



AMERICAN INSTITUTE OF MINING,
METALLURGICAL, AND PETROLEUM ENGINEERS

ORAL HISTORY PROGRAM

Carolyn Hansson: Of Mini Skirts & Metallurgy; Forging a Career in a Male-dominated Field

PREFACE

The following oral history is the result of a recorded interview with Carolyn Hansson conducted by Jenifer Locke on March 1, 2022. This interview is part of the AIME Oral History Program.

ABSTRACT

A combination of intelligence, tenacity, and a passion for metallurgy-highly seasoned with British wit-helped Carolyn Hansson forge a successful career in male-dominated industries and academia. Dr. Hansson was the first female student in the Royal School of Mines at Imperial College, London University. She was also the first woman to earn BSc in metallurgy in the UK and a Ph.D. in metallurgy from the same institution. Carolyn began her career at Martin Marietta Research Laboratories in the US. She then shifted into academia, first at Columbia University in New York City, followed by the State University of New York at Stony Brook. A stint doing research at Bell Labs was next, followed by time in Denmark with the Danish Corrosion Center. After that, she moved to Canada to join the faculty of Queens University, followed by many years at the University of Waterloo. She is a dedicated educator, an expert in the field of corrosion of steel in concrete, and a leading researcher in the field of materials science. Among her many awards and honors is the Concrete Prize, given by the Danish Concrete Institute. She was also named to the Order of Canada, that country's highest civilian award. Dr. Hansson has been an active member of AIME and TMS since 1969.

Readers are asked to bear in mind that they are reading a transcript of the spoken word, rather than written prose. The following transcript has been reviewed, edited, and approved by the narrator.

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PART 1

00:22 INTRODUCTION

Jenifer Locke:

Hello, I'm Professor Jenifer Locke from The Ohio State University, and I'm here at the TMS annual conference on March 1st, 2022. I am lucky to be here with Professor Carolyn Hansson who is a Professor Emerita of Materials Engineering at Waterloo University. Carolyn was the first female student in the Royal School of Mines at Imperial College in London and the first woman graduate with a BSC and PhD in metallurgy in all of the UK. She has worked in the United Kingdom, the United States, Denmark, and Canada in industrial, academic, and not-for-profit sectors. She's focused her research on the influence of the environment on metals, such as embrittlement, erosion, corrosion, all on the properties of alloys, so, a really long and historied career in a lot of amazing places. And, this recording is a part of AIME's oral history capture program.

01:18 A WAR BABY DISCOVERS METALLURGY

Jenifer Locke:

So, to start, thank you for being here with us, Carolyn. And, could you tell us about how you grew up, where you grew up, what your parents did, and about your formative years?

Carolyn Hansson:

Yes, I was born in England. I'm a war baby, result of a weekend absence without leave that my father took. And, I was born in Hazel Grove in Cheshire and grew up mostly in Poynton. Poynton had a population of 6,000 at the time, so it was fairly small. I had a great upbringing, but it was in the war, so, everything was rationed and not easy. Both my parents were forced to leave school at 14, so they didn't have any higher education. My mother was very bright. She did get a scholarship to go to high school, because high schools were paying in her day. But, her stepfather wouldn't let her and forced her to leave at 14 to earn a living. And, my father was a middle manager eventually in a contracting company that did asphalt flooring and roads and was very proud of the red asphalt on the way to Buckingham Palace, i.e., a red carpet to Buckingham Palace.

Neither of them could understand the stuff we were doing because they hadn't had that education. And, as far as my father was concerned, the best thing or the most surprising thing that my sister and I ever did was actually get through high school without being thrown out. He was thrown out of several, because he was naughty, not bad. The English system was you took general subjects for a national exam at the age of 16. And then, you had the choice of leaving at that point or going on to senior level. And, I chose to go on. I wanted to do chemistry, biology, and art at the higher level. But somebody brightly thought that that wouldn't lead to any career and said, oh no, it wouldn't fit in. So, I ended up doing chemistry, physics, math, and applied mechanics. Now, I hadn't done physics at the lower level because we didn't have a physics teacher in our all-girls school. I forgot to mention, I went to an all-girls school from the age of 4 to the age of 18. So, I only did physics for the last two years and didn't have the first three years. I really enjoyed physical chemistry. I was okay with inorganic. and I hated organic chemistry with a passion. All it seemed to me was being learning long words for no reason. And so, I didn't know what I wanted to do. And, we had a careers convention at school where the school invited people from

different professions to come and visit us. And, there was a group from the atomic energy, and they said to me, "Well, how about metallurgy?" And, I said, "What's metallurgy?" Sorry. it was England, metallurgy. And so, they sent me some information. I thought that sounds interesting. So, I applied to Imperial College, Birmingham, and Sheffield, and Imperial was the first to answer.

04:46 THE "MINES WOMAN" - CHALLENGING TIMES IN A MALE-DOMINATED SCHOOL

I went down to Imperial College for an interview, and they told me, "We don't very often get very many women applying." So, in my naivety, I assumed that maybe 10% of the students were women in this area. And, it wasn't until I arrived there, literally, on the first day, that I discovered I was it at the Royal School of Mines, not just in metallurgy but in the Royal School of Mines. And, people were saying, "That's the Mines' woman," when I walked across the quad, which was terrifying, you know? And, it was an interesting time. I had been to an all-girls school, and the boys had been to all-boys schools. There was absolutely no meeting of the minds whatsoever. They couldn't figure out why I was there, assumed I wanted to get married, which, of course, was the last thing on my mind. But, the first six months were pretty difficult.

As an example, the president of the student union of the Royal School of Mines decided it would be appropriate if he walked into the union meeting with me to give me some support. Well, at that time, the union had some officers, one of which was an honorable pornographer, whose role it was to entertain the student body during union meetings with rather lewd pictures of women. So, when I walked into that meeting with the president, for my benefit, the honorable pornographer put on this huge screen a naked man gently holding his penis, for my benefit. So, that was the atmosphere that I learned to live with. Anyway, my classmates had very great difficulty in knowing how to deal with me, didn't want to be a lab partner or anything.

Jenifer Locke:

So, Carolyn, when you had these types of events/openings at the start of your university time, and the honorable pornographer was there with his showcase of photos, what was the impact on you? Was it embarrassing? Was it scary? How did you feel about that?

Carolyn Hansson:

All of the above, I was terrified. But, the way you have to deal with being terrified is to put on a brave face, and go with it.

Jenifer Locke:

So, you stayed calm and smiled and—

Carolyn Hansson:

I can't remember what my face looked like, it was terrifying, but you live with it. I mean, this is what the world was like in those days. So, yes. So, one of the things that was interesting to me was, one of the professors in my department once said to me, "Miss Russell," because you were never known by your first names. The boys just had their last names. I was Miss Russell, my maiden name. "I advise you never to learn to type." So, I thought, okay. And so, I never did learn to type, but didn't have the opportunity,

but I never did. And, that proved very useful because, when I actually graduated, I received a letter from the president of the British equivalent of NIST, who happened to be a metallurgist. And, he had heard I'd graduated, and he was offering me a job. And, I thought, this is very good, very nice, until I got to the bottom and discovered it was a job as his secretary. So, I was able to write back and say, "I'm terribly sorry, but I don't know how to type. But, thank you. I'm honored to be asked." So, that was that one.

Jenifer Locke:

So, did this person give you the advice of not to type as a way to help you in the future to avoid being a secretary?

Carolyn Hansson:

Yeah. Oh, he was, he was being very, I mean, computers didn't exist in those days. So, that was not a problem, and he was trying to be helpful, and he was helpful.

Jenifer Locke:

Yeah. Immensely helpful.

Carolyn Hansson:

You see now how I still can't type. Okay, six months were terrible. And then, they, the boys in my class, and they were boys not men, accepted me, and I became the designated driver everywhere we went. And, in England, everybody played sports, but what do we do with Carolyn? She can't play on a rugby team or whatever. So, they made me scorer of the cricket team. Well, I don't know if you know anything about cricket, but it lasts a long time. The game started 11, stopped for lunch at 1, stopped again at 4 for tea, and go on till about 7. And, the scorer has to look at every single detail and record it all, which was so boring. But, I had 11 guys taking me out on a Saturday night every week, which wasn't bad.

I then had a good time. The beginning of my final year, the department chair, Professor Geof Ball, summoned me to his office and told me he'd just come back from a meeting of all the department heads in the UK in metallurgy. And, his was the only department that had a woman in it. And, of course I was enjoying myself at this point. And, he said, "If you don't pass, if you fail, there won't be another woman admitted to a metallurgy department in this country for many years." So, I thought I'd better buckle down and do some work. But, that's the kind of pressure I've been on all my early life. So, I tried to work, and I got a degree. And, when I was walking down the corridor three feet off the floor, because I'd actually passed my exams, I met Harry Paxton, who was on a sabbatical leave at Imperial that year. And, he said in his lovely Yorkshire accent, "Well, don't think you know anything lass; if ever you do get to know anything, I might offer you a job." He did subsequently offer me a job some years later. So, I thought, I must know something by then. But, he brought me down to earth in a big bang. That was Harry. Very sweet, very kind, man.

Jenifer Locke:

When you look back at your university time, what kind of feelings come up? So, there's a lot of fun times?

Carolyn Hansson:

Oh, yeah.

Jenifer Locke:

But, there's also incidents where people, you know, say things that are hurtful, maybe unintentionally. So, when you look back, what are the feelings that you have?

Carolyn Hansson:

I enjoyed my time, after the first six months or so. People, by and large, were very kind to me. But, in the UK at the time, universities had dressed up balls several times a year. And, the first couple of balls I was never in, I wasn't invited. And, several men said to me afterwards, "You weren't at the ball." I said, "No." "Oh, I wanted to ask you, but I assumed everybody else was asking you," But, we had great times. I've got some wonderful pictures, but I didn't bring them with the balls and things.

We used to get up at four in the morning and go to the florist at the (Covent Garden) market, and bring it back to the university, decorate the hall and everything. And then, we'd be still dancing at four o'clock the next morning, you know, that kind of thing. And, the men bought a tuxedo first year, and it was worn out by final year. Women, of course, had to spend money on different dresses every time. No, I had a good time.

There's a lot of talk these days about teenage girls being bitchy. I never found that at high school; we didn't have any of that stuff at high school at all. And, I was horrified when I went to university to see how some of the men treated other men, the bullying. I was just completely shocked. It was a total eye opener to me. I had never seen that in a girls' school. And so, that was an eye opener, which was disappointing.

But, by and large, I had a very good time, and I have very fond memories of Imperial College. I lived in residence, and residences in 1959, you know, they were miles apart in most universities. Not IC, they didn't know what to do with a woman. So, they just made one floor of the men's dorm a woman's dorm. And, we were free to go everywhere we want. I remember my father being horrified, "You're gonna have men in your bedroom?" I said, "Dad, it's not my bedroom. It's my study." But, we all survived. I don't recall any pregnancies. So, there must have been something going on that was right.

I don't know what else I can say. My metallurgy cohort in the first year was 25, and by the final year, only 15. Imperial college only had 3000 students, 1,500 were undergrads, 1,500 were grads. The college was formed by Queen Victoria's husband, Prince Albert, with the funds from the Crystal Palace World Exhibit in the 1800 and something or other. And, he set it up as Imperial College with the idea of attracting students from all around the world in the British Empire at the time. So, we probably had a more diverse, not very diverse by today's standards, but more diverse than say, Oxford or Cambridge, or some of the rural universities. So, that was the background of it. And, I think it was a very good, well it's well-known as a very good university. And, I learned a lot. The first lecture on the first morning was given by an elderly gentleman, Professor Andrade, who talked to us about presenting data in graphical form. And, it's amazing what you remember. I can remember this so clearly. Talking about graphs and so on, he said, if one of your experimental data points lie on the curve, your results are good. If two lie on

the curve, they're excellent. If three are lying on the curve, that's obviously fiddled.

So, that was my introduction. You had a question here about political and cultural events. When I went up to university, we were still in the throes of the aftereffects of World War II. Food rationing had only been stopped a couple of years prior to that. So, there wasn't a lot of interest in politics. Everybody wanted peace and quiet, and we didn't have much money. One of my friends in graduate school had a 1920s sewing machine. So, we taught ourselves to sew clothes, and we'd go down to the market and buy the end of the roll. And, fortunately, miniskirts came in, which meant you could get a dress with long sleeves out of one yard of material. It was wonderful.

15:54 SUMMER JOBS & WOLF WHISTLES

Jenifer Locke:

Carolyn, can you tell me about any internships or things you had while doing your studies?

Carolyn Hansson:

Yes. We didn't have a co-op system, which is typical now, but we were expected to work during the summer months. And, my first summer month, I worked in a steel plant, fairly local to where I lived in Cheshire. And, that was very interesting, wolf whistles everywhere and so on. But, by this time, I was used to it from school, from the university. So, it didn't have much effect on me.

The next year I had applied for and been accepted to go to Chalk River Nuclear Research in Canada and was really excited about this until, a few weeks before I was due to go, they said, "Carolyn, that's a woman's name. We don't have women in Chalk River." So, that was the end of that.

However, while all my classmates were working in steel mills in Sweden, on the rolling mill or on the furnace or whatever, I ended up working for Johnson Matthews precious metal division, where everything was in miniature because we were working on ruthenium and rhodium and everything. So, I learned all about swaging and rolling and drawing and extrusion and everything, not just one parameter. So, it worked out very well, but I would've liked to have gone to Chalk River.

Jenifer Locke:

It took them a while to realize that you had a woman's name.

Carolyn Hansson:

Oh, who knows who looked at my— [resume]

Jenifer Locke:

So, not so smart of them.

Carolyn Hansson:

Right.

17:41 A MENTAL LINE ON A BLACKBOARD - LANDING A JOB AT MARTIN MARIETTA

Jenifer Locke:

So, what was your first kind of professional job after you left university?

Carolyn Hansson:

After I turned down the head of—

Jenifer Locke:

After you turned down your secretarial—

Carolyn Hansson:

I then actually did my PhD. But, after I finished my PhD, my thesis supervisor introduced me to Bert Westwood, whom you may know, because he was a president of TMS at one point. Bert was head of the labs at Martin Marietta. And so he invited me for— my husband, got a job in Maryland, so, that's why I went over there. And, I had done my thesis work on superconductivity and crystal structure at liquid helium temperatures. And, there's not a lot of call for that, actually. So, I was interviewed for a job. And, I actually consider my success in getting the job had less to do with the fact that I'm obviously a brilliant person and more to do with the fact that, as I say, miniskirts had come in in England, they hadn't come in in America, and I'd come over with a wardrobe full of miniskirts. And, there was no way I was going to go out and buy clothes.

So, I ended up going to the interview, which was, of course, all men. And, I mentally wrote a line on the blackboard above which I shouldn't draw because you had to lift your arm up. And, I filled it. And then, I turned around to the audience and said, "Does anybody have a rubber anywhere?" This is the word for an eraser in English. So, that's why I think I got the job, anyway. They did tell me that, if I worked out, they would consider hiring other women. Again, the same thing over and over again. Right? So, I thought the best thing I could do is do well at the job. So, that's what I've tried to do ever since.

Jenifer Locke:

So, do you think that you handle pressure excessively well? Multiple times now we've heard that someone tells you, if you don't do well, every woman in the rest of history is out. But, you seem to excel, even though you had this pressure of every woman for all time on your shoulders.

Carolyn Hansson:

Yeah, I excelled because I took the work seriously, and I worked hard. I found the English sense of humor is very good. It stood me in good stead. A lot of times people make a pass at you, you'd make a joke of it. I remember one time I was at a conference, and Bert Westwood, in fact, introduced me to somebody. I'm not going to mention his name, of course, and said, "Carolyn, you've got to pick this person's brain because we want to get into directional solidification. And, he knows everything about directional

solidification.” This was in the sixties, right? And so, this gentleman said to me, “Would you like a drink?”, I'd just given a talk. So, I thought a drink would be nice. So, we go into the bar, and he leans over the table and said, “Well, would you like to go to bed before or after dinner?” So, I said, “Oh, I'm sorry. You should have asked me earlier. You're number 10 in line.” And, we could laugh about it. And, you know, I had to work with him.

So, that's the kind of thing I learned to do. And, it's made my life so much easier. You know, if you're going to complain every time somebody says, what's a pretty little thing like you doing in a place like this? Life's hard. I just turn around and say, I think you're cute too, you know? End of story. So, that's how I've dealt with my stress, make a joke of it, for better or worse.

Jenifer Locke:

Did Person A, when you said you're 10th in line, did they get the point and never come back?

Carolyn Hansson:

Oh, yes.

Jenifer Locke:

Oh, good. Okay. So, they all got your—

Carolyn Hansson:

He laughed.

Jenifer Locke:

—your British humor. Oh, good. Okay. So, yeah, they all took it well.

Carolyn Hansson:

Yes. But, when you ask about pressure, when I got to Martin Marietta, they said, “We want you to work on liquid metal embrittlement.” And I said, “What's that?” And they said, “Well, you better find out because we've got to get a proposal into the Naval Ordnance Lab in three weeks.” And, we got the contract.

Jenifer Locke:

Congratulations.

Carolyn Hansson:

I was doing work for the Naval Ordnance Lab. And, at one point, I was asked to go and make a presentation to Rock Island Arsenal. Yes, it does exist. And, I was due to get a flight, and, at 11 o'clock in the morning, I suddenly thought I don't have clearance for an arsenal. And, Bert, who's my boss, said to me, “Go and talk to the office, and they'll see what they can sort out; get on the plane, and we'll see

what we can do." So, I get on the plane, and I go over to Rock Island. And, it turns out that the company had got in touch with the British embassy to get clearance. And, the British embassy was closed because it was the Queen's birthday. So, everybody gave me a pass. So, I went in with no problem.

Jenifer Locke:

Happy birthday, Queen!

Carolyn Hansson:

Exactly. So, these, these quirky things happen, you know?

22:51 AN AMAZING ADVENTURE IN MOSCOW

Carolyn Hansson:

I didn't tell you about the time I went to Moscow, at a time when it was the USSR, as a graduate student. I went with my supervisor. And, that was very interesting, because you know you were watched 100% of the time. And, we were warned that people would try to proposition you and get you into a bad situation. And, we were there because, in my thesis work, my supervisor and I had developed a low temperature x-ray diffraction attachment that you could measure the lattice parameters at 7 degrees Kelvin. And, we'd sold this, licensed it to Oxford Instruments who paid us to go over and demonstrate this thing. So, we get there and it was very weird; we weren't allowed to spend money. We were given coupons for meals. And, at one point, Hugh King, my supervisor had arranged for us to go and meet an academician. And, they're like God in the USSR.

So, we were in his office bowing and scraping a little bit. And, my supervisor, who was very calm suddenly said, "I need a glass of water." And, he promptly collapsed on the floor. So, a very pretty doctor was called in, and she started opening him up. And, he'd had surgery the year before, and he'd got this red scar down. So, she thought, you know, there was something terribly wrong, he's got to go to a hospital. And, I'm thinking, if I allow him to go to a hospital, and he never comes out, Ann will never forgive me, Ann being his wife. If I don't let him go, and he dies, Ann will never forgive me, you know?

So, we ended up, yes, you should go to the hospital. And, we were told everybody spoke English. I mean, the whole thing is ludicrous. We got in the ambulance. First thing we did was have a crash with an army truck; fortunately, we weren't hurt. We got to the hospital, nobody spoke English, nobody. So, they put the two of us in this room, and they started undressing him, because, of course everybody assumed I was his wife. I've been assumed to be the wife of anybody I stood next to at things, you know? So, I'm thinking he's going to be terribly embarrassed, if he wakes up and he finds me here, and he's stark naked. Anyway, I went through his pockets and took all his -- you know, we'd had to surrender our passports as soon as we got into Moscow, so, that didn't matter. But, I took his money and all the other ID and politely turned my back. Anyway, it turned out, he just had problems because he'd had this surgery, which had removed half his intestines because of a burst ulcer. And so, he hadn't been eating properly.

So, he was in hospital for several days, and we had a plan to go to the Moscow circus with bears on ice. And, I went in one day, and he's sitting with a Russian dictionary trying to write in Russian, "Please may I go to the circus?" like a little boy, you know? Anyway, we got him out.

In the meantime, we'd met a couple of East German guys, lovely young men who didn't have any money because the exchange rate between East Germany and Russia was so bad, so they couldn't do anything. When Hu' came out of hospital, we got all his meal coupons, which we spent. We took these two East Germans to the best restaurant in town, and I remember we had rather a lot of champagne. I can remember dancing through the Red Square with these three guys, my supervisor and these two East Germans. You know, my profession has allowed me to do these. If I had been a nurse or a teacher or whatever, that wouldn't happen. No, it's just amazing. So, I've been very lucky.

26:52 MEMORABLE MENTORS

Jenifer Locke:

So, we heard about a couple of different bosses or mentors that you've had. Are there any other influential mentors you've had in your career that you want to tell us interesting or fun stories about?

Carolyn Hansson:

I've got a lot of people who have gone out of their way to support me and help me; surprisingly several. Hu' King, was a young assistant professor when he met me. He had the guts to take on the first woman who hadn't achieved all the best things in the world. And, he's thriving. He lives on Salt Spring Island in Canada, and he's 91 this year.

The next one was Bert Westwood, who was the best boss anybody could possibly have imagined. He pushed people. He pushed his people and stood in the background. He was great. He's now living in Albuquerque. And, I speak to him and his wife once in a while.

Harry Paxton was another person, who unfortunately passed away a couple of years ago. And, I didn't know until after he died that he had been instrumental in nominating me for some awards. I was told this afterwards, but unfortunately, I never had the opportunity to say thank you.

Do you remember Keith Brimacombe? He was a fantastic guy. He died far, far too young. He was also a mentor. And, when he was president, I was on the board of directors here. And, he invited us all to the Rockies. He came from that area in Canada. We had a great time.

He called me one day, must have been in 95, 1995 and said, "I think you should apply for that job at Waterloo." And, I said, "What job and why?" And, he said, "Because I think Waterloo is your kind of university." And, I said, "Why?" And, he said, "Trust me." So, I said, "Okay." So, I applied, and I said, "You have to write me a letter." And, I got the job. He died two years later, very early. He had been appointed as head of a new program; very pan-Canada program called the Canadian Foundation for Innovation. And, he was working so hard he neglected his health and died of a heart attack. Very, very sad.

More recently. Rusty Gray and Hani Henein have both been very helpful. So, all of these ex-presidents of TMS, I don't know what TMS is producing, but it's certainly very, very productive as far as the idea of mentorship is concerned.

Jenifer Locke:

Are there any commonalities between those folks that you think made them especially effective mentors for you?

Carolyn Hansson:

Yes. I think they appreciated the fact that women can give a different perspective on things and promoted that. None of them was afraid of competition, and I think that makes a big, big difference.

30:06 A FORAY INTO ACADEMIA

Jenifer Locke:

So, you, you told us about your first job that you had at the Martin Marietta research labs doing liquid metal embrittlement. And, we know you eventually made your way to Waterloo, where all have you been in between there?

Carolyn Hansson:

Well, I've been married twice, and both husbands were the type that don't stay in a job for more than five minutes. So, like a dutiful wife, I followed them around.

And, my first husband moved from Maryland to Long Island. So, I applied to the state university. Bert Westwood actually called the head of the department at State University of New York in Stony Brook and said, "We've got this person, highly recommended." And, the answer was, "Well, she's a married woman. She doesn't need the money. We could give her a bit of lab space to play in." So, Bert said, "I don't think that would go." And, at the time, Columbia University was advertising for assistant professorship in metallurgy. So, I applied. And, of course, again, I was the only woman on the faculty.

So, I remember going for the interview, and I'd taken slides with me. For those of you who don't know what slides are, they're about that size, and you have a thing and you put them on which projects on the screen. I had all my slides with me. We go into the room, there was no projector. And, they expected me to do everything with chalk on the board. I never got one sentence out without them, interrupting me with a question, and they hammered home. And, I thought, well, that's dead. Looking back, I think they were trying to figure out if I was capable of dealing with a classroom of boys. And, they accepted me. And, my first class, I ended up teaching a graduate class, and I was the youngest person in the class.

So, then commuting from Long Island to New York, I enjoyed Columbia. And, I would go there again, if it didn't happen to be placed where it was at the time, which was not very good. And, I was doing a huge commute. I got a phone call a year later from Stony Brook, said they'd had a coup and kicked the chair out, and would I like a position? And, it was just down the road from where I lived. So, I said yes. And so, I was there for a while. And, in fact, few years later, I was sitting in the chair where this other person had been. So, that was fun, too.

32:34 A NEW OPPORTUNITY - JOINING THE BLUE SUITS AT BELL LABS

And then, Bell Labs offered me a job. Now, Bell Labs in those days was the top lab in the world. And, they had decided they should have some women. So, nothing to do with my abilities. I wore a skirt.

I got there, and everybody wore a suit, dark blue suit, a blue button-down collar shirt and a tie, everybody. It was a uniform. It was unbelievable. And, the competition or the pressure was produce, produce, produce. I had been there 4 months and I adopted a son. And, you asked me earlier, how did that affect life? That was very interesting.

Fortunately, I did get a place the last minute in a daycare center that was built as a daycare center and was actually on PBS as how a daycare center should work. It was fantastic. Some of the places were for people like me, who could pay for things, some were partially supported and some were free for the low income. So, we'd had people from Jersey City and places where lower income and every color of skin under the sun. And, my son went there.

Jenifer Locke:

When you were at Bell Labs, you said that you adopted your son at that point. What was it like bringing a son into your life and integrating your professional life at Bell Labs with being a parent? What can you tell us about that?

Carolyn Hansson:

Well, my son was 16 months old when I adopted him and walking and getting into all sorts of trouble. We adopted him on the 23rd of December. On the 24th of December, I went and bought 27 door and drawer locks to close everything because he could get into everything and did. But, I could go on at length about that, about adopting. It was the best thing I have ever done in my life. He is going to be a parent. I'm going to be a grandma in June.

Jenifer Locke:

Congratulations!

Carolyn Hansson:

And, he has been wonderful. An excellent, excellent son. And, when he got to 21, I remember thinking, "Oh, Carolyn here have a drink." He hadn't been arrested. He hadn't been binge drinking. He didn't smoke. He hadn't done drugs. What more could you ask?

Anyway, back to 1976. Bell didn't know what to do with me. As I think I told you before this video, I discovered that most men had never worked with a woman. As far as they were concerned, women were wives, either their own or somebody else's, or a secretary, and they just didn't know how to cope. And so, I got a lot of silly comments. And so, I decided my role was to put them at their ease. If we had to work together, I couldn't have somebody, you know, working with me who didn't know how to handle me or didn't know how to treat me. So, I spent quite a bit of humorous effort in making sure that they didn't go overboard one way or the other. I remember being in a meeting shortly after I adopted Russell, my son. It came to five o'clock, and the meeting was being held by the director and the chair. And, I said, "Well, excuse me, gentlemen, I have to go now." Nobody had ever, ever said that at a meeting in Bell. They went on until the business was finished. And, they just looked at me completely blankly and said, "You can't leave. We're not finished." I said, "I'm sorry. I can. I'm not having my 18-month-old sitting on the side of the street because the meeting's going on too long. So, thank you." And, it was awful. They obviously thought I was not part of the team, that I wasn't going to produce. But,

when they discovered that I was just as productive as they were, because I went home, I dealt with my son, when he went to bed, I did some work. So, they accepted it.

And, they had a woman technician there from Germany. and they very tentatively asked me if I would be willing to have her work as my technician. I said I'd love to, which surprised them. And. do you know, there were men standing outside the lab door expecting to hear fireworks because they had assumed two women couldn't work together? The two of us were great friends. All they heard, actually, was laughter and giggling. But, that was the attitude. They had no idea about working themselves with women or about women working with women. So, it was very different.

38:01 BALANCING WORK & LIFE - NORTH AMERICA VS. DENMARK

Jenifer Locke:

Is there anything looking back that you wished, not specifically in your own life but outside of your life, that influenced your life with you and your son that you wish would've been different, would've made things easier for you or more manageable?

Carolyn Hansson:

Well, I was very lucky, as I say, because there was this fantastic daycare center, and I actually lived less than a mile from the lab. I could have walked there every day. But, I had a 12 mile round trip to the daycare center. But, no, I don't think so. I think everything worked out amazingly well. Of course, there were hiccups and so on.

But, one of the best things I ever did as a mother, with all due respect to the United States and Canada, I moved to Denmark when he was five. And, I was able to be a good mother in Denmark because people are not so work driven, and they are just as much, or more, productive than North Americans. So, I worked from 8:30 until 4:30. I did not take work home with me unless there was a panic on. And then, you know, there'd be a couple of weeks of mad work. I did not work at the weekend. I was able to go to his basketball games and soccer games. I was able to be a good mother. And, we were there until he was 14.

And then, we came to Canada. And, again, back to the work grind. It's crazy the way North Americans work, and it's not necessary. It's not productive to put in all those hours. You cannot concentrate all those hours. So, my goal is to say, "Okay, America, okay, Canada, let's have this: 8:30, 4:30, and go home and be a parent or a partner or a single person having fun." Right?

Jenifer Locke:

So, when you went to Canada, did you put in your kind of own, I'm doing 8:30 to 4:30?

Carolyn Hansson:

You have to be kidding, I was appointed as head of the department at Queens University Metallurgy Department. No. You know, the problem with academia is you're working three jobs, that each one should be full time. You're being a teacher, which should be full time. You're being a researcher, which should be full time. And, you're being a professional, which should be full time. And, that's just not

possible. You know, none of us has, you know, more than 24 hours in a day, and we would like to sleep sometime.

40:49 A STRONG OPINION ABOUT "PUBLISH OR PERISH"

Jenifer Locke:

So, what advice do you have for the younger versions of you out there?

Carolyn Hansson:

No, I wouldn't have advice for the younger versions. I'd have advice for the administration: stop this publish or perish ridiculousness. Stop this counting H factors. Who the heck cares? You know, I have been on number of committees where I've stopped and said, this isn't right. I look at a CV, and somebody's got 600 publications. And, I say, how old is this person? And, they say, well, what's that got to do with that? And, I do the calculation. I say, excuse me, he's claiming to have had a publication every 10 days for 40 years. That's not possible. He's put its name on stuff that other people have done, and that's unethical. So, that's what I'd like to do. Stop this counting of metrics. It's nothing to do with quality. It's nothing to do with achievement.

And, I can remember, was it Barrett? Metallurgist, long before you were born. He said, you should aim to publish two papers a year. If you have enough work for four papers, keep two of them. You may have a lean year. If you would publish two papers a year now, you're regarded as incompetent. It's not realistic. It's not realistic to have a research group with 20 graduate students. You cannot mentor 20 people. And, I think that's where I'd like to see the change.

Jenifer Locke:

Can we hire you as president of all universities?

Carolyn Hansson:

I'd love to be. Or, NSF. NSF should put that down. The equivalent in Canada has now said, we don't want to see all your papers. We want to see what have you done in the last six years? But, even then, they're counting. And, when I review a paper, I write back to Natural Science and Engineering Research Council, equivalent of NSF, and say, this person claims to have averaged so many papers per year for the last six years. This is not possible. But, I'm a lone person. Nobody else seems to be doing this. My question is, why not? Why don't you go home and, next time you review a paper or a proposal, say the same thing.

Jenifer Locke:

My publication record is low, compared to most.

Carolyn Hansson:

No, no, your publication is not low, because you're working on corrosion. If you're doing a tensile test, you do the test. You've got the data point. If you do corrosion, you've got to wait, thank God. Otherwise, the chairs were sitting in, we would be on the floor, the concrete floor would've fallen apart. I mean,

that's the problem with corrosion.

PART 2

00:17 ADVENTURES IN DENMARK - WORKING FOR THE DANISH CORROSION CENTER

Jenifer Locke:

So, you told us that you went to Denmark and that's where you were able to be a great parent and you had the time to do work/life balance the way it should be done. What did you do career-wise there? We didn't really hear much about that yet.

Carolyn Hansson:

Well, my first few months were not work/life balanced at all because I had been there about three weeks, and I was working at the Danish Corrosion Center. And, everybody in Denmark speaks English, and they would ask me questions and discuss things with me in English. But, sitting around the lunch table, they'd all be speaking Danish. And, I sat and listened to this and thought, if I don't learn this language, I'm not going to survive. And, Danish is a very difficult language to learn because they don't pronounce it. People say they're a nation of ventriloquists, and they are. They say the first consonant and maybe the first vowel, and then they swallow the rest of the word, which makes life rather difficult.

So, I signed up for a course, which I didn't discover until later, nobody signed up for until they'd been in the country at least two years, and they'd already been through Berlitz and Inlingua and all the other stuff. But, I signed up after a month in Denmark, And, the course was taught by somebody who'd bought the rights from the US CIA. When they want to drop somebody in another country, speaking in a local area, speaking the local dialect or the local thing, they have this technique. And, he had licensed that technique to teach Danish to the likes of me. So, I was, in addition to working all day, I was going to class three hours, three times a week. And, there was at least as much homework, but I did okay in the course. This started in December. By Easter, my husband was saying to me, well, why aren't you talking Danish? You're sitting up in bed at night speaking it in your sleep. And, I was too scared to do that. You know what it's like? Well, come Easter, we invited a couple of people over for Easter dinner, and they bought Easter beer.

Now I didn't know anything about Easter beer. And, during the evening downed three cans of this beer and was talking non-stop Danish, because the beer had 12% alcohol. And, the following Tuesday, I went into work, and I was speaking Danish. And, I worked in Danish for the rest of the time. But, that also had its drawbacks because you can't learn a lifetime's vocabulary in four months. And, I remember one of my colleagues said, there's somebody on the phone, Carolyn, who wants a consultation on a problem.

I'd been there a few months, and the Danish cement company, Aalborg Portland, had devised a new recipe for a cement and got hold of the Danish Corrosion Center to say, we'd like to give you a contract to look at whether this new cement will protect steel reinforcement just as ordinary Portland cement does. So, I had the job of setting up this project. So, I suddenly had to learn a lot about this coating on steel, which is generally known as cement and concrete. So, I spent a lot of time trying to figure out all the hydration of cement. One of the things that people don't understand about concrete, those homemakers that are putting in their own private patio, the pH of concrete is about 13. And, it will dissolve the dead skin on your hands, if you're playing around with it. And, if you play around too much,

it'll just start dissolving the live skin, too. pH of 13 is very caustic.

We did a lot of work looking at the corrosion of steel and concrete. This started because, at one point at that time, just before I arrived in Denmark, a balcony had fallen down in Copenhagen, killing the three people on it. And, there were 6,000 similar balconies in the city. And, at the time I was there, the government in Denmark gave a contract to the Danish Corrosion Center to monitor these. So, we had people going out monitoring these 6,000 balconies. So, we had quite a lot of expertise by the time we finished on that.

One of the things that was interesting, too, I learnt Danish, but I was expected to be able to understand and speak with Norwegians and Swedes because I was on several Nordic committees. And, there was one occasion I remember when we were at a meeting, there were a couple of other Danes there. And, they started ridiculing me because I had mispronounced a Danish word. And, the Norwegian turned around and said, "Yes, you are right. Carolyn doesn't speak Danish perfectly; but she speaks the only Danish, the rest of us can understand," because the Danes don't pronounce it very well. To give you an example, in Sweden, the floor is Golvet, G O L V E T, pronounced Golvet. The Danish equivalent is G U L V E T. And, it's pronounced go-ol. So, you see what I mean?

There was one occasion, one of the many occasions that I had fun in Denmark, this was a different type of fun. We wanted to buy an electron microscope from Phillips in Holland. So, we were supposed to fly to Amsterdam and then from Amsterdam to, I can't remember the city that Phillips is in. And, I said to my boss, how about we ask my husband, who had a pilot's license, to fly us directly there, thinking it could give him some free flying time. Well, my boss thought this was a wonderful idea, but thought his cousin would be better to do it. So, his cousin arranged to fly us there. And, I asked if he would like me to sit in the seat beside the pilot, because I had a lot of practice in visual navigation and it was all visual, And, no, no, my boss wanted to sit there.

So, I was sitting in the back, and we take off. And, first of all, he hadn't filed the proper flight plan, which was a bit of a problem. But, I'm watching the dials. And, with a plane, the fuel tanks are in the wings, and you have to make sure they're balanced. So, you switch one to the other. And, I'm watching this, and it's going down, down, down, down. And, eventually, I said to the pilot, who didn't know me from Adam, of course, "Don't you think you should switch fuel tanks?" Well, this of course did not make me popular at all. He did switch the fuel tanks, thank goodness, because we'd have been totally out of balance. But, anyway, we're flying along, and we get to what he thought was our destination. He said, "Oh, there's the airfield, you know, we'll go down there." And, I said, "I don't think that's right." And the tower was not answering his calls. And I said, "This is not right." So, anyway, he ignored me and landed. And, we were surrounded by tanks and trucks and men with guns. We were in a German military airfield, one Brit and two Danes! Now, Denmark was occupied by the Germans. And, there's a kind of between them. They're not exactly the most, you know, popular people on either side. So, I was left negotiating with these Germans that we weren't really terrorists. But, we were taken, we were arrested, of course. Oh, yeah. And then, they had to check up on us, and, eventually, they decided to let us go. And, they told me how to fly to where we were going in Holland and warned us that there was a flight exercise going on. So, we had these fighter jets flying all over. So, we had to fly very low. So, we managed to miss the fighter jets. And, I had suggested that I sat in the front seat and navigated, which I should have done in the first place. But, we get to Holland, and I'm saying, there's the runway. That's not a runway, that's a field. I said, yes, it's a grass runway. No, no it isn't. Anyway, I fought him, and I was, of course, right. So, then I got the pleasure of sitting in the front seat and navigating on the way back to Denmark. But that was one of my interesting things; I didn't expect to get arrested in Germany.

I had a lot of meetings in Sweden, Finland, and Norway. I traveled a lot in those countries. It was a very interesting time. And, I learned a lot about cement and concrete, and, in fact, I was incredibly honored to be given the Danish Concrete Institute Society's top award only four years after I had started working on concrete. I was also elected to the equivalent of the Academy of Engineering, the Danish Academy of Technical Sciences. And, I think I was the only non-Dane at that time who was elected. So, it was a good time, very good. Yeah, and, of course, I had mentors there as well.

Jenifer Locke:

Do you want to tell us about any of the mentors, any of them that you'd like to share anecdotes about?

Carolyn Hansson:

Well, I can, but they won't mean anything to the metallurgical world, because they were concrete people. Henri Henrickson was an excellent mentor. My boss, Hans Arup, was also, he was a corrosion guy, and, and a few others.

10:50 RETURNING TO ACADEMIA - QUEEN'S UNIVERSITY, ONTARIO, CANADA

Jenifer Locke:

So, where did you go after Denmark?

Carolyn Hansson:

Canada, for a variety of personal reasons. I was hired head of the department, full professor with tenure. Sounds wonderful, but you have to remember: that's not necessarily wonderful. Everybody, including the students, assumed that the only reason I had been appointed was because I wear a skirt, and they told me so, serendipitously. About a year afterwards, two of the students came up and asked, we're having a debate on affirmative action versus equal opportunity. And, we would like you to speak against affirmative action. Would you do that? I said, "I will indeed, because everybody thinks that I'm here in this position because I wear a skirt." And, the student said, "Yes, we did. We don't now, but we did." So, affirmative action has a lot of backlash. I believe that the only reason why a woman in North America cannot take whatever profession she has is either because of money or because of her parents' culture. There is no official hindrance to a woman going into the metallurgical field or any other engineering field or any other STEM field. Everybody's falling over themselves backwards to increase those numbers. But, don't do it too much because you might find yourself in the position I was in.

12:37 "YOU JUST DON'T UNDERSTAND" - LEARNING HOW MEN COMMUNICATE

Jenifer Locke:

Any good anecdotes on comedic relief that you had during that first year, as a Chair in Canada, to help you kind of deal with the stress?

Carolyn Hansson:

I was shocked to find, when I sat down at the department meeting, that the men were referring to each other by professor this or professor that. And, I looked at them and said, "What? I'm sorry, I do not want to hear Professor Smith or Professor Siamoto. Would you please use your first names? We're in this together." So, that was one of the interesting aspects.

And, I think I mentioned, or maybe I didn't, in mentoring students, girl students, I've often given them, or lent them, a book called You Just Don't Understand by Debbie Tannen. If you haven't read it, I strongly recommend you do. I think I bought 10 copies, and I never get them back.

Her thesis is that women communicate with each other in order to build a bond. And, I notice you're nodding; you're agreeing with me. Men, on the other hand, communicate in order to figure out where they are in the pecking order. I could not believe this. I must have asked over, well over 200 men, is that true? And, only two have disagreed with me. The others have all said yes, of course. And, I'm just horrified at the thought of going through life, trying to figure out where you are in the pecking order. Is this person better than me or not? So, I strongly recommend that book, and I've recommended it to both men and women since then.

Jenifer Locke:

But, what did the book teach you, besides men want to find their order?

Carolyn Hansson:

Well, what it taught me to understand men a lot better. I mean, here I was head of the department with, you know, men, male colleagues. And, I'd sit around a department meeting, and you could see the level going up like this, you know, they'd be outdoing each other. Think about sitting around and watching an American football game. The women are watching the game. The men are trying to outdo each other on the statistics of this player and that player and the other. It's everywhere. Once you realize it, it's everywhere, and, excuse me, gentlemen, but it's laughable.

15:15 THE REWARDS OF A LONG CAREER

Jenifer Locke:

So, what, out of your kind of long and wonderful career, have you found most rewarding and are most proud of?

Carolyn Hansson:

Well, obviously, I'm proud of students, the students that have trusted their education to me. Not all of them have appreciated my English sense of humor, but some of them have. And, if you're teaching a class, and you get one letter from a student, as I did a couple of years ago, sent me a card saying "you haven't just made my day, you've made my life." You only need one of those. And, students say you made such a difference to me. And, that is very, very humbling, actually. I regard all my graduate students as my kiddies, and I've been invited to numerous weddings and celebrations and so on. So, that's given me a lot of fulfillment.

The other aspect is the network of friends I have. One of the problems, of course, is all my friends are

men. And, one of the difficulties is you can't suddenly ask a colleague out for lunch, if he's a married man, you know. It does make life difficult. But, I have friends all over the world, 99% of whom are men. But, I'm not complaining. I've had some very good, good friends.

I've had the opportunity to, to work with industrial people as well as academics. And, you know, if you want my opinion, I would say industry is preferable because you're not trying to do three jobs at once. If you're doing research, you're doing research. You might have a bit of administration on the side. But, as a professor, you have to be your own market manager, your own expertise exploiter, your own archivist, your own accountant, your own everything. And, in industry you don't. So, I think you can achieve a lot more in industry, not on the personal level but on the professional level.

And a lot of my students, because of the work I've been doing, have left after the Master's degree and gone into industry. And, when a company calls you and says, "Do you have any more? I'm only hiring from you." That's happened to me a couple of times. There's one other professor in the University of Toronto, they've said, "I'm only hiring from you and from Doug Hooton." And, that's incredibly gratifying when you know that they're going out there, and they're doing a good job. So, that's one of the big impacts I've had on industry, is providing them with people who know something about corrosion, even though they're civil engineers. You know, there's a lot of construction that's deteriorating rapidly because of corrosion, largely because we put these darn deicing salts on it everywhere or stick it out in the sea. So, that's one of my biggest contributions, I think. The people side.

18:40 A LONG TENURE AT WATERLOO UNIVERSITY, ONTARIO, CANADA

Jenifer Locke:

Can you tell me a little bit more about your time at Waterloo and what all you've done there?

Carolyn Hansson:

Yes. I mentioned that Keith Brimacombe had recommended that I apply for the vice presidency, and I was interviewed there. That was an interesting thing, but, after being interviewed, I hadn't heard for a while. And then, I got a phone call offering me the position, and being me, I said, "Oh, thank you. Since I haven't heard from you for three weeks, I assumed you'd offered it to somebody else." And the person at the other end, who was the vice president, provost, actually, said, "Yes, we did, but it was turned down." So, I said, "Oh, and can you tell me, was the other person a white male?" And, he said, "Yes, as a matter of fact, yes, he was." So, I said, "Fine. Then, I'll consider the position." I didn't want them offering me a position just because I'm a woman. And then, I accepted the position. I started in January 1996, the end of November '95, the provincial government cut the funding to public, all of our universities are public, cut the funding to the universities by, I think it was 28% or so, no 15% effective May. The university introduced an early retirement program to deal with it. And, on the 1st of January, 130 faculty members and 200 staff members announced they were taking the early retirement package. That included all my senior staff in the office of research and every associate provost in the university. So, it ended up in the administration, there was the president, Jim Downey, the provost, Jim Kalbfleisch, myself, and the vice president development, Ian Lithgo. And, we had no senior management underneath us. I hadn't even found the way to the ladies' room at this point. So, it was a very, very difficult situation. Nobody wanted to talk about research because everybody was saying, "Who's going to teach the course tomorrow?" You know, so it was very difficult.

On the other hand, it was a fantastic job. You should take it, if you get it. Because it's the one job that gives you a window on research right across the university. And, you don't get that if you are on the administrative side or the VP academic or something, you're too busy with rules and regulations. But, when I went there, I didn't know how you did research if you didn't have a lab. But I now know how you do research in 18th century Russian literature or economics or so on. It was fantastic. And, it was great for five years. But, I spent most of my time in meetings, chairing meetings, visiting, dealing with problems and so on, and I missed the lab. So, but five years, that was wonderful. And, I strongly recommend if anybody has the opportunity to do the VP research job, take it. It broadened my perspective enormously. It really did.

I did manage to graduate three PhDs and two masters while I was there. So, I did manage to do that. I then went back to my teaching, and I have spent the last, oh, long life, teaching predominantly first- and second-year mechanical engineers materials, required courses. And, I've taught fourth-year non-metallic materials, which is not so much fun, I have to teach polymers. And, I've taught biomedical engineering students' materials, and I've taught management engineering students materials. And then, on the graduate side, I've taught corrosion frequently. And also, I developed a course on material science of cement and concrete for the civil engineers. So, that's basically what I've been doing over the last couple of decades, actually.

Jenifer Locke:

What's your favorite course to teach and why?

Carolyn Hansson:

Probably corrosion, because I could do it standing on my head, as you can. I try not to stand on my head. However, what I do do in my classes, if I'm teaching an hour-and-a-half class, I stop and say, okay, get up and stretch. And, before exams, I've been lying on the floor in the classroom, teaching them how to breathe from your lower abdomens so that you can calm yourself down and things like that. They all think I'm weird, but, you know, maybe I am. One of the things you can't do is be self-conscious as a professor, you know?

Jenifer Locke:

Constantly judged.

Carolyn Hansson:

Oh, oh yes. The other thing is you can't have a thin skin. Everything we do, the courses evaluate and criticize, you send out a proposal, it's sent out for reviewers to criticize you. You send out a paper, it's sent out to reviewers to criticize you. Everybody has the right to criticize a professor and gets very upset if you criticize them. *C'est la vie!*

Jenifer Locke:

And, it's your British wit that helps you deal with the life of full criticism, right?

Carolyn Hansson:

Oh, yes. But also, you know, students come along and say, "I've got this paper; he says, he doesn't understand that sentence." Of course, it's understandable. I said, "Yes, you knew what you did. And, if the reader can't understand it, we haven't written it properly, or you haven't written it properly. Maybe you better go back and figure it out." And, I say to students, if you can't explain your research to your grandmother, you don't understand it. Of course, I'm going to be a grandmother.

Jenifer Locke:

One day they'll be explaining it to you.

Carolyn Hansson:

Right. Exactly.

24:41 "I'VE JUST TRIED TO DO MY JOB" - HONORS & AWARDS

Jenifer Locke:

So, can you tell me about some of your more memorable honors and awards? I know there are more than several.

Carolyn Hansson:

I have had far too many honors and awards, considering the things I've been doing. I've just tried to do my job. But, as I mentioned, I've got a number of mentors. I received the Society of Women Engineering Achievement Award in 1980. They had tried to persuade me to join that society. And, I said, "I'm not a woman engineer. I'm a metallurgical engineer." So, what did they do? They gave me the achievement award, which gives me honorary membership for the rest of my life.

Jenifer Locke:

One way to do it.

Carolyn Hansson:

Yes. I have been very honored to be elected to the Royal Society of Canada. And, when I was elected to the Academy of Engineering, it's changed now, but at the time when I was elected the Academy of Engineering, I think that was 1998. There were only ever 250 fellows out of the whole of Canadian engineering of all kinds. So, it was a tremendous honor. And, I think there were two other women at the time. So that was a, a great one.

As I mentioned that I was elected to the Danish Academy of Technical Scientists. And, I'm a Fellow of TMS, I'm a Fellow of the American Concrete Institute, and I'm a Fellow of the UK Institute of Materials, Minerals, and Mining. I could never get those words right in that.

My greatest honor, of course, is that I was named to the Order of Canada, which is the highest civilian award in Canada. And, for that, I am very proud. That's what this little badge is. And, I suppose that

people who read these things or see them will know John Cleese, the comedian. He was interviewed one time by the senior journalist in the CBC, Peter Mansbridge, who also is a member of the Order of Canada. And, Cleese leaned over and said, "Well, that's pretty, what is it?" So, Mansbridge explained it was the Order of Canada. And, he said, "Oh, where can I get one? Can I buy one?" So, Mansbridge said, "Well, weren't you, in the Order of the British empire, it's the same kind of thing." And, Cleese said, "Yes, well, they did offer that to me, but I couldn't figure out which empire I was supposed to be commander of." So anyway, that told you the perspective, but it was really very gracious. It's presented by the Governor General of Canada. And, I have a big medal, by the way, on a ribbon, you know; but this is the one they ask you to wear.

So, other than that, I'm getting an award from AIST next month. And, I keep saying, stop nominating me because, with all due respect, my CV doesn't need it. I've been saying, nominate younger people for whom it can make a big difference to their career. What's the point of giving it to me? And, nobody listens. So, I mean, you can ask Rusty Gray, how many times I've said to him, don't nominate me; Hani Henein, don't nominate me and yet.

Jenifer Locke:

They respect you too much to listen.

Carolyn Hansson:

Well, I don't know.

28:24 GETTING INVOLVED WITH AIME & TMS

Jenifer Locke:

So, how did you first hear about AIME and TMS and get involved?

Carolyn Hansson:

Bert Westwood. He was very much involved with both societies, and I joined TMS in 1969. So, I've been a member for a long time. I can remember the first talk I gave at TMS. It was at the Waldorf Astoria in New York. And, Bert, you know, pushed me to give the talk because it was a joint paper. And, of course, I was terrified, terrified. I was only about 25, maybe 26. And, we get there. And, first, of course, I was wearing miniskirts because that's all I had. And, the speaker was up on a platform and the projectionist was a bit lower. So, he was kind of looking at, you might want to cut this, looking up at me all the time and kind of-- I'd say, "Next slide, please," and I'd get this silly grin. And, what Bert advised me, which I advised to other students, if you're scared, look beyond the back row that everybody thinks you're looking at them. And, I looked up, so I'm trying not to look at the audience, which is of course all men, and I look up, and the ceiling was painted with naked men. You know, one of these Roman fresco things. So, I was just completely shaken. I don't remember what I was talking about. I just remember these awful things. That was my first talk.

And, as I think I mentioned, at the hundredth anniversary of AIME in 1971, I was awarded the Robert Lansing Hardy Award for a promising metallurgist under the age of 30, for which that was my first award. And, I was completely overwhelmed by it. I remember giving the president a hug, which shocked

everybody when he gave me the award.

But, oh, there was another time. Bert was on the board of directors, I guess, and his wife couldn't go with him. So, he invited me. And, I can remember having the whole board running up the down escalator and down the up escalator at one point. So, yeah, take the pomposity out of everybody. One of my goals actually has been, since I graduated, is to prick the pomposity of the male, because this business of outdoing each other really makes them rather pompous. So, you're sitting around at a meeting, and you just pop in a silly comment, and they come down to earth, you know?

Jenifer Locke:

How has membership benefited you in your career?

Carolyn Hansson:

Hugely. Networking, visibility. I mean, you know, everybody loves the word outstanding. If you are a woman in metallurgy, you stand out. Why do you think I've got all these awards? It's not because I'm capable. It's because they think, oh, it's about time a woman got the award.

Jenifer Locke:

But, you are that capable.

Carolyn Hansson:

Yeah, I'm capable. I'm not brilliant, but I am a great believer that there isn't much variation about the average intelligence, intellectual ability. And, it's how you use that average intellectual ability. And, I have tried very hard to put mine to the best use so that I don't hold other people up. But getting to know people, you know, it's the society. When I was in Denmark, for nine years, I didn't participate at all in TMS. And, when I came back, my first TMS meeting, it felt like coming home.

Jenifer Locke:

It says a lot.

Carolyn Hansson:

Yeah.

32:19 RUST'S A MUST - AN ODE TO CORROSION

Jenifer Locke:

So, do you have any ideas of attracting younger people, emerging scholars and emerging leaders in industry into corrosion and into metallurgy? What are ways to get people attracted to it?

Carolyn Hansson:

Well, nobody is attracted to corrosion. However, do you know that poem? An Ode to Corrosion?

Jenifer Locke:

No!

Carolyn Hansson:

You don't!

Jenifer Locke:

I don't think I do.

Carolyn Hansson:

And, I can't remember it, of course. I will get the words, and I will send them to you. I remember when I gave the Acta Materialia Materials and Society Award back in 2009, I think it was. I had the whole audience reciting it. I'd got the words up on the screen.

You know, mighty ships upon the ocean suffer greatly from corrosion. Even those that stay at dockside are rapidly becoming oxide, and it goes on from there. And, then it ends up with, here's an ode to rust, no doubt about it. Most of us would starve without it. It's an ode to the corrosion engineer.

Jenifer Locke:

That's awesome.

Carolyn Hansson:

We should attribute it to, it was a bunch of corrosion engineers who came up with it over beer one night.

33:32 ADVICE FROM A MENTOR TO HER STUDENTS

Jenifer Locke:

So, as a mentor, what advice do you give to both female and male students (that might be different between them), but, what advice do you give them, while you are a mentor of them, that you think you'd like to share with us?

Carolyn Hansson:

Well, as I said, I tend to mother them a bit. And, I talk, I talk to all of them about how they present themselves. In the men, you know, don't be too dogmatic and assertive. I probably spend more time on the women trying to mentor those because most of the women who come into university are diffident is probably the best word. And so, I try to teach them to, however you're feeling to, I mean, we're all

actors and actresses, and to put on an act of being confident and speaking, not aggressively but assertively, if you know a subject. I tell my students, if you're giving a talk on work you've done, you know much more about it than your audience does. So, don't be afraid. They're not going to tell you you're wrong because you know what you did. And, women, particularly, for example, one of the things I learned, I was told by my former PhD supervisor, reminded thereof or pointed out by him, that, when women raise their voices to speak to a large crowd, our voices tend to be shrill. It's a fact of life that we can't change. So, either learn like an opera singer to sing from your diaphragm, to speak from your diaphragm or use a microphone, because there's nothing worse than listening to shrill. Men, fortunately don't have that problem; they have some of the breaks, but we have others.

35:35 NO REGRETS & A FUN-FILLED CAREER

Jenifer Locke:

So, do you have any regrets regarding your career choices? Would you have done anything different, taken any different paths?

Carolyn Hansson:

Absolutely not. I love metallurgy, metallurgy, metallurgical engineering, materials science, whatever you want to call it. I've had such fun. Materials intrigue me. You know, I look at things, and, of course, I see corrosion everywhere. I look at materials differently from anything that I would've done had I not been in this field. And, I find them fascinating, that we can change things so easily, if you know how. You just take something like steel, which has been around for centuries, and think about the different properties we can get from that by alloying, by heat treatment, and so on. It's amazing. And, I find great joy in teaching these things or opening people's eyes to what's around them, to what the table's made of, to what their refrigerator is made of, to all of those things. No, I have no regrets. I would like a few more decades of it, but I'm not going to do that, am I?

Jenifer Locke:

Well, thank you so very much. This has been fascinating, and you have such a fascinating career and life. And, thank you for sharing it with me and sharing it with everyone who will enjoy watching this. It's been a real pleasure to spend this time with you, and thank you for giving it to me and to us. So, thanks again, and we really are happy that you've shared your story with AIME.

Carolyn Hansson:

Well, thank you very much for inviting me. It's been a pleasure. Thanks.