PROFILES OF SWE PIONEERS

ORAL HISTORY PROJECT

Josephine Webb Interview

March 2-3, 2003

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Josephine Webb

Josephine Webb graduated from Purdue University in 1940 and became a Buhl Research Fellow in the electrical engineering department of the Carnegie Institute of Technology for two years. She joined Westinghouse Electric Corporation as a design engineer in 1942, and in 1946 became director of development for the Facsimile Development Laboratory at the Alden Products Company where she designed an eighteen-inch full newspaper size fax machine. Following a brief tenure with Foxboro Instrument Company, she co-founded Webb Consulting Company with her husband. She also took a position in 1977 with North Idaho College where she began development of a Computer Center and worked on several government grants for enhancing the campus and its educational programs. Webb holds four patents for her work and has been active in many professional organizations, including IEEE, NSPE, and the Society of Women Engineers, in which she is a Fellow.

In her 2003 Profiles of SWE Pioneers Oral History Project interview, Webb discusses her education at Purdue University; her early career work for Westinghouse during World War II; her consulting work with her husband; her work in academia; and her involvement in the SWE, particularly in the area of career guidance.

- July 2016

INTERVIEW WITH JOSEPHINE WEBB, BY LAUREN KATA, MARCH 2 & 3, 2002

LAUREN KATA: Good morning. It is Saturday, March 2nd, and this is an interview with Josephine Webb, PE, a member of the Society of Women Engineers, a Fellow of the Society of Women Engineers. And the interviewer is Lauren Kata, Society of Women Engineers Archivist.

Josephine, when were you born?

JOSEPHINE WEBB: I was born in 1918.

LK: What date?

JW: June 21st.

LK: And where were you born?

JW: In Niagara Falls, New York.

LK: Would you mind describing your family background a little bit?

JW: Not at all. I'm one of the early examples of a one-parent family, because my father, I never knew. He went away to World War I, even though it was late in the war, and never came back. So my mother and my older brother and I lived in Buffalo, New York, for most of my childhood. And my mother became a social worker for the International Institute.

My mother was born in Hungary, and came here with her father when she was fourteen. She was very determined to learn English properly, so she worked both as a maid and later as a more experienced person with American families, so that she learned to speak English properly, rather than staying in the neighborhood in Cleveland and Buffalo, where the various Hungarian immigrants have

stayed, and one of them being a first cousin.

Anyway, I had a very nice childhood, in spite of the fact it was with one parent. My mother was determined that we get a good education. And we lived in a suburb called Kenmore. I went to a school. The New York schools were very good. In fact, when I moved to Idaho, I was shocked when my daughters needed to go to school, to see that my schooling was better than theirs.

LK: Wow. So you weren't an only child, you had siblings?

JW: I had an older brother, with whom I was very close. He's two and a half years older, so the two of us were inseparable. He took me with him to all kinds of things. Like when he got interested in radio, we both became ham radio operators. He took me through it, and I got my license, and so forth. So early on, I was very influenced by the male members of the family, namely, at that time, my brother.

LK: What was his name?

JW: Roderick (phonetic) Rohas, R-o-h-a-s. Rohas was my maiden name.

LK: So aside from your ham radio experiences, do you have any other early experiences with technology?

JW: Well, basically, our high school had a science club, and I was very good in math, and I liked that kind of thing.

LK: What high school did you go to?

JW: Kenmore High School. I feel that I had a rich training at that high school, in technical subjects, and being in the ham radio

club and things of that sort. And I loved aviation, so we went out to the airport a lot. We saw when Lindbergh came to visit. I was just a little kid then (Laughs).

LK: What year did you graduate high school?

JW: 1934. And then I worked for two years before going to Purdue University, to major in engineering. And that, of course, was again at the urging of my brother to apply for an out-of-state scholarship, for which I received a whole fifty dollars (Laughs). It paid the out-of-state tuition (Laughs).

LK: I'm interested in the time you spent at Purdue, but I'm wondering if we could take a step back and talk a little bit about your high school experiences. Can you talk a little bit more about your teachers and your interaction with them at Kenmore High School?

JW: It's rather hazy, it always has been. I mean, at the time, it was just taken for granted. I know I had a good English teacher. I know I had a good math teacher. We had a science club.

LK: What was it like to be in the ham radio and the science clubs in high school?

JW: Well the ham radio thing -- I guess I don't have a publication here, but they put an article in a magazine about my being the youngest YL operator when I was thirteen, so I remember that quite well.

LK: Were there many girls in the club?

JW: No, there weren't. I did meet, a couple years later, a girl from Delaware who was only eight, whose father was a ham

(Laughs), and he had seen her through to getting her license. I don't know how she did the technical part, but obviously there are a lot of things you can learn by rote (Laughs). But anyway, I never kept in touch with her. She was only eight, so she superceded me as the youngest YL operator by a lot. And I just remember paling around with my brother a lot. He liked old cars and things like that.

My brother, Rod, preceded me at Purdue by a year. And when he got there, he said, "You apply for an out-of-state scholarship," which I did. And so I arrived a year later. My brother Rod was in mechanical engineering, and had married. I was in electrical engineering, and by that time I had met the person who was then to be my husband later. And so all through my childhood and early life, I had either a mentor or a companion, a male figure in my life. And this is not, certainly, as true today of women who go into engineering. Back then it was a wonderful protection, because everywhere I went I was accompanied by my husband, who was three years older. He had been in ceramic engineering at Alfred, but had dropped out because his mother needed him.

We two met in Buffalo where we both worked for the same radio store. And (Laughs) of course, once we met, we were inseparable, much to my mother's disgust (Laughs). She would come downstairs and say, "You've got to come up now," when we were sitting in the car outside. But anyway, it all worked out.

LK: This was in the 1930s?

JW: Yes. And in 1936, I went to Purdue. And my then-almost

[husband] also applied at Purdue. He'd been out of school longer because his mother and younger sister needed his support. It was a very tough decision for him to leave and go off to school, because they were, to a certain extent, depending on his money. But my mother and others helped him get some money, loans. And one of the people at Radio Equipment, who used him for sound equipment, an older man, who was the president of a hardware company there in Buffalo, hired him to set up a nice sound system for his band. He, as a hobby, had a jazz band, and he needed to have proper equipment for it. And so we both got to know Walter a lot. And Walter funded my husband's -- partly, I mean -- funded my husband's starting in school, gave him enough money so that he could go.

LK: It sounds like at that time support networks were very important.

JW: Very important. Neither of us had a dime.

LK: And you attended Purdue on a scholarship?

JW: Partly on a scholarship, partly on a grant, and partly I worked with the NYA, National Youth Administration, was it? Yeah. I got a job at school to do that. I lived in the residence hall the first year, and then a rooming house the second. And then at the end of the second year, Walter said, "Hey, you two, you might as well get married. I'll help you both," which (Laughs) was just like a fairy tale. So we got the extra help. But we both worked. Each summer we worked. And so we got through Purdue together.

LK: How did your mother feel about you wanting to be an

engineer?

JW: Well, my mother was a professional woman, which was a little more unusual then. And she knew my brother Rod and I had been very close, and that I was good in science. She not only put up no objection, she was very encouraging. Her work as a social worker didn't give her extra money, but she helped when she could. My husband's mother would put five dollars in a letter (Laughs), and things like that, even though she didn't have much either. But in those days, this was not unexpected or unusual. And we didn't feel at all sorry for ourselves.

We were just delighted with Purdue. We investigated the physics department, and everything we could, and got NYA jobs -- well, I got one in statistics. Herb got one repairing electronic equipment, that's what he had done at the radio store. And so we both learned practical experience like that.

LK: Herbert Webb was your husband.

JW: Yes.

LK: How many other women were at Purdue when you started?

JW: Five. No other electrical engineers who -- two in chemical, one in electrical -- I mean, one in -- let's see, I was in electrical, two in chemical, two in mechanical.

LK: What courses interested you the most while you were there, do you remember?

JW: We had very eclectic tastes. We loved drama. We loved other courses besides the engineering. And we got through our

calculus and math and that sort of thing pretty well. We didn't take in many sports frankly, but we took in all the special concerts and things like that. My husband had played clarinet and I'd played piano, and we both loved music.

LK: Do you still play the piano?

JW: To a certain extent. You know, I'm not as good at it, but I made sure I have a piano everywhere, and so do my kids.

LK: Was there anything on campus, like an engineering organization that you or your husband belonged to, a student chapter, maybe?

JW: Well, there was Sigma Xi, and we were both elected to Sigma Xi. And it was funny, because when I was elected [into Sigma Xi], they put in the letter appointing me that it was because I was a woman. I wrote back and refused the election, because I (Laughs) said that was not a good enough reason. (Laughs) And they realized what I was talking about and changed their tune, so I did become a Sigma Xi member.

And let's see, what else at Purdue? We were just so busy because we worked. We serviced radios and things like that, and found a nice little apartment for nineteen dollars a month -- which was high. But we managed all right. By brother, bless his heart, didn't do as well from the standpoint of his lifestyle. He had married early, and his wife worked at the rubber plant nearby, and he went to school. They struggled harder than we did. We felt a little embarrassed that we were doing so well. I didn't see a lot

of him at Purdue, but he was always there when my mother would come over from Buffalo, occasionally, to visit. And we went home during holidays.

So we got through Purdue. And in the senior class they had people from industry come to interview. And it was 1940. The war had not started. Herb had not joined the group of students who were the reserve in the Army, I forget what they called them. But anyway, at that interview, they offered Herb a job at Westinghouse, the Westinghouse representative there offered him a job in Pittsburgh. They did not offer me a job. But this was before the war. And of course, even now it's a dilemma for married women: Whom are you going to follow, and so forth. But we left in August of 1940, and Herb worked for Westinghouse.

The next year, on December 7th, when the war started, a lot of the ROTC people were called away. And suddenly I was getting offers to go work for Westinghouse, because they'd lost a lot of their male engineers.

LK: Before Westinghouse, did you work at the Carnegie Institute of Technology?

JW: Yes. Well, that was during the time when my husband was working at Westinghouse, and I wasn't. So I thought I'd go back to school. But instead, Dr. Teare [at Carnegie Tech] suggested that I come in as his assistant, at which time the two of us worked on his research project to test how well copper conducted electricity on transmission and distribution lines. The title of his research was

called **[insert title]**. And so I learned a lot from Dr. Teare. He very graciously put me on as the second author. I did help with the material that went into it, but I had nowhere near the knowledge, mathematically, that he did. And we submitted the article to the AIEE.

LK: The American Institute of Electrical Engineers.

JW: And it was chosen as the best theoretical paper in 1944, so it was a very nice thing to have happened.

LK: Were you surprised that he asked you to co-author?

JW: Well, I didn't really evaluate it until afterwards. You know how it is, you just take things for granted. Certainly I didn't know that it was going to be chosen as best paper. I just worked on it with him.

LK: What was his full name?

JW: Professor Benjamin Teare, T-e-a-r-e, who later became dean of engineers.

LK: At the Carnegie Institute?

JW: Yes. A very gracious man, he and his wife both.

LK: When you were conducting your research, who worked on it? Just you?

JW: Just me and Dr. Teare.

LK: Between 1940 and 1941?

JW: Oh, wait a minute. Yeah, about a year and a half, I think, uh-huh, until I got the offer from Westinghouse.

LK: Can you talk a little bit about that experience, working

at Westinghouse?

JW: Well, I really loved it. Herb was in switchgear engineering, working on compressed air circuit breakers. My job was oil circuit breakers. We would meet for lunch, but other than that we didn't see each other. We moved out into the suburbs near Forest Hills -- well, Forest Hills, near East Pittsburgh, where the plant was, and we'd take the PCC cars into Pittsburgh, the streetcars. They're very famous, those early cars. But anyway, we'd jump on those, and get home, or go downtown to Pittsburgh, where we haunted the used bookstores and did things like that (Laughs).

LK: What was your title at Westinghouse when you first started?

JW: That's a good question. I guess just design engineer. I can't think of anything more specific than that, but it was as an engineer. And when I read some of the horror stories that women tell me about how they had to soft pedal the fact that they were engineers, or take jobs that looked more like secretarial -- it didn't happen to me. It was maybe the times I was born (Laughs).

LK: At Westinghouse, what were the greatest projects that you worked on?

JW: I think I had two patents from Westinghouse, and they were all in switchgear. They were in the nozzles for the circuit breakers, I think.

LK: And you received the full credit for that patent?

JW: Yeah.

LK: Was that usual at Westinghouse?

JW: Yes. My husband had about a hundred patents. He was very imaginative and very skilled, and did a lot of -- he was prolific with his ideas.

LK: At the time that you were at Westinghouse there were also a lot of engineering training programs--

JW: Yeah.

LK: -- that companies like Westinghouse introduced to train women to enter the workforce.

JW: That must have been during the war, World War II.

LK: What was your relationship to that end of the company, the training of women into engineering type jobs, and then your work as an engineer? Did you have any interaction with those women?

JW: Frankly, I didn't, actually. I think that came a little later. It was still the war, but it was near the end of the war. I don't think it started right away. What happened is, as soon as the war was over, my husband and I, who had been -- he had been at Westinghouse for five years, and I for somewhat less, decided that we wanted to go work for a smaller company. He was in industrial electronics, and I was in power systems. So in August of the year the war ended -- in Europe, anyway -- we both took off, interviewed in Massachusetts and went to work for companies in Massachusetts -- resigned our positions with Westinghouse. You can see how intertwined our lives were. We moved to the Boston area. I worked for a firm called Foxburrow Instruments, and my husband worked for what became Electronics Corporation of America, was its new name.

And we lived in a suburb called Sharon, which was near Foxburrow. Herb took the Rhode Island train into Cambridge, where he worked.

LK: What about working for Alden Products?

JW: That's the one.

LK: 1945?

JW: Yes. That's the first position I had. And I just applied, and was interviewed. They were doing work in -- oh, what do you call it -- (Laughs) imaging --

LK: Fax machines?

JW: Fax, that's the word. And it's so interesting that now, fax is taken for granted, and I worked on it way back then. It was over long lines, of course -- and black and white. My daughter still has a framed picture on the wall of one of the first faxes that I had received that was very well done. It was only a few miles away, apparently. They hired me to head up a design group that worked on fax machines. I had no engineers under me, but I had technicians under me who did the actual building and things. So I had, actually, a good experience there.

LK: As a manager, correct?

JW: Correct, of the design group.

LK: What was your official title, do you remember?

JW: I don't know that I had an official title.

LK: But you directed--

JW: I directed five workers in the Alden Products Laboratory. I was director of the lab, I guess.

LK: And how long were you with Alden Products?

JW: A good question. I think I was there a couple of years and had a chance to go work for Foxburrow, which was a much bigger company.

LK: What did you do at Foxburrow?

JW: I was in the research department there. I remember enjoying wonderful people who worked there, they were good mentors. So I worked on all kinds of electronics. Foxburrow Instruments is still in existence, as part of Bristol. Then, we were a separate company from the Bristol Instrument Company. I still hear from the wife of one of the directors that I worked for. He is since deceased. Unfortunately, a lot of my companions are deceased.

LK: Did you have a relationship with her when you were an employee at Foxburrow?

JW: Yes, yes. Very often we'd get together as two couples, or something like that, outside of the job. So I got to know Peg, [the wife of] my closest associate, Needbred. And he became quite prevalent in the field. I'm trying to think of what his position was. Until recent years, I knew. And Peg was a librarian, and they had five children. (Laughs) I still didn't have any children at that point. But I did decide to have a child.

LK: This was in 1948?

JW: Yes.

LK: You mentioned earlier that your relationship with the men in your life might have protected you. Do you feel that your

relationship with your husband helped you in your career?

JW: Well, I think it certainly did, which is so fortunate, because I didn't feel any of the discrimination that I know many women do, and particularly when we went to IEEE meetings, or other types, like NSPE and the IRE. (Laughs) I'm trying to remember what those things stand for.

LK: That's okay. Let's talk a little bit about the associations that you became a member of. When you were working at Carnegie Institute, you mentioned the American Institute of Electrical Engineers?

JW: Uh-huh.

LK: Were you a member at that time?

JW: I was. It later changed its name to the IEEE. And I stayed a member for a long, long time, and then finally resigned.

LK: While you were in school, were you a member?

JW: I was a student member, so I just transferred from student to member to full member when I got work.

LK: Did they have an associate member grade, do you recall?

JW: I don't remember, I'm sorry.

LK: Do you remember, or do you have a sense of how important it was to belong to a professional association in your early career?

JW: Very much so. I believe we both felt that way. And in fact, when we did some private research much later in life, we submitted a paper to the IEEE, which was accepted. And it was nice being a member. Whenever we moved to a new city, it was nice going

to the local chapter and making connections. So from the beginning, we felt it was important to be a member of professional societies.

LK: In 1949 you left Foxburrow Company?

JW: Yes.

LK: And then where did you go in your life and your career?

JW: Well, the reason for leaving is that we two, again, picked up and gave up our positions. My husband gave up his position with the Electronics Corporation of America, and I with Foxburrow -- although I think I was on maternal leave by then.

LK: Did they have maternity leave?

JW: No, they didn't (Laughs). I just meant that I was. And I think they would have taken me back, but we gave up all of those things for our dream of coming west and starting an intentional community of people who wanted to live out near a lake or on a lake and own a lot of property together, and help each other build homes. I guess we were about a generation before the real hippies came along, but it was the same instinct, the same idea.

We piled everything in a big van, and with two other couples, trekked to the west, never having been here before, though we had researched areas where property might be relatively inexpensive, and where there were nice bodies of water. We didn't want to go to the southwest, which was so dry. And one couple preceded us by a year, so we had a place in Spirit Lake, Idaho, to come to, and then began looking around for property.

The two of us and our nine-month-old child came west. And when

we got here, it was pretty undeveloped around north Idaho, and Spokane, even. We looked around and looked around, and found some wonderful property on Coeur d'Alene Lake, and managed to get a hold of it. We had to go into debt. And nobody would -- no banks would lend us any money, (Laughs) but my mother lent us enough money to pay for the property. Afterwards, of course, we paid her back. But therefore we had a place to start here. We designed and built our own house, a little concrete block house. Meanwhile, we were renting in Spirit Lake, and trying to establish ourselves in the Spokane area. We set up our consulting business, called Webb Engineering, and we both got our PEs.

LK: What year did you get your PEs, your Professional Engineers license?

JW: I'm trying to remember. I think Herb got his first. I think it was in the '50s.

LK: Why did you decide to become a professional engineer? Why was that important to you?

JW: Because we wanted to do consulting business and be independent of working for industry. We had worked at Westinghouse for a large company, then we worked in Cambridge, Massachusetts, for smaller companies at that time. And we decided it was time to try it on our own.

LK: Were many people doing that at that time?

JW: Well, there were big companies, like Bechtel, and some of the others that had engineers on their staff who were PEs. And we

just felt that we'd give it a try. We did a lot of very mundane work just to get enough money to get along on, but gradually we got some -- there were people who began to know about us.

And at that time, when you wanted to do consulting in something like industrial electronics, you could find a company that needed that sort of thing, photo electric controls, liquid level controls, paper mill controls and things like that. Now a days, of course, all that is handled by the industry who is providing the equipment, and it's much harder. But then, they didn't do that as much, so there were, perhaps, in a small sense, more chances back then for small companies.

So we went along with that for a few years. My husband Herb got the territory for combustion controls, so he traveled around eastern Washington and north Idaho, and either served or sold equipment for power plants. Meanwhile, I helped write some of the reports and that sort of thing.

LK: You were also raising your family?

JW: And raising, first, one daughter in '48, who was born in Boston, and another daughter in '52. And so I was able to be home. We had our laboratory, which was also set up as a measurements laboratory, as an addition to our home. So both of us could be at home, so to speak. The trick was to close the door and not do any home stuff when (Laughs) we should be upstairs working in the lab. And you know, that kind of discipline you learn as you go along. We were there when the kids came home from school. They had a long

school bus ride. And we became active in school stuff.

LK: What was it like before they were in school, in terms of the hours that were scheduled for the lab and the hours that were scheduled for the home?

JW: Well, they participated in a lot of things with you. Like, when we were building our concrete block building, the littlest one, I can still picture her with a shovel, working on the mortar. Of course, they weren't very effective, but she was cute (Laughs). And so we tried to include them a lot. They didn't act like they were particularly deprived, even though we lived out a ways, because we lived on the second level above the lake, and they had woods to roam in and places in the lake. And of course, we spent a lot of time around the water, and had a little old boat, and that sort of thing at the time. So they grew up around the water.

LK: And also grew up around the laboratory?

JW: Oh, yes. I would get them to take measurements for me and call out numbers, and that sort of thing. Sometimes when I worked on studying the need for more [electrical] lines and so forth, to send in to the Rural Electrification [Authority] for a grant – that's where I started my grant work, actually -- I took a lot of measurements and did a lot of writing of distribution lines, and what was overloaded, and what wasn't, and where we should put reclosers, and where we needed to adjust phases, and so forth.

So I would go into the local office of Kootenay Electric, which still exists, by the way. And when I had a report due that had to

be sent in, sometimes I'd work until 2:00 or 3:00 in the morning. The girls understood. They took over, and did their own and their dad's breakfast, and that sort of thing.

LK: How old were they when you were working on this project?

JW: Well, let's see, probably ten, eight or ten, somewhere in there.

LK: In a sense, Webb Consulting was a family firm, then, wasn't it?

JW: In a way it was, (Laughs). And we called ourselves Webb Engineering. That's what my business card still says. But those were interesting times, to say the least. And in the meantime, we had bought this wonderful piece of property across the lake, where we really wanted to live, but it was not accessible to Spokane -- not very accessible. And my husband, Herb, got a job as an associate professor of engineering at Gonzaga University in Spokane. So he commuted four days a week to Spokane, from our home in Rockford Bay. And so that was a big change in our life.

LK: Was that in 1960? What year was that?

JW: Well, let's see, that sounds about right.

LK: Okay. So once he decided to become a professor, what happened to the consulting firm? Did you continue?

JW: We still continued. We had an understanding that he wouldn't be part of the Jesuit community. We were not Catholics, you see. Those universities hire you anyway. And so he stuck strictly to his job as a teacher. And I think he taught ten or twelve credit

hours a semester in junior and senior electrical engineering. He had to scramble to keep ahead of everyone (Laughs) each night in the beginning, but he loved teaching. He really did.

LK: I would like to shift gears a little bit and talk you to about the Society of Women Engineers.

JW: Right.

LK: When did you become a member -- first of all, when did you hear about the Society of Women Engineers?

JW: I heard about it in the 1950s when it first started. I was living in Spirit Lake, Idaho, and felt that there was no way I could join at the time. I couldn't get to the meetings or do any of those things.

LK: How did you hear about it?

JW: Through the mail, I suppose as a graduate of Purdue, maybe, something like that. But anyway, in 1960, I joined. And my first meeting was here in Seattle. I remember it very well.
In fact, they had me join as a senior member. I became a senior member right away. And I got to know some of the local people like Irene Peden, who was up for an award at the time. I didn't know them well, but these are all the women I know through SWE, over the years.

LK: Why did you decide to become a member?

JW: Well, it was a pattern that we had established from the beginning, to join the professional societies. And I was very passionate about more girls going into engineering, so it was logical to join. In the meantime, as my kids were growing up, I was often

invited to speak at a local PTA, or some kind of meeting, or go on one of these career guidance things that the schools put on. And I kept yelling "High school is too late!" At any rate, early on, I did try to present myself in the community as available to help with encouraging girls to go into things; and of course, by example, as well.

LK: As a senior member of SWE, do you feel that you had an influence on young professional engineers at the time?

JW: Young women?

LK: Young women.

JW: There weren't many in the Spokane area. Keiser wasn't hiring them. Hewlett Packard hadn't come yet. The telephone company was the one place that hired women. But there was not a very big group in the Spokane area. They were all down in Tri-Cities, working for Hanford -- but that was just a little too far away for me. I did go down a couple times, with some of the women in Spokane.

LK: So because you weren't in such a populated geographic location, you gave services in other ways to the Society [of Women Engineers], right?

JW: That's about right.

LK: And what was your main activity or responsibility in the 1960s?

JW: Well, I volunteered to gather interviews and things by mail, and so they called and asked me if I would be the statistics chairman for the 1964 meeting in New York City.

LK: The meeting of the International Conference of Women Engineers and Scientists?

JW: Right.

LK: That was the first international meeting?

JW: The very first, right. That was thrilling, to be a part of that. I worked hard preparing a paper about women engineers in the United States, and how many were in what fields of engineering, and so forth. And I presented that paper at the meeting in New York.

JW: I didn't realize I'd taken so much time. We didn't get very far, did we?

LK: Well, why don't we take a break.

JW: That'd be fine.

(INTERRUPTION IN RECORDING)

[Tape 2]

LAUREN KATA: This is Sunday, March 3rd, 2002. This is tape two of my interview with Josephine Webb.

LK: When we spoke yesterday, we talked a little bit about your experiences in your early career, and with the Society of Women Engineers. Now, if you could talk about the work that you did as part of Webb Engineering, your consulting firm?

JW: Yes, I'll be glad to. When we moved west and were no longer working in industry, we set up a consulting firm. So not only did we consult with industry on industrial electronics and that sort of thing, we used it to develop some ideas.

Since we lived right on the lake, and we watched TV programs

showing underwater communication, like Lloyd Bridges in "Seahunt," we thought, "Gee, they can't talk under water. Let's see if we can't do something about this." So we experimented. And it's quite difficult, because the way we talk in air, we're used to. The way you would talk in water is a much different story: you have to have a receiver that can pick up the water sound waves, rather than the air ones, and it has to match -- actually, the technical word is impedance match, between the water and the speaker, and the sender. So we worked hard on that, and actually got one that was pretty good up to about forty or fifty feet. All of this is an example of trying something out and spending your own time and money on it to develop a prototype.

We asked the University of Washington, in their oceanography department, if we could come over and test it. Well, like so many ideas, it sounds good (Laughter)-- it "sounds good" -- (More Laughter)

JW: -- but when we brought it over, and they took my husband out in their research boat, one of their divers put it on -- and this is without any additional amplification, it's just a voice thing which you use directly, transmitting from you to the other person through the water -- but when we tried it, the divers couldn't hear. And we wondered why, and it's because most of them were retired Navy divers, and their eardrums were already punctured. This, of course, we hadn't thought of. And so they said, "Well, we're sorry, but we can just barely hear you." You know, it wasn't practical. And they

said, "That's true of most of the people who will be diving, the commercial divers anyway.

So we were quite crest fallen. But that was an example where we invested our own time and money to produce some equipment. We did write an article for the IEEE, and it went into the magazine, because the theory was valid, and there was a lot of math involved. So we worked up a nice article. Mostly, my husband did the analysis, and then we presented the article in New York at one of the IEEE conventions.

LK: You presented it together?

JW: Yes. So that was fun. But my children got to understand that not everything works, you're not always a success.

That was true of another we had, called sculptography.

This was before we had light like we have now in the form of lasers, and so forth. I don't know if we were behind the times or ahead of the times, (Laughs). But anyway, we developed this system to make a three-dimensional model or image, based on photographing from twelve cameras, all around the periphery of the way you would look. And in addition to the photographic image from twelve cameras, we had to have another image that was a series of lines. So we scribed bars, which projected onto the person standing on a turntable in the middle, while we photographed them, but we also photographed the line. And then you could change that into a carving machine. So we used plaster of paris and carved a little model about as high as one of us. And then the tool would follow the contours of the

line, and we produced an image. Then how do you get a photographic image on it? Well, there was photographic material that you could put onto the plaster of paris and then expose it and develop it and get an image, which we did.

LK: Oh, how wonderful.

JW: And my husband took it to various businesses around the country. Kodak said, "Well, it's nothing we do, but could we have a copy of it for our museum?" (Laughs) And so, again, we invested some money -- very little, but you know, that was another idea.

LK: What year was that, or what time period was that? Do you recall?

JW: That would have been in the '60s.

LK: And for that particular product, how did you come about the idea? Do you remember?

JW: Well, for example, my husband and I were watching Lloyd Bridges in "Seahunt," and we realized they couldn't talk. The Navy used a more complicated idea, even then, using high frequency and transducers to change it to audio, but that was expensive. So we were trying to produce something for sports divers that would be cheap, (Laughs) and just got the idea.

LK: What about the idea for the sculptography? Do you remember why that came up?

JW: Oh, gee, I can't say offhand. But similarly, it came out of our experience.

LK: And what was it like working in your home lab on these

independent inventions?

JW: Well, it was something we did together. Very often when it was done, and we produced the model, Herb would go around the country to show it, and I would stay home with the kids (Laughs), a typical wife, in that sense.

LK: Not that typical.

(Laughter)

JW: But he kept in touch. And the girls knew what we were involved in, and because they were born in '48 and '52, they were big enough to fend for themselves when necessary. Sometimes, we did go to meetings in Spokane together. And by '52, or somewhere in there, Herb got an offer to teach engineering at Gonzaga University.

LK: That's wonderful.

JW: So that helped supplement our income. And I was working for Kootenay Electric Co-op, designing REA [Rural Electrification Authority] distribution lines. So we had some income. We lived out in the country, and didn't require much. But other than that, we stuck with the independent consulting all along, whenever it would come up.

LK: How did you engage the patent process?

JW: We hired a patent attorney in Spokane.

LK: And you received patents from your inventions?

JW: We did.

LK: Why was that important for you?

JW: Well, because you have to protect your product. And of

course, we learned all that working in industry. We both had patents, particularly my husband, with Westinghouse, protected his designs by patenting them. Similarly mine, although I had fewer -- worked fewer years. And so we knew what the patent process was.

LK: Do you recall some of the patents you received during your career?

JW: I only received three or four in my career. Then we did papers for the IEEE with both our names.

LK: Was it usual for teams to present their findings at IEEE conferences?

JW: I believe so.

LK: Was it usual for husband/wife teams to do that?

JW: No (Laughs), it wasn't. But we were cordially received.

LK: Sure.

JW: In fact, at the presentation of -- which was it? -- I think it was at sculptography -- that was the name we coined -- in New York City, at the annual [IEEE] meeting, we took the girls along, took them out of school so they could be with us. And they were in the audience.

LK: Do you remember how they reacted or what they said to you?

JW: No. But you know, to them, this was all pretty ordinary (Laughs). That's the way they saw our lives. That's the way kids are, anyway. So that was kind of fun. And meanwhile, I also got interested in SWE.

LK: And part of your interest with SWE included career

guidance?

JW: Right, yes, very much so. In fact, locally, I made sure that I was available for that sort of thing. I was pretty disgusted because the counselors in high school were not counseling -- in the '50s and early '60s, they were not counseling girls to pick important subjects so they could go into science, or let alone, engineering. And so I wanted to be sure and get my two cents in. Even a doctor, a woman doctor, locally, when she was appearing before one of these career guidance fairs that they had, she had the nerve to say to the kids, "Well, I've done this, but it's impossible. Nobody else could"--

LK: Wow.

JW: -- and, "So I don't advise you to do it." (Laughs) I mean, that's an example. We hear of a lot of ridiculous things. So I tried to do counseling.

LK: Did you feel that you were a different kind of role model for young girls than, for example, the doctor?

JW: Well, I'm not sure -- I don't recall challenging her directly at the meeting.

LK: Sure.

JW: But I certainly didn't ascribe to that attitude at all.

LK: You exerted some influences at the college level, working in administration, correct?

JW: Yes.

LK: Could you talk about how you became involved in higher

education, and how that was related to your involvement with career guidance?

JW: Well, it grew out of being on the board of trustees of a community college. And of course, there, you get to make decisions on whom to hire and what the budget is, and so forth. They get to figure out the policies. Just like with the board of the theater group which I belonged to, you can make sure that the theater is hiring a good director and producer -- you get to influence those things. But you don't tell the staff or the director or the producer which plays to produce. That's not part of what a good trustee does. They are there to make sure that the money is spent properly, and that you have a good functioning thing, and that you raise money. In fact, that's where I learned that when you ask someone to be on a board, you tell them in advance, "This is a working board, and you are expected, A, to donate towards this cause yourself, and, B, to go out and raise money together with the other members of the board. So that was our policy, and I had that experience in my background.

I served on the board of trustees of the college, -- it was a community college, which is state supported, and very little federal at the time, in the 1960s. I served for several years and decided to resign from the board, or not ask to be renewed in 1976, because I could see that the college was very small, and we weren't thinking that big (Laughs). So I resigned, but recommended to the administration that the president was trying to do too much, and

should have an assistant. So a year later -- more than a year later, they posted a job description for a person to be the administrative assistant to the president. So I applied, and Title -- was it Title III? Anyway, it had to advertise provisions, because federal funds are involved in a state and federal community college.

LK: Was this Title VII?

JW: Yes, that's right. And I got interviewed like everybody else, and they picked me. I think my experience on the board had something to do with it. But anyway, that year, I joined the college as a salaried employee, as an administrative assistant to the president. And I worked on developing a foundation, just like the other agencies and art organizations had. The big Yale and Harvard and places like that had them, but community colleges were just getting started with that sort of thing. And so it was very challenging. I was with them for thirteen years, and enjoyed it very much. We were breaking new ground, so to speak, there was a lot to do.

LK: Do you feel like, in that role, you were able to promote a positive image of women engineers?

JW: I believe so. For one thing, it's a small town, and I knew everybody, and they knew me, and they knew I was an engineer, which is unusual, because usually, those sorts of positions were for people with degrees in education. And what I found is when I began promoting the fact that the various departments should be looking for grant money, particularly federal grant money, as well as private

foundations, they needed to know how to write specifications for grants, with the needs and the who, when, why, how and where. And they needed to understand budgets. Well, as an engineer, I knew that. A lot of the educators didn't have the remotest idea. And this is not to disparage them, but they had no reason to. They didn't know how to make a budget. So being an engineer helped in that way. I felt I was using my engineering all the time. And I enjoyed that.

Over the period of those years, I was able to get money for about thirteen new employees, who started out on federal funds, and after several years were phased in a little at a time, into money from the regular budget. Meanwhile, I phased my own salary out into just federal funds, and so gradually, thirteen years later, I resigned. Actually, I guess I should have resigned sooner. I was seventy-two at the time, but they hadn't stopped me. And so that worked out just real well.

But you know when you leave a position that you've loved, and colleagues whom you had loved, it's really a wrench, even if you decide it's time to change jobs. And that was true of me. So what I did is stay on the foundation board -- we now had a strong foundation -- so I could go out in the community and help raise money, and also help train other board members to do that. That's more simplistic than it was. I wasn't the only one. But I enjoyed the relationship that I had with other people.

So later in life, it's been more a matter of personal

relationships and professional relationships than strictly technical problems, but it all grows out of the engineering background.

LK: Do you think that there's a need for a separate Society of Women Engineers today?

JW: Oh, well, we're an unfinished job. There's still so much to do; A, to acquaint the public with the role of women; and B, to acquaint young women with the great opportunities there are in engineering. And it's not universally done. Maybe the time will come when -- well, in fact, it's often said, "What in the heck do you have a separate thing now when you're trying to integrate yourself into it?" But there has to be an organization that will look to our particular lacks and needs, and will help instruct women in how to get promotions. We still talk about the glass ceiling – and now, for example, there are a lot of student sections where you can help students become full-fledged engineers and know how to function in society. So that's the reason we need a Society of Women Engineers still. And it's very good for older women, too. I know the Society was seeking opportunities for women in their forties and fifties, who married and had children and wanted to get back in the game to be trained. We had some grants, as I recall, to let a woman go back to school and get her masters or her special degree so that she was employable in engineering again. So that's still going on.

LK: That seems like an under represented group.

JW: Yes.

LK: Finally -- this is sort of a loaded question: what do you

consider to be your most important contribution to engineering?

JW: I think it would be public relations, and guidance counseling to a certain extent, but giving talks locally to various organizations, particularly women's organizations. There are quite of few of them out there, and they need speakers. (Laughs) I did quite a bit of that, talking about my life as a professional engineer to women, particularly women interested in social issues enough to belong to various organizations. So I got invited to speak locally quite a bit. I enjoyed it, and the women seemed to enjoy it too, because -- you know, we've gone through so many stages. For one thing, in the '60s and '70s, it got to be so important we considered it feminist. Young women now don't want that label, because they think it's derogatory, that it means extremism and that sort of thing. At least that has been true in the past few years. And also, they don't think they need it. They think everything is done, and that there aren't any barriers anymore, and "So what do you need to worry about? I'm not going to be called a feminist, because that sounds like a charge." So I try to point out that feminism, philosophically, is to be a partner with the male population, not try to be like them and succeed only by challenging their dominancæ. And so the idea is that we would be cooperating together in making decisions, rather than "one wins." I think we should have a society in which we're equally valued. And that's what I try to bring out in my talks.

LK: Do you consider yourself a feminist?

JW: Definitely, in the sense that there's still a lot of work to be done, because you know, our salaries are not -- in all fields, they're not equal. That isn't true so much anymore in engineering; I think we're doing very well. But there are still a lot of male bastions that we aren't fully integrated into yet. And that doesn't mean that I want to climb around in boilers, although I've done it (Laughs), but that we be considered equally.

When I tried to get a grant for graduate work in nuclear engineering, I applied to the University of Idaho -- our Idaho Society of Professional Engineers said there were opportunities --so I applied. I didn't get chosen. And you can understand, I'm pretty sure, in retrospect, it was because they weren't hiring a woman.

LK: What year was that?

JW: Oh, gosh, sometime in the '60s, the early '60s. But my family was always very cooperative, and that's what the girls learned, that they didn't have to worry about -- in their own life, they weren't going to hit a stone wall. And so because I was able to go to meetings, they connected me with the same people I'm still connected with now, which is a wonderful thing. I've really enjoyed being a member of the Society of Women Engineers.

LK: Well, thank you very much.

JW: You're welcome.

END OF INTERVIEW

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