood, you told me an interesting story — the other day — about when you were five.

BLB: Oh, yeah. (laughs)

DR: Can you tell that?

BLB: Yes. My mother had driven me and my two sisters, that were both in high school, down to Tennessee to visit our dad, who was working on a TVA [Tennessee Valley Authority] project in the 1930s. So we of course needed something to do with ourselves on weekdays while we were there. So mother found out about a stocking factory that was someplace close to Knoxville. And we drove out there to see this plant that made hosiery for ladies.

And when we got there, why, there was this problem that I was much younger than I was supposed to be to be granted admission for this tour. I forget what they wanted. It was

eight or nine, something like that, but it was beyond five. (laughter) So they considered this, you know, they would just leave me in the car for an hour or two, whatever it was going to take, if I didn't go in. So apparently I wasn't running around and misbehaving, so they decided they would risk it for this five-year-old. And so I went in.

And there were these big machines that were totally automated that were knitting the hosiery. And you'd see, I don't know, it was like ten or twelve of them, which would be five or six pairs that were being knit, and you could just see them grow (laughs) as you watched the machine.

Once in a while a thread would break, because silk was much weaker than nylon. And then the operator would come by and grab that one and pull it off the machine, because it was no good. But it really was something that impressed me, and so I still remember it. And I think back on it to myself, little did they know that this little five-year-old girl was somebody going to be a mechanical engineering. (laughter)

But yeah, plant tours are nice. I enjoyed the one I was on here this week, on Wednesday.

DR: Where did you go?

BLB: Kimberly-Clark.

DR: So your dad was a civil engineer.

BLB: Yes.

DR: Did you ever visit him, then, on any of his jobsites? Did you understand at an early age what he did?

BLB: Yeah. I think in many ways the conversations over the dinner table were probably more important, because I learned that engineering was basically very practical. I also learned that he could argue like crazy about things with other people at work as to how something should be done, and it was not personal. When he got ill with heart trouble, all these same people that he would argue with were the ones that came to visit him because they all respected him. And that's something that you don't always get in other careers.

I worked in the office where my dad had been working before he got ill. This was a summer job. And I did a number of odd chores.

DR: This was while you were in high school?

BLB: Yeah, it was while I was in high school. It was a little over a mile, I could walk. They had a lunchroom where lunch was very cheap, so I didn't even have to make lunch. (laughter)

DR: That's nice.

BLB: And it was fun because I did a little bit of filing, a little bit of this and that. And one of the things that I did was deliver mail, which got me around throughout the office. And you developed a sense of what people did, just watching them. And it, to me, indicated that the engineering was the least monotonous, you know, it was much more differing from day-to-day, in terms of what they did.

So that made it seem appealing to me. I would escape routine. (laughter) So, of course, if you're a woman and

you're good in math and science, you think of possibly going into teaching. And I think I was quite correct in saying that I would not tolerate all the discipline problems and that type of thing, you know, getting the kids to shut up and…

You know, college teaching I could maybe manage, because presumably by then, with older students, they would not be as disruptive. But my attitude toward kids is I don't know that I would want to raise them, because they're fine when they're behaving well, but they don't always behave well. (laughter)

And that it would drive me nuts when they go into crying fits or whining fits. And it just is not something I would look forward to.

DR: So you knew that teaching was not really an option.

BLB: No, teaching was not an option. Pure science was not an option, because often in that sort of thing you're working in a situation where you're trying to learn something or discover something. And it isn't as if something needs to be done by a certain date because there's a contract. So you have more of a feeling of urgency in an engineering job.

Probably the ultimate intense pressure is when they are scheduling you, and it really involves invention, so you don't know how you're going to meet the date, because you haven't created the concept of something that will help you meet that date. And that's tough.

DR: Yeah. (laughter) So we've covered how you followed your father's and brother-in-law's engineering careers, and that kind of helped you decide that you wanted to go into

engineering. But I'm wondering what experiences you had in school, with math and science, and were there any of your teachers or perhaps a counselor that might have been encouraging of a girl who wanted to excel in those subjects?

BLB: Well, counselors in high school in the 1930s were hardly present. (laughs) And so we had one for the entire high school. And it was the smallest general high school in the city of Chicago, but it still had like 1,800 kids or so — that's a four-year high school. Yeah, ultimately I did see the guidance counselor once. And she knew of some women engineers, so she was not discouraging; I'll give her credit.

I was a good friend of the head of the math department, in that one of my best friends was a daughter of his. And so in addition to responsibilities for math, he had the book storage room. And he let us go in there and study because it would be quieter than the study halls. And he would be in and out of there.

DR: So did you tell him about engineering?

BLB: No. I remember him more for his comments about the University of Illinois. I went there basically because all my sisters and brother had graduated from the University of Illinois. So we would go there as a family on Sundays to visit whoever was there. Mother would come to breakfast and say, "Let's go visit" whoever it was (laughs) that was down in Urbana.

DR: So college was something that just expected that all the kids would go.

BLB: Oh, yeah. Oh, yeah. And so we went down there. To me, the University of Illinois was synonymous with college. That was where I wanted to go. And so I remember Mr. Drummond (phonetic) at high school saying that it was interesting to him that the University of Illinois never seemed to send anybody around to the high school to talk about the university and entice students to go there, and yet regularly there were a number of the best students from our high school that went to the University of Illinois.

And nowadays they have all these grade-point requirements. They didn't then. You got an acceptance letter that said, "You are accepted to the university." And stapled to it was a note that said, "This essentially entitles you to go look for a room." (laughter) And so you were on your own on that. So I had joined a sorority. I had been through rush week in the spring, so I had a room, so there was no problem there.

DR: Wow. You had to find your own room, huh?

BLB: Yes, yes. That was quite clear. Although students who came into the university in the bottom quarter of the class, they were automatically on probation. And then in terms of our high school, it was generally known nobody should go down to the University of Illinois and try it unless they were in the top third of the class. And so the students themselves self-selected.

And some of the ones from my high school — let's see, we had about 200 in my graduating class in high school, and probably fifteen or twenty of them went to the University of

Illinois. It was great, you'd see these people on campus and say, "Hi"; there was somebody that you knew from back home. And some of them made it, some of them didn't. And at that time, of course, the fellows that disappeared often were getting drafted, so they might come back later and finish.

But the wonderful thing about the arrangement there was that most of my male classmates were World War II veterans. And some of them had really stinky high school records, and yet they had matured and were good potential students. And many of them, basically, could not get in anywhere else. So those guys could come — some of them made up some of the high school math in order to proceed with the engineering curriculum. Of course, that usually meant that they took more than four years to graduate, but that was done by a number of fellows who had shaped up, so to speak.

DR: Let's stop for one second, all right?

(INTERRUPTION IN RECORDING)

DR: Okay. We're back. And you were talking about how you selected the University of Illinois. And I'm wondering, do you think that you had more opportunities as a woman because of the result of World War II? Do you think you had more opportunities to enter an engineering program at a university?

BLB: I might have if I'd been applying elsewhere. But you know, at Illinois, I was automatically in. (laughs) And they had had women in engineering for a long time — just a few. And the sorority that I pledged had a woman who was graduating in civil engineering. And so I figured, well — I didn't tell them

when I went through rush week that I was going into engineering. I was already in it, but—

DR: Oh, really? So you didn't tell.

BLB: No. I told them I was interested in math and science.

DR: And why do you think you did that?

BLB: I wasn't sure that it would be well received. And the house that I joined — because they had this one woman that had just finished, I figured that they would be quite accepting of it. And I didn't want to make a point of it because I wasn't that sure of it myself. You know, it's a complete university. You can transfer from one major to another. You may have to take an extra semester or two because of not having some of the requirements in what you've been taking. You can transfer out of engineering a lot easier than into engineering because of all this hierarchy of math and science in the first two years. If you stumble and don't take one of those courses, why, you really stumble badly, because you're not going to finish in four years. Actually, a lot of the engineering students don't finish in four years.

DR: Did you?

BLB: Yeah, I did. We had a fair number of students at the time who had had some university work elsewhere, maybe not in engineering. So there were very few students that were just sort of opening the book to the M.E. [Mechanical Engineering] curriculum and taking just exactly — because some of them had

had some of the courses elsewhere, and all sorts of things. But I just did it by the book, so to speak.

DR: What made you choose mechanical engineering? Did you ever consider civil, like your father?

BLB: No. Basically I did it on the basis of what I liked in physics. I didn't like electric too well, mainly because I didn't have any, you might say, gut feeling for electrons flowing here and there. (laughter) Links and levers I could understand, and gearing, that's all very straightforward, it seems — at least it was to me. And I had not had chemistry in high school, so I didn't pick that, because it was just a void.

DR: But you had had physics in high school?

BLB: I had had physics, yeah. Part of that was because I basically did high school in three and a half years.

DR: Now, how did that work out?

BLB: Well, in the Chicago Public School System they have people staggered, not by a year, but by a semester. And I skipped a semester when I was in second grade. I skipped the second half of second grade, because that was easy to do because they had both semesters, 2A and 2B, in the same room. So I was in the first one, but I was sort of soaking up the other at the same time. And so I got pushed ahead.

And then when I finished eighth grade and graduated, I was going briefly to a private high school. It was a girls' boarding school that no longer exists, that had very high academic criteria. And when I was there, they had this problem of, do we put her ahead or behind? Well, they put me behind

initially. And that really crushed me, because then I would have had four and a half years in high school.

So I had been there a week or so when I, you know, complained to my parents. And at that point I had a stepmother, and she came up and talked to them. And they put me ahead because they'd seen that I could probably do the work. And so that's how that happened. But I didn't have as many credits as many of other people do because of that.

DR: So you entered college, then, at a slightly earlier age than most people do.

BLB: Oh, yeah. I was young by a year. I looked probably even younger. I was a real cultural misfit with the World War II veterans (laughs) who were all much older than I was. But it didn't seem to matter.

DR: So can you describe your engineering classes in college? Were you the only woman in the class?

BLB: Most of the time that was so. And it was not so for things like rhetoric, which was basic English composition.

DR: Right, a required class, probably.

BLB: Yeah. Because they would set those classes up so that you would have a mixture of people from various colleges within the university, so that if you had like twenty seats, they might send only eight of them up to the College of Engineering. And when they would call the role the first day, you could tell by the color of the class cards where people were from, and you know, what college they were in. And so we got

mixed up on some of the basic courses, but then as you get further along, why, all your classmates are in engineering.

DR: And they were mostly male, then?

BLB: Oh, yeah.

DR: Or all male?

BLB: Yeah – well, the last two years there was a woman who transferred from Navy Pier, which was a two-year deal then, that was part of the University of Illinois. And so she was a little older than I was, because she had worked two years as a draftsman before she started taking engineering. Now, she was on the Urbana campus for three years, which is not unusual, because a lot of the people who had gone two years, even though it was University of Illinois, when they got to the main campus, it took them, usually, extra time. So she got her degree, finally, in M.E.

There were some other women in other majors within engineering. I know there was one in aeronautical that was current with me. There was a woman in civil engineering that was a year behind me. And I still exchange Christmas cards with her. (laughs)

DR: Oh, really? That's great.

BLB: Yeah. And that was funny. Connie Inek (phonetic) Hauser, she's out in Boulder, Colorado. At the time we were both students, she was quite gung ho about taking engineering. And I wasn't that certain about whether it was going to work out. And I was a little skeptical that she really was that certain. And it turns out it didn't matter. We both worked

until retirement as engineers. (laughs) Yeah, so that was sort of funny.

DR: What were your relationships with your professors? How did they feel about having a woman in their engineering class, particularly those classes where, you know, you had labs, or something?

BLB: Well, they didn't remark about it. This is one of the things that I hold the university in great regard is that nobody seemed to worry about the fact that I was in engineering, or encourage me or discourage me. There was one time a professor in a lab posed a rather practical question. And he asked this Chinese foreign student first. He didn't understand it, know what to do about it, because it was not a textbook type question. And then he asked me, and I gave him a suitable answer. But I felt singled out that day, but that's the only day that I did. On the other hand, I don't recall — well, I was being singled out in a positive way when I made Mortar Board, which is an activities honorary. And when you do that, why, you get to wear a cap and gown to class that day, so it's very obvious. (laughter) And that was for outside activities of a non-engineering sort. So I arrived at my one o'clock. And Professor Conzo (phonetic), who normally dealt with graduate students, was teaching our section of this course. And so basically, he gave the pitch to the guys about, "You guys have been shown that it can be done, that you can do more than just your engineering courses and get away with it," so to speak.

DR: So were you involved in any engineering groups or organizations as a student?

BLB: Not — no, I mostly concentrated in what we called the "south campus" activities. And I was very active in the yearbook. I was active in the Illini Union some. I was an officer of Panhellenic my last year. And the Illio was the biggest time commitment, the yearbook. So I was associate editor my senior year.

DR: So you had no trouble, then, going from engineering classes, where you dealt with all engineers, into doing outside activities that really had nothing to do with engineering?

BLB: Yeah. And my siblings had all been into these outside activities, so that was kind of built-in to coming to the University of Illinois. So that was something I greatly enjoyed. In general, once I walked out of the engineering classrooms and buildings, why, I would not tell people I was an engineering student, and would avoid mentioning it the first two years. The third year, I didn't care. It leaked out. The fourth year I talked about it openly, because by then I had worked one summer at Holley Carburetor in Detroit, between my junior and senior year. And so that was a reassuring experience, and so I went on from there.

DR: You had a couple of jobs while you were in college, correct? You worked for the Chicago Bridge and Iron Company?

BLB: Well, that was in high school.

DR: That was for your dad, okay.

BLB: Yeah, yeah. So yeah, I had this other that was more of an engineering look. I was doing tasks and ordering parts, different materials to fit into the rest of the test program, some of whom arrived before I went back to college. And I was told later that they came dribbling in after I left, (laughs) but there wasn't anybody to test them anymore. And at the time I worked there that summer, there was one other college student who was there as a summer employee.

DR: This is at Holley Carburetor.

BLB: At Holley Carburetor, yeah. He was a physics major at the University of Michigan. That was very nice to have someone who was also a college student to chat with, because I was doing these tests, and I could be doing it and talking to him at the same time. (laughs)

DR: So do you think that really helped you when you did graduate from college and enter the workforce, having that practical experience?

BLB: Oh, yeah, right. It made me look better on paper, so to speak, but I think it went deeper than that, because it built my own self-assurance to a considerable degree.

DR: So you think that's important.

BLB: Yeah, yeah. So you're doing something that you're not just sure if it's going to work out. I had never met a practicing woman engineer until after I had my own degree. I mean, that's the way it was. (laughs)

DR: Right. So there were none at Holley, then, when you were there for that summer.

BLB: There were none at Holley. There were no engineering professors that were women at the University of Illinois, although they didn't seem to mind that I was a female student.

DR: Did you have any mentors, or somebody that you would consider a mentor during your college years?

BLB: No, no. That all came later. (laughs)

DR: Right. And what about the student that you mentioned, Connie Hauser, do you consider – you kind of supported each other, then?

BLB: Yeah, but she was in civil, so I didn't see her that much. You know, I'd say, "Hi" when we were rushing between classes. (laughs)

DR: So after graduation, did you have any difficulties, then, finding or interviewing for jobs?

BLB: Oh, I had my job before I graduated.

DR: Can you talk about that a little bit?

BLB: Yes. Yeah, GE [General Electric] sent three men to come and interview at the University of Illinois. And they had a general meeting to explain to us how the pension plan and the engineering program and all these other things that would take time in an interview that were sort of cut and dried. So you had to come to that. And then they had interviews in twenty-minute spacing, for a day and a half, three men. So I forgot what the product of all that is. They talked to a lot of people. They left twelve offers, mine was one of them.

DR: Do you remember your interview?

BLB: Oh, yeah, yeah. (laughs)

DR: Did they ever make any – did they ever point out the fact that you're a woman and that it was unusual, or was it just–

BLB: Yeah, yeah. The man interviewing me pointed out that they had had women as engineers. That was good news to me. I mean, I signed up to take engineering because I thought I would like the work. It was not that I was, you know, setting out to be a trailblazer or something of that sort, so it's better to be the second and third instead of the first. So I knew about Edith Clarke and Flossie Buckland (phonetic). And actually, Edith Clarke had already retired when I came to the Schenectady plant.

DR: To GE?

BLB: Yeah.

DR: They both had been GE employees?

BLB: Yeah. Well, Flossie was still there. And I never actually met her. I had seen her and realized who she was one time. But there were all sorts of tales about her. She was a very unique personality.

Edith Clarke had been retired and was down at the University of Texas at the time I started with GE. While she was at GE, she had written a book on power systems, and this had become the classic text of that field, so that a great many of the electrical engineers who started at GE when I did had had a course using Edith Clarke's book.

And so this was great because it meant that there were all these EEs that understood that there was one, at least, woman

electrical engineer that was worth something, because they'd all had a course out of her book. (laughter)

Then there's some interesting tales about her, but she's long dead, so you didn't have access to anything much except printed records.

DR: Yeah. We have — exactly, we have some of that.

BLB: Yeah. And so she was a great forerunner. And Flossie Buckland became a Fellow at the American Society of Mechanical Engineers. And she married a man who had come from Colorado. And he had had a classmate who was a woman engineer at the University of Colorado named Elsie Eaves.

And Elsie was the first woman to become a member of the American Society of Civil Engineers. So this is all tied together. I forget where Edith Clarke went. Flossie Buckland got her first degree at MIT [Massachusetts Institute of Technology]. And she also got a Masters in engineering from the Union College.

DR: So you knew, then, when you graduated that you had a job waiting for you.

BLB: Yes, right. When I interviewed GE, I didn't realize it at the time, but I asked a real nasty question.

DR: Really?

BLB: (laughs) And the man interviewing me—

DR: What was the question?

BLB: Well, I asked him — you know, he had all this material about GE, so there was a listing of vice presidents. I asked him what the background was for each of those vice

presidents. And the idea is that if you are an engineer, you want to go with a company that likes engineers and promotes them, so that engineers count, so to speak. If you just ask someone who's interviewing you how engineers are treated and that sort of thing, they're going to know what the right answer is.

(laughter) So you don't come at it directly. And so I asked which of the GE vice presidents were engineers and which were finance, and that sort of thing. So most of them were engineers. And this guy knew practically all of them. And I didn't know enough about GE to realize that most people wouldn't be able to answer that, but this guy could. (laughs) And then he asked me why I asked that, and I said, "Well, because I wanted to work for a company where engineers counted and were regarded as important." So I think that was a valuable thing to do because it, in many ways, was borne out by various experiences I had later on. And so that was good.

And I also thought, at the time, that maybe I should work for GE because they made appliances. And boy, I sure chucked that.

DR: Well, you thought that's what you wanted to do then.

BLB: Well, I thought it would be a good place for a woman.

DR: Oh, okay. Household appliances?

BLB: Yeah. Well, I started in on a program that was three months here, three months there.

DR: Oh, right. It was GE's — what — it was like a 13-month --

BLB: They called it — yeah, it was a test program, they called it.

DR: For new engineers coming in from college?

BLB: Yeah. And when I say "test," why, it was testing equipment that was about to be shipped, and so you got to see if it was working correctly and all. And I had my first assignment in gyroscopic gun sights, which they were making for the Navy. Met some women engineers there. (laughs) And one of them was color blind. She couldn't tell the difference between a red lead and a black lead.

DR: That may be a problem. (laughter)

BLB: Yeah, yeah. And she was a student at Cornell, she didn't have her degree yet. But the other one that I met there became a good friend, and she was a Purdue [University] grad, BSME [Bachelor of Science in Mechanical Engineering].

So at any rate, the second assignment was enlarged steam turbine in Schenectady, which is a fascinating place, but filthy. You just lived in oil. (laughter) I mean, it was a place where if ever a woman was out of place, by conventional standards, that was it.

DR: And did you feel out of place?

BLB: I loved it. (laughter) Yeah, well, there were so many interesting things to watch that even if you had a job where you were sort of just standing around taking readings once in a while, there was all this activity going on that was worth watching. So I liked it. I knew when I went over there that it was filthy, that you just lived in oil. By the end of the

weekend, you got your hands clean. (laughs) And then it started in over again. But I figured, hey, it's only three months. So it was an interesting experience.

It also did a lot for me in terms of psychologically. I then knew it didn't matter to be a woman. And that does a lot for your bearing and how you behave afterwards.

DR: So you didn't feel treated unfairly then, by the people were already working there?

BLB: No, no, no. And it was one of these things, because of my prior assignment in Schenectady, I had a pair of needle nose pliers (laughs) and the guys would come looking for me — "Hey, Betty Lou." (laughter) And the other thing was, we had a hard time getting the balance weights in the generators. The hatch was usually very small. So there were two people they looked for. One was a tall guy who had long arms, and the other one was Betty Lou, because she had smaller shoulders, and she could maybe get both shoulders in this little hatch. (laughter)

DR: So you were in demand, you were popular.

BLB: Yeah, yeah. So they'd come looking for me, because the two of us were the ones that got that job. So yeah, the fellows worked pretty well with me, I'd say. So I was one of them.

When I went to Erie—

DR: This was your next test assignment?

BLB: Yeah, this is where I found out what appliances were like. And I lived in a room close to the plant. And most of the people in that situation were getting their meals at a

boardinghouse. So I called this one woman that ran a well-known and good boardinghouse. And so she was Italian, so she didn't have a complete command of English. But she told the fellows the next day — first, well, she told me she didn't have any room, which was true. But she spoke about it to the guys, and they said, "Oh, yeah, that's Betty Lou, we know who — she's one of us." And then on Friday I got a call from a guy that I knew slightly, and he says, "I'm moving back to Schenectady on my next assignment this weekend. You can take my place at Ma Brakalanto's (phonetic) on Monday."(laughter) So I did. And the table seated twelve, and I was the first woman she'd had.

DR: Oh really?

BLB: Yeah. The food was generous, so I figured out right away that I should probably just skip desserts, as a simple way of not putting on too much weight.

DR: Right. So you were working on appliances then.

BLB: Yeah, that was refrigerator cabinets there. They had not moved to Louisville, although the people that were making the move all knew who they were.

DR: And you discovered that you didn't really like it?

BLB: Well, I knew before I got there that I liked steam turbines too well. (laughter)

DR: Oh, okay, from your last job.

BLB: Yeah, yeah. Basically, what it boils down to is there's more of a creative emphasis in the appliance work than there is in an analytical basis. And I prefer more of an analytical basis, so that you think your problems through that

way. Although, you know, I was redesigning little brackets in the refrigerator cabinets so that I was able to enumerate a list of what the bracket had to do as far as supporting it from various directions, and that sort of thing, so that I got some commendation on that. But that, again, was the analytical part kicking in.

So yeah, my assignments in GE varied, which is good. And you still keep building your benefits up so that you get more vacation time and pension credits as you go along. But I worked in jet engines, then I worked briefly on reactors for the Nuclear Navy. And that was followed by going down to Philadelphia for work with space satellites.

And then when that business sort of turned down and wasn't going to have interesting new projects, it seemed, why, I sold(?) my jet engine experience to gas turbines in Schenectady and worked there in a whole series of different jobs.

The last one I was working in the area of emissions, so that the biggest part of it was supervising air emission tests from new gas turbines. It had nothing to do with keeping GE out of trouble; it was keeping the customers out of trouble.

And so there's a lot of preliminary work. The customer will give you their permit, which may be screwed up, because the people in the various state governments don't understand gas turbines very well, and how they operate. So you work with the customer and say, "You've got to get that changed, because gas turbines aren't like that."

And so then you would hire an emissions test crew, and some of them really didn't have the right sort of equipment and personalities in the crew to do some of this work. So you got some of them that would turn — you know, they'd drive 1,000 miles to the test site with their vans with all the equipment in it.

DR: Wow. So this was your last job for GE?

BLB: Yeah, I did that about eight years. And basically what it boiled down to is the test crew knew their instruments, and knew all of that. And what I was there to do mainly was to make sure the gas turbine was right. With a new gas turbine, why, there's almost an infinite number of things that might not be right. And so it basically used all of my background of having worked with gas turbines in different ways. And so you'd get a lot of troubleshooting, then. And you work from one — you solve one problem, and then you discover another. And pretty soon you've got all your problems solved, then you can run the test, and it will pass.

DR: Well, going back a little bit, can you talk about what your first permanent job for GE was?

BLB: Yeah. I worked on jet engines. This is in the Cincinnati area, in the Design Area. I worked, oh, maybe four or five years in compressors. And then I worked on the rear of the engines, and that's all hot sheet metal design. And I have one patent for a converging diverging variable exhaust nozzle, so that you vary both the throat and the exit diameters for the

hot gas flows. So that was probably the highlight of my design experience. (laughs)

But yeah, the compressors are much simpler in that, except that the problem with the compressors is there's lots of stages, so that you have to go through all these calculations separately for every stage. All compressor wheels are round. (laughs) We even had some studies looking at square exhaust nozzles instead of just round ones.

DR: So you were working a six-day week schedule back then, right?

BLB: Yeah, yeah.

DR: So it was pretty intense.

BLB: Particularly along when the Korean War was on, everybody in the plant was working six days.

DR: Oh, so that was the reason.

BLB: Yeah. And then later it seemed that I worked an awful lot of overtime there. I would estimate I probably worked Saturdays two-thirds of the time I was there from '51 to '60. And after a while you feel like you're being used.

DR: Yeah. (laughter)

BLB: I mean, it's one thing when you've had a major failure and have to redesign things like that.

DR: That must have been tough on your personal life.

BLB: Oh, yeah, yeah, yeah. I put in long hours and all. When I went to New Zealand in '59, I had planned that long ahead.

DR: It's a vacation you took?

BLB: Yeah, for a vacation. And so I had to get this one design complete before I left. (laughs) My apartment mate laughed about it, said the next to last night, why, I was at work, still, when she went to bed. And when she got up, the packed suitcase was there, and I was in the bed. (laughter) And she knew that, you know, on Friday night — see, this was Thursday. Friday night, why, she was going to drive me to the airport.

DR: Was she an engineer, too?

BLB: No, she was a schoolteacher.

DR: Do you remember Virginia Lawicky (phonetic)?

BLB: Oh, yes. Mawick (phonetic).

DR: Oh, I'm sorry, yeah, okay.

BLB: Virginia Mawick Tripp (phonetic).

DR: And she was an engineer at GE during your early days?

BLB: Yes. And she was, you know, much like me in many ways. And at one time we were the two SWE members in Cincinnati, and shared an apartment. (laughter) And so I liked her very much.

DR: So it was probably helpful to have another woman that was going through similar experiences.

BLB: Oh, yeah, yeah. She was a mechanical engineer. She did not do anything in the way of stress analysis. She did fluid flow, and such. In fact, I was in Schenectady at the time she died. And one of the men who had just transferred to Schenectady from Evandale (phonetic) said that just before she had died she had completed a very detailed thorough analysis of

heat transfer and the lube system of some jet engine – he said, "A really great piece of work."

But he said she was looking like her health was deteriorating. It was bad. Her little girl had gone overnight with some neighbor girl about the same age. And so when she came back home, her mother was dead. She couldn't wake her up.

DR: Oh, what a shame.

BLB: Yeah. And so well, unfortunately, Ginny drank quite a bit. People would say that's probably the big difference between her and me, because we were alike in many things. So she had three kids. Her husband had mental problems, and abused her some, particularly when he was drunk. And he eventually committed suicide. And then her brother, who was a Catholic priest, adopted the three kids, and he had them in a home that was part of his parish. And he would have dinner with them every night. And that was part of the deal, because he didn't have them actually in his home in the parsonage, so to speak, but they were nearby. So that's the last I heard of that.

DR: Well, let's take a break. The tape is about to end.

BLB: Okay.

(INTERRUPTION IN RECORDING)

DR: All right. This is tape two of the interview with Betty Lou Bailey. And you've just been mentioning that you and Virginia were the only two SWE members in Cincinnati, Ohio, at the time. How did you learn about SWE?

BLB: When I was working for a three-month assignment on switch gear in Philadelphia in ‘51. Doris McNulty, who was working as a draftsman, had heard that I was there.

DR: Oh, I know that name, yeah.

BLB: And so she came down to see me. And the Philadelphia Section wasn’t having any meetings over the summer, but one weekend I went with her and two other women engineers down to the New Jersey Seashore and got to meet them. And so I joined. And then Ginny and I had met each other in Schenectady, so we were rooming together. So it’s through me, why, she got to know them. Doris is still around in the Philadelphia area. But she got sent over to Italy by her employer. And so at that point she sort of lost contact with SWE, and so now that she’s back and retired and all, why, she hasn’t picked it up. And it startles me that she hasn’t, because at the time she dropped out, she hadn’t missed a single convention.

DR: Oh, really?

BLB: I mean, she was really into it. She was a charter member. At the time I met her, she didn’t have her degree yet. Her father was killed during World War II, so he’s buried over in the Solomon Islands. Her mother is a nurse — or was a nurse, and so the money ran out after she had two years of college. So then she started working as a draftsman, and finished her degree at night. So because there were sort of a core group of women there at Drexel at the time SWE was started—

DR: Right. And you joined a year after SWE began.

BLB: Right. Yeah, we didn't – you know, it was several years later that the section at the University of Illinois started. And they were fortunate to have Grace Wilson as their advisor for many years, so that she would go through all the cards file of freshmen coming in, and pick out the ones with the girls' names, and have them come to a picnic at her house, because she was a professor – and apparently a very good professor.

DR: So what made you decide to join SWE then? What did you think that SWE could bring you?

BLB: Well, the main I was interested in was the idea that you could help young women seek this out as a career.

DR: So you didn't really think that you needed help yourself, but you wanted to, in turn, help others?

BLB: Yeah. I basically felt that it worked for me, and I liked it, and that other young women should consider this, too, and realize it was there and could work. And I think, as I look back on it, it seemed to me that, you know, you do this thing that isn't supposed to work, you go into engineering, and then you got kind of skeptical of some of the other things that you're supposed to do, like getting married. (laughs) So that when I was in my mid-twenties, and it was the second time a man had proposed to me – both of them were very creditable people, and we had fun dating – but I suddenly realized I liked my life the way it was, and liked my independence.

DR: And your career was important.

BLB: Yeah. And partly, I think, in my case, was that by the time I had finished my freshman year in college my parents were both dead. So I didn't have people hovering over me making decisions for me, you know, from a fairly early age. And so that this is how you get an independent young woman. (laughs) So when you look back on it, why, you realize all these things built up.

DR: So it helped you to have this network of women, then, that might be going through similar experiences as you?

BLB: Oh, yeah. One of the things that I think of in terms of SWE is — you know, you get physical help, there's good guidance material, you can add to that, and I have. I, at one time, figured, hey, what I need is a cheap one — that's two — you know, one page, two sided, then they can reproduce it. It doesn't require stapling because it's only two pages back to back, and yet it would have some — you could pass it out freely. It isn't like a booklet with nice pictures that cost money (laughs) — I mean, real money, not just a little bit.

So yeah, the thing to me about SWE is that when I'm with women, I tend to talk women's talk, when I'm with engineers I talk engineering. And I soon learned in college that something that was hilarious that happened in engineering class, you come back to the sorority house, they don't even understand it, you know. (laughs) And so it's just to sort of compartmentalize what you want, when you're with the women engineers, you can cover anything that comes to mind. So it's a very relaxed group, as far as from your view as a participant.

DR: Right. Now, were you involved with any other type of organizations? Did you belong to the American Society of Mechanical Engineers?

BLB: Yeah. I've not been terribly active with them, but I do go to their meetings some, even now. The first one that really meant something to me was when I was in Cincinnati, I joined the Engineering Society of Cincinnati. I didn't realize it at the time that I was going to be their first woman member. (laughs) But they were attractive because they had a very good program for counseling high school students. So that was why I was there in the first place. My timing was good because they had decided that they needed some help from women who were in the field, because they were getting girls coming to these sessions that they had. And they figured that, you know, having this—

DR: Sort of role model.

BLB: — a group of four or five men up there was not really the answer to the young women.

DR: Right. So they were looking for more of a role model for the girls.

BLB: Yeah. They felt that it was not welcoming to the girls, which is correct. (laughs) So I showed up. And I remember this one man who was an engineer at Proctor & Gamble, he took me aside and gave me this pitch about joining the Engineering Society of Cincinnati. And I had no idea that they didn't have any women already. (laughs) And you write down references. Well, I knew this one fellow that I knew well at

work had joined. And we would flip for who buys the Coca-Cola this afternoon, so he was a good friend. And they did check up on me that I was the genuine article, with him. Of course, he told me about it. But at any rate, this Proctor & Gamble guy talks to me to get me to join the Engineering Society. I found out later on they didn't have any women engineers at Proctor & Gamble. (laughs)

DR: Oh, really?

BLB: Yeah. While I was there in Cincinnati, they hired their first woman engineer by accident. (laughter) They bought a small company out, and so what they didn't know about this small company was that the company had an outstanding job offer to a young woman who had yet to make the scene. So they hadn't seen any person like that. But she was coming, and they didn't know it. So pretty soon, why, she showed up, and by then her job was transferred to a Proctor & Gamble plant in Cincinnati.

DR: So did she join the Engineering Society?

BLB: No. I never met her, although I learned that she left them after just about a year to go back to college for a Masters degree. So my reaction to that was thank God it wasn't to have a kid. (laughter)

DR: Oh, really?

BLB: You know, that she was leaving for the same creditable reason that guys left. Oh, dear, but...

DR: So was it around that time that you also got your Professional Engineer's license, or was that later?

BLB: Yeah, I took the first day of the exam at Illinois when I was still on campus. And I transferred that to Ohio, so I only had to take the second day. So you go up to Columbus and take the test.

DR: How important was that to your career, to have that PE after your name?

BLB: Well, it looks nice. You didn't really need it, so to speak.

DR: Did it feel like it added credibility to your work?

BLB: Yeah, yeah, right. And I never got registered in Pennsylvania. I registered in New York. I'm not sure I'm going to keep it up, because now they want you to have additional credits for keeping up with things. And so this costs money; I don't know that it's worth it in terms of both time and money to me. It looks good on your business card.

DR: So you think it's important for engineers still today to go for the PE?

BLB: Yeah. If you have ever in a situation where you have to testify in a court, you should be registered as an engineer to be accepted as an engineer. And that may happen for any number of unplanned reasons.

DR: But do you think for women in particular that it might be important to show that they're serious about their career, or something of that nature?

BLB: Well, yeah. I mean, it's sort of in the same category as getting a Masters and that sort of thing, it makes you look a little better on paper.

DR: Right. Well, can you talk a little bit about in the ‘60s when you went to work for the Aerospace Division of GE? This was something completely new to you in your career.

BLB: Oh, yeah, right. Although it still is a situation where your design work is always very lightweight, because it flies. So unlike a gas turbine which stays on the ground — you design those things and cost is king — weight is king if it flies. And so we were still in that... So that was interesting. And it gets into this one situation where it was before the laws changed. You know, at one time it was quite legal to discriminate, although not everybody did, thank goodness. (laughter)

But the federal government had certain things out in the way of executive orders that discouraged people from discriminating if they were working on federal government contracts.

DR: And you were working on a NASA contract.

BLB: Yeah, I was working on NASA. So the situation arose which I wasn’t aware of at the time — initially. And I had been switched onto a job because my boss felt I could do it. And he took a fellow off the job that was a person that I respected, but I guess it was done on the basis of personality, because he was more of an introvert than I am. So the boss wanted somebody who would push people more to get things done.

And so it worked out so — I didn’t know it at the time, but the people down at NASA didn’t know anything about me, but they were objecting to the fact that I was a woman on this job. And

so my managers didn't tell me anything, but I, in time, was told that they wanted a review of the program that I was following.

It was a design, build, and test program involving Douglas Aircraft. In fact, it was the adapter that went between the booster and the satellite. We were working on a weather satellite called Nimbus, and it included the separation arrangement, which was probably the hardest part of it, and used explosive devices that cut through a band, and then everything opens up, and they separate.

So I worked up a presentation, and NASA, being a somewhat disorganized outfit, they had two contracts for the same setup, between the booster and the payload. And so I didn't know it at the time. But I thought I was going down to NASA Goddard to give a talk maybe to a dozen people about the program and how it was going. Well, they had not only NASA Goddard, they had another NASA installation that had already let out a contract for the same thing.

So I walked in this room, and there was like forty or fifty people. (laughs) And I had been through the presentation a couple of times. They had some people from Douglas Aircraft there for support if there was discussion in more detail than I could give. Well, I was taken aback at that when I saw how big it was, and all these people lined up in rows instead of around the table. And there was a table up in front, and I had flip charts, of course. That was the era of flip charts for presentations. (laughs)

And I started in. And so I remember, well, I would try to look relaxed, so I leaned – put my butt on the little table that was up front. And that, I think, actually helped me relax a little. But I'd been through this several times. And I also told myself, "Hey, you know more about this than anybody else in the room."

DR: Right. That's why you're doing the presentation. (laughter)

BLB: Yeah. And so I went through the presentation. It took from 9:00 until noon, which was because of questions. So they liked it very much. (laughs) The other contract that conflicted and wasn't as far along was scuttled. And so we proceeded, and nothing more was said to my management about "getting rid of this woman." (laughs)

So actually, that request was not in accordance to having – you know, the idea of having me removed, it was contrary to what was supposed to happen on federal contracts. And the other thing, from the viewpoint of GE, they don't like people from outside messing around with job assignments. And I think it was that basic principle rather than the fact that I was a woman.

DR: So how did that make you feel when you found out, you know, several years later, about the whole situation?

BLB: Well, it was after the presentation was made was when I found out about it. So I was proud of my managers.

DR: Yeah. It was because of your presentation that you got the contract, right?

BLB: Yeah. Well, that happened after I was chosen for the job. But see, I had been shifted. And it was probably right after something I'd done on a different project. And I had been in the Piasecki plant. They were contracted for some material for us for a heat transfer test. And we had a very tight schedule for testing in what was normally a vacuum chamber for production work. So we had to have the parts for this assembly in our hands by the middle of December because the scheduled time for the test in this vacuum chamber was in the Christmas/New Year's period. And as soon as it got to be January, they were going to be using it for regular production tests.

So these guys were not working very hard at all on our parts when we went over there. And I bluntly told them that, and that they had to shape up because we had to have the material on this time. Well, they didn't say a whole lot, but they did get the parts to us. And then it turns out that they complained about my critiquing them to the purchasing people.

And then in turn, why, things work slowly through the channels at GE on something like that. So eventually it ended up with my boss saying something about this to me. And I said, "Well, they got the parts in here on time," which was the objective. (laughter)

And he had no — he couldn't top that, so to speak. (laughs) And so in time the same folks at Piasecki got the follow-on job, so we all got better acquainted. The boss that I had was perceptive enough to say that these guys just didn't

know how to fight with a woman. And you know, it was apparent when I got to know them all better, they were conventional manufacturing types that could make the air blue with things they would say, (laughs) so that anything I said was very polite in comparison. (laughter) But they didn't like it, apparently. But they got used to me.

DR: And you got used to them, I'm sure, too.

BLB: Oh, yeah. Well, yeah. What was it – oh, when I was working on jet engines, one of the hourly guys told me something that I thought was interesting. He said, "The things you had in the shop were more different from the standard designs than some of the other engineers." So to them that meant that somebody downstairs in the office area – because the offices were all underneath the shop – somebody downstairs had confidence in you.

And I obviously was younger looking, and that sort of thing, because you know, at seventeen I started college, and didn't look like I belonged there yet. (laughs) And the summer that I was on my last rotating assignment, one of the things I was doing was buying dresses so that I wasn't just wearing sweaters and skirts where I was supposed to be being an engineer.

And of course, being an engineer in GE was – you were inherently the lead person. Sometimes you'd go out – like there'd be four of you going to visit the vendor who was making parts that were from drawings that I had supervised the drawing creation. And so you'd have maybe an inspector from source inspection, and a contract guy from placing the job – and I

forget what the other one was. I know there was four of us. We went into Harrisburg.

And so here I am, this young looking gal with these guys. Most of them – I think I knew one of them ahead of time. But I was the engineer, so I was the spokesperson. And that's the way it is if you're an engineer. And a lot of kids don't realize that, but it just comes with the territory.

DR: Right. Can you talk about when you went back to school in the '60s to get your Masters degree? Why did you decide to do that?

BLB: Well, it was handy, and I could do it locally.

DR: It was at Penn State, correct?

BLB: It was at Penn State Graduate Center, that was in a junior high building that had been sort of discarded by Upper Marion Township where I lived. So the faculty – one man really worked there, the others were all adjunct. It was really pretty crummy, (laughs) but it looks great on paper.

DR: Was it for mechanical engineering?

BLB: No, no. It's a degree called a Master of Engineering. And people confuse it with another degree that's called a "mechanical engineering degree," which is another graduate degree that they want to abbreviate it to "ME," and so it comes out "ME" – instead of Master of Engineering, it comes out as "mechanical engineering." It was actually a major in engineering science. And it was a quarterly setup, so you met two days a week. If I missed one on a business trip, why, I

could get notes from people that would send them to me in the plant mail.

DR: So you were working full time then and going to school.

BLB: Oh, yeah, yeah. It was one of these things – if I thought I was going to have way too many business trips that would interfere with twice a week going to school at 7:00 o'clock in the evening, well, I just wouldn't take a course. And so I ended up – sometimes it was getting me like one a year. And then they started offering courses in the summer term as well – this was quarters. And so it was one year I got four courses in. And I thought, "I'm going to get this thing done!" (laughs) Instead of, you know, doing one a year, which is sometimes the way it was. So I eventually finished the thing.

But it was kind of poor. You know, I'd looked forward to taking a course in heat transfer. And the professor never got to what he considered to be the most comprehensive combination of all of this, which was an afterburner design. Well, I'd worked on exhaust nozzle design, so that to me the afterburner design was something I could already do before I walked into the class.

DR: Right. I was just going to ask you if (Inaudible)–

BLB: And yet I'd had no formal heat transfer other than, you know, one week or two in physics. (laughs) And the statistical course was – well, I had picked up a little bit of statistics here and there. And I had hoped that the course would sort of glue them together. It didn't. (laughs) So

everything I learned at the University of Illinois at College of the Engineering, I have used, including the courses that I thought were totally useless at the time I had them. (laughter) So I give money to the University of Illinois. I never give money to Penn State.

DR: So you don't feel like your graduate degree really helped you in your career.

BLB: No. It just looks good on paper, yeah. And when you get close to the end of something like that, well, you get this feeling of I've got to protect it by finishing, because I've put the effort in. And so that was the way that went.

DR: I wanted to ask you what it was like being part of the first ICWES in 1964 in New York, the first International Conference of Women Engineers and Scientists Conference?

BLB: Oh, yeah, that was fun, definitely fun. And I had a young high school girl with me that had won the competition at the Philadelphia Section. And the reward was to come to the International Conference. And so we had a suite, you know, two bedrooms and a one bath. So she had her own room, really. And she was a neat kid, and seemed to get along okay with being much younger than anyone there. But that was the way it was.

And oh, we had this banquet in a non-air conditioned room on a very hot night. (laughter) And you probably have seen this picture that they took. It must have been one of these rolling lens type cameras.

DR: Oh, yeah, the landscape view.

BLB: And it's very clear. I mean, you can study that picture and say, "Oh, there's so-and-so, there's so-and-so." And that photographer was great. I do remember, though, in all this heat, why, the English women at our table looked down the way and saw the butter sitting there. It was in a little dish with ice cubes on it. And the English lady says, "Now I know why Americans put ice cubes with the butter." (laughter)

DR: Oh, that's funny. What was it like meeting women engineers from other countries?

BLB: Oh, it was fun. I was scheduled later in '64 to go to Australia.

DR: For work?

BLB: No, just vacation, for fun. And there were two ladies who were from Australia – both from Melbourne, but they didn't know each other. So I visited both of them, and that was fun. And I thoroughly enjoyed that. And if I hadn't met them, why, I wouldn't have gotten to be with them a little more later. You know, one of those women visited me in Schenectady much later. You know, I kept in touch. And the other one lives down in New York City now. And she immigrated to England after Australia. Well, she's a very interesting person. She's originally Russian and married a Polish man. So they moved to Poland, and then to Australia, and then to England, and then to the U.S. Well, her kids are here in the U.S., too, so that makes sense. After they moved to the U.S., why, she did, too.

DR: So it sounds like you've done a lot of traveling throughout the years in your off-time.

BLB: Yeah, yeah. I went to Mississippi in February, and that was my 50th state.

DR: Oh, wow, that's great.

BLB: I've been – (laughs) well, as I explained to someone from England, you know, seeing our own country is a lifetime project for us. And I don't always go to some of what you might call keen vacation spots. I've been twice up to Spitzbergen.

DR: Where's that?

BLB: Up north of Norway. It's way up there. It's eighty degrees north latitude. (laughter) It's way beyond the Arctic Circle. And both times it was on a Linblad trip, so you get to see polar bears, you know, from the ship. They're on the ice cakes that are floating around. And I got a kick out of that. I enjoy being outdoors, and have a lot of that sort of hobbies.

DR: So you never really had a – you were able to, then, balance a demanding career with a personal life–

BLB: Oh, yeah, yeah.

DR: – with no problems.

BLB: Yeah. I sing in a chorus that does major works. And we just did a concert this last weekend. We will do the Messiah next. And we give people more of the Messiah than usual. We give about two and a half hours worth of it. (laughs) But you still cut things, because it is a huge work. And I can't conceive of doing it without some of the things that many people skip.

DR: Let's talk about SWE again. Since you were a very early member of SWE, and you've continued your membership,

you're still a member now, can you talk about how you've seen SWE maybe change or grow over the years? And do you think it's still relevant to new women engineers today?

BLB: Yeah, I think it is, particularly when they talk about the fact that the women have, you know, glommed onto things like the medical profession or law, but their percentage of engineers is still very low. And you know, it's one of the things that probably is based on misconceptions of engineering.

And one of my pet peeves is that often engineers are thought of as working in a corner by themselves grinding out numbers. And it's really the ultimate group practice. So many of the people that are here today are here as part of a big company, which means it's even bigger practice than if you work in a small company where you're sharing the engineering with three or four other people. So that part doesn't come out very quickly.

And I think there's some indication now that women who are considering what field to go into are more attracted to some of the socially relevant things, so that they want to become teachers or maybe ministers or doctors, and don't see any social significance to engineering. Now, engineering people are not usually the sort that pats themselves on the back for doing these good things.

I just read an article about a man who's an economist. And he'd taken a visit to the sewers of Paris. And to him it was sort of a revelation that we don't pay attention to these things that we count on for our daily life. And engineers pretty much

understand there's a lot of things under that street. (laughs) And a lot of people — it doesn't — that has never dawned on them, except maybe if they see one dug up. (laughs)

DR: Right. So do you think SWE, then, still can play a role in educating people about engineering—

BLB: Yes.

DR: — particularly young women?

BLB: Well, that's universal, I would say. Engineers understand these things are useful and relevant, and that sort of thing. It comes out in funny ways. Like one of the guys that had been out on a field trip to a new gas turbine installation down in the Caribbean was laughing when he got home about when he went to check in over at his lodging, why he was handed both a key and a candle. And the candle is because the power goes out all the time. (laughs) And so you quickly get a message that they really are eager to have that gas turbine producing power. And you know, he was pleased, in a way. But they don't verbalize that sort of thing as being something that's socially useful, even though it is.

DR: Now you've been involved with SWE, both on a local level with section work, and nationally, correct?

BLB: Yes. But mostly I've been at-large.

DR: What they call a MAL, member-at-large?

BLB: Yeah. When I was in Philadelphia was when I really got involved in it. I had gone a few times to national conventions in the '50s to see what I had joined into, (laughs) because that was about the way you did it. And it was fun,

because you go – the membership was maybe 1,000. There'd be 100 there, which was very good for a national organization to have ten percent of the members there. But these are women with relatively good salaries. And so at the end of such a convention in the early days, you would have talked to everybody that was there.

Now you've got – you know, we can only have our conventions in places with huge facilities so that you can have twenty or so simultaneous things going on, and it's really a big deal. And you search around looking for gray hair, (laughter) because those are your old buddies. So it's different, but in a good way.

DR: Right. So that shows that SWE is reaching a larger number of women, correct?

BLB: Yeah. One year – and maybe a second year – we had one panel that was really for people who have retired or were close to retirement. And I think that was appreciated. And I don't think it was in the preliminary program, I think it was in the final one only. And so some of the people said something about, gee, they wouldn't have scheduled a visit somewhere else that blocks out three or four hours if they'd known that we had this thing expressly for the older members. So, yeah, it's different.

DR: Well, what advice would you have today for women considering becoming an engineer in today's world?

BLB: Well, it's a lot easier that it used to be, I think. That's the first thing. I remember one of the students at Union

commenting about, you know, somebody said something about jobs, and this girl says, "Well, it's very easy. If you've been an engineering major, you have a job offer. If you didn't take engineering, you don't." (laughter) And that campus is largely oriented to liberal arts, although they were among the first ten that offered engineering in the U.S. So it's been there.

Well, I think much of it is the same, that you talk to the students in high school and try and tell them that it's a worthwhile thing to do. I tell them it's a group practice sort of a situation. There is a little bit of truth to the muddy boot image.

One of the SWE tales that I remember is this woman who obviously was stylish and that sort of thing says, briefly, "My wardrobe also includes a hardhat. (laughter) You know, because I would wear my hiking clothes when I would go visit a power plant, and have a pantsuit that is suitable for both going to a meeting when they've never seen you before in your life, to get things started, but also is such that you can climb the stack afterwards in the afternoon when you start looking the site over.

And I remember particularly one time I was here, this woman had just graduated from the University of Wyoming, a very cute and attractive young woman. And she was a petroleum engineer, and she was about to go into field work. And it turned out as I got to know her better that it was probably the right choice for her. She was raised on a ranch, wasn't really interested in an office job, and she was aware of the fact that she might get a

hard time by being a cute young woman. So she had a truck, and she had a big German shepherd. (laughter)

DR: Oh, that's funny.

BLB: Yeah. And I strongly suspect she would do very well.

DR: Yes. Well, I think I just have one last question for you. If you had to choose, what would you consider to be your most important contribution to engineering?

BLB: I don't know. One of the things I wanted to mention and didn't is that I started a math tournament when I lived in Cincinnati. It was for high school kids.

DR: Okay. We can talk about that.

BLB: Yeah. And from a technical viewpoint, I think that the exhaust nozzle that I have a patent on at Evandale was important.

More recently, I basically started the format that we used for getting bids on air emission tests. And I always seemed to get some of the more interesting ones. And when we had the first-of-a-kind gas turbine, the 7F, why, I used, you might say, all my background, so to speak. And I just, you know — this guy says to me, "Hey, we got 300 and some ppm of hydrocarbons at the inlet." And I'd been up on the roof, and knew what some of the piping was that had been up there. And oh, that's that — it's a leak out of the gas line from the gas valve compartment. And we were losing a lot of gas that had already been counted as going into the turbine.

So on that basis, we would have failed efficiency. That gas leak was also going into the incoming gas in the machine, so

it was screwing up the seal – the carbon monoxide, and so we were headed to flunk that. And basically, all the six weeks of combustion tests that the guys had been running on the machine before we got that straightened out, had to be discarded. But you know, so I did that, and we passed everything. And I was important in doing that. And because it was the first of a kind, it would have set very poorly to have not that pass everything.

DR: Are there any further experiences that you'd like to share that we didn't cover?

BLB: I don't know. (laughs)

DR: Okay. All right. Well, thank you very much for your time.

BLB: Okay. Fine. Very good. Hey, you did it right.

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