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Elizabeth Rauscher
An Oral History with Elizabeth Rauscher

Interviews conducted by
Dennis Preisler
in 2012

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Dr. Elizabeth Rauscher in the Bevatron accelerator control room at Lawrence Berkeley National Laboratory in 1978. Photo by Joan Price, courtesy of Dr. Rauscher.

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Interviewee: Elizabeth Rauscher, Ph.D.

Interviewer: Dennis Preisler

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Preisler: Today is April 27, 2012. I'm Dennis Preisler and I'm interviewing Dr. Elizabeth Rauscher at her home in Apache Junction, Arizona. And it's, like I said, April 27. So we're going to go ahead and start now. And we'll start by talking a little bit about your background, your education. And as somebody who went to college and my father when I was growing up, you know, he was like, "College, college, college, it's the most important thing. It will be with you for life." And I know that when I went to college, my favorite thing about college was all the fun I had. (laughs) So my first question is, what really inspired you to go to college?

Rauscher: Well, interestingly enough, my parents, well, on both sides of the family, particularly my dad's side of the family were very well educated. [Father, Philip J. Webster, Ph.D. in agricultural economics, UCB] Everybody was supposed to get PhDs at big institutions. And he had uncles that were head of universities like Swarthmore University. And there were books all over the place and magazines. So if you ask a two year-old what's going on here, they may not be able to explain it in words. But it was clear, my mom was reading all the time, and an expert on history.

So one thing that was sort of an expectation, but I didn't get along too well with my parents. And I was sort of, in their view, unruly. So I don't know what their expectation was. But I remember cutting ivy, which I would get paid for, you know, probably five cents an hour. And putting that money aside. And at about seven I said oh, well, I better start saving for college.

So it was sort of an impulsive thing. It wasn't really discussed. The idea was to be a learned person of the world. And friends of my mom [Claire Elsa Soderblom Webster, M.S., economics, UCB] and dad talked about their world travels. And I was very impressed. And one, when I was about seven, gave me a philosophy book, which was very interesting.

Preisler: For a seven year-old.

Rauscher: ["Man's] Right to [Knowledge"] was the title of the [blue-covered] book. And interesting, I didn't talk to my son about it, either. But at

seven he said, “Oh, I’m going to start saving for college.” And I never told him that it was seven that I chose to start saving for college. I thought that was an interesting imprint.

Preisler: Uh huh, huh huh, yes.

Rauscher: But anyway, my idea was, about four, I was sitting and watching the grass grow, as they say, when the idea as a child’s idle, that’s terrible. Well, you have to be idle to think. And I questioned, I loved nature, grew up in the woods, and just felt the harmony and beauty of nature. But I didn’t get along too well with my family, nor them with me. So I was asking myself, you know, how, why is this the case and how could this be resolved. And questioning that.

Then I remember being about nine, or eight, I guess, and watching my mother authoritarily iron her clothes. I was young enough that I was looking up at the table, so maybe I was more like five. But I did think about do you automatically know stuff, or do you have to work to learn. In other words, that is a decision that you have to make really young if you’re going to learn a lot.

And then there was this saying on my dad’s side of the family, “Gain and disseminate knowledge and make the world a better place.” I don’t know who said it, but it was sort of implicit and explicit.

So that’s what I thought. And my idol, well, I thought Paul Newman was cute. But actually, my idol was Albert Einstein. And I have a nine year-old older sister. And her first husband was a math major at Berkeley. And so he was talking about relativity. And he was a weekend warrior for the National Guard. And he’d talk about Nikola Tesla and inventions and things like that.

So I began to, when she moved out, she left a huge dressing room. So I began to gather stuff. Because I thought if you’re going to invent stuff, you’ve got to have something to invent it with.

And then I, from nine to thirteen, I built six telescopes. Now some I took apart to build better ones, but they all worked fine. My biggest was a three-inch reflector. But most of them were refractors. And I built a cloud chamber when I was about fifteen. And I thought about it.

Now if I’m going to understand everything – which I also realized was probably impossible, but there was that drive to do that – if I’m going to understand everything, I’ve got to study the very small, the atom, and the very large, the universe. And maybe somewhere I’ll find consciousness. Or maybe unconsciousness.

So that was sort of my point of view. And the second thing I thought about was influenced by my sister's first husband, was nuclear energy. Because he took nucleonics for the navy. So I read his book on how to build a bomb. Actually, it wasn't very complete.

But what I thought, really, is we're going to have wars over oil. So we do need to look for alternative energy. But even at the high school level, I thought well if the nuclear waste problem isn't solved, we're going to have to deal with that. So it may not be the answer, but I don't see any other particular direction. But we're going to need oil [substitute].

I didn't anticipate how bad the water pollution would be. But I did see the issue over fossil fuels.

And so that interested me. And actually, plasma physics and fusion reactions as well. And I wrote my first paper that was published when I was sixteen. And then when I got to college at sixteen, it got published when I was a junior in college in an engineering magazine. And it was on fusion reaction and how to build fusion reactors. Which, of course, no one's done yet.

Preisler: Right, right, there's a lot of [unclear]

Rauscher: Just a few years, another 20 years, very interesting. And one of my best known papers is on the theory of fusion and how plasmas interact and how the non-localities [operate], what they call the instabilities and how I think about it the other way around. So I've actually kind of got a design in my mind. But there's only so much time to implement everything.

So my inspiration to go to college was I also saw the other side of it. You needed the green card. You needed at least a bachelor's, if not a PhD, to have any role in trying to improve the society. And also make a contact with people of like mind. It was a long path.

As far as my favorite things in college, I mostly worked. I worked half time for the math department, which I enjoyed, correcting papers. So I wasn't a party person. I was pretty much studying, because I actually had a double major in physics and chemistry [B.S. in chemistry].

And the thing that I got out of college was to go to college the first year and find out, my God, I can get all As. That I really can do this. And I must admit that I was a worrier and nervous over exams and everything. But I got the highest grade out of about a thousand students in calculus a couple of times. And you know, really, I got the

highest grade in E and M [electromagnetism] in physics and the highest grade in geophysics. And so it was sort of a proof that you're not just a dud. And it still was a whole uncertain path, of course. But I did enjoy working for the math department.

And then I didn't really talk, my folks were lecturers. They didn't talk, you didn't have a conversation, a chatty conversation, with a child in my family. The adults all got together and gossiped. And to me, the content of what they talked about was uninteresting. But I hadn't really held a deep philosophical conversation with anybody. And I had started some of my theories that turned out, I published in books, in high school. I didn't talk to anybody.

And I remember going to a teaching assistant party, somebody, I think, that knew my brother-in-law or that I had met. And I was talking about something, I don't remember what, but there were a whole bunch of people listening. And it was sort of like an ah-ha moment, the first time to actually talk about something and someone listened.

Preisler: Yeah. Yeah.

Rauscher: So it's kind of coming out from a really sheltered existence. And I remember talking to my dad once, trying to explain why they interpret the atom the way they do, and the Bohr atomic model and the Thompson Pudding model with the protons [like raisins] in throughout the atom. And he just ridiculed me and laughed at me. And I said that's it, I'm not talking to these guys [my parents] again.

Preisler: Right.

Rauscher: They're off my list. So that had happened when I was about 15. But I actually started lab book, my first lab book I started when I was eleven. I started making notes on things like how Hoover Dam was constructed and on observations with a little microscope my mom got for me. And as I say, my relatives were all into the humanities. But as I say, my mother had a scientific bent.

And I went to a doctor's office when I was eleven and saw Scientific American. And I begged Mom to give me that as a Christmas present, which she did. So she did encourage me. Although later, you know, they realized, they were told that women would never make it in science. (Preisler laughs) So then there was sort of the idea of discouraging.

But I had made up my mind what I was going to do. Had a very clear outline. I didn't always see how to get there.

Preisler: Now you also studied under Glenn Seaborg for a while.

Rauscher: Yes. Yes.

Preisler: What was he like to study under?

Rauscher: Oh, I'll get to a little bit more of my degree, and then I'll talk about Glenn T. Seaborg because he comes in naturally with the PhD level.

Preisler: Okay. Okay.

Rauscher: So I got a bachelor's in physics and chemistry, a master's in nuclear engineering. And at that time, I had been married and was going through a divorce and had a young son. So I decided to get a master's, to work for a while, before I went back for my PhD. I had to be able to support, at that time I was supporting the three of us. And then I got divorced, so I was supporting me and my son, Brent Rauscher.

But anyway, I came back and did my PhD. And actually, I started under John Rasmussen in nuclear science. And he, I had taken a year undergraduate research with him. And also with Emilio Segrè. And I will have to say, John Rasmussen really taught you how to, you know, look up the references and be careful. And what I did is write a report for something like eight units of research my senior year on a student's PhD thesis that had an error in it. I did show where the error was. And I got published as a footnote with no name attached. (laughter)

Preisler: Oh, no! That's not fair.

Rauscher: But I did learn, I did learn the process. So I actually started writing papers. And then Rasmussen left [UCB for the Colgate Laboratory]. And so I needed another PhD research advisor. And actually, I didn't know it at the time, but Rasmussen had studied under Seaborg. So it's kind of tricky when you leave one guy. But I went with Glenn T. Seaborg, [a Nobel Prize winner]. And actually, I'd always kind of been interested in consciousness and psychic phenomena. [I also had two other Nobel Prize winners on my Ph.D. thesis committee, Edwin McMillan and Owen Chamberlain.]

And he was very well organized. And he had the most phenomenal memory I noticed of anybody I've ever met. Now he took copious notes. And sometimes he would ask me about something I had said in a previous conversation that I had more or less forgotten. (laughter) I mean, he was really good.

And he had more honorary degrees than anybody else on the planet. He had been chancellor of UC Berkeley. Head of the AEC for ten

years, Atomic Energy Commission. And he realized, actually what happened, when the AEC became the Department of Energy, first it became ERDA and then Department of Energy. When that transition happened, the Bureau of Indian Affairs was under the land management. So basically it would have been under the Department of Energy. And he realized that was insane. But of course there's no Department of Swedish Affairs, so there's some really—and later I worked with indigenous people.

But he did really kind of organize what really is our modern Department of Energy. And let's see. He was not a person, I had some colleagues that you tell jokes and laugh. He was definitely not that. Most physicists at Berkeley were serious. And sometimes they'd say something that I thought was funny. I mean, it was a thing that was funny about physics. But definitely were not supposed to show any emotion.

And my work life—

Preisler: One more question about, on your education and teaching. You started, while you were teaching, I think, or doing your graduate work, you started the philosophy of science classes?

Rauscher: Yeah, I did. I started a group called the Tuesday Night Club, which was named after my father's father [Isaac Danial Webster, M.D.] group that he had called the Tuesday Night Club, which was MDs and PhDs. He was an MD. And he helped start some of the public hospitals. He died before I was born, so I never met him. But he was interested in all kinds of things, including séances. But he was an outstanding diagnostician. He said he could smell diseases.

And later, when I was doing medical research, I could smell some diseases.

Preisler: Well, okay. Yeah.

Rauscher: It's very interesting. You have to notice it and see how it's correlated with the condition.

Preisler: So when you did the philosophy of science, that was a way to gather--

Rauscher: What I did is, it was world religions and philosophies. It was a way of gathering a group of young people that were scientists. Most of them had bachelors and masters at the time. But to discuss, really, sort of looking for world commonality. And sort of ways to create peace. But the specifics of it was to discuss different world views and how those evolved and how they interact. So one person would be responsible for

an evening every Tuesday. And then the fourth Tuesday would have someone do an ethnic dinner.

Preisler: Oh, okay.

Rauscher: So someone would do Chinese or Italian. And then we would have sort of a party. And they took it, they took it seriously. And at the time I was teaching a course in solar physics.

Preisler: Okay.

Rauscher: So I had those two things going on. That was when I was at Lawrence Livermore Laboratory. First I started out at Lawrence Berkeley Laboratory and spent 19 years there. But then I'd had a joint position at Lawrence Livermore Lab for three years. And the Tuesday Night Club was at Livermore. And the other club I belonged to was Vaqnos Del Mar, which was a skin and scuba club. And we used to go skin and scuba off the California coast. And I taught skin and scuba.
(Preisler laughs)

I came back to Berkeley after I was at Livermore. And—[complete my Ph.D. in Nuclear Science.]

Preisler: Now we can move on to a little more of the work life. Throughout most of your career, you were probably the only female physicist working in any of the labs or any of the jobs that you had. How did this make you feel?

Rauscher: Well, it's interesting, because I noticed that there was a lack of females when I entered physics classes.

On the average, as a freshman, there were about 410 guys, as I recall. I was the only woman student. They were all men and just me. And at the time, the hairdo was sort of short. So I kind of wore tweedy outfits and short hair. But I still stood out like a sore thumb. I mean, the professors definitely knew who you were.

And they had various viewpoints. Some were fair. I had one as a junior level E and M course. And he said, "Don't ever come to my office hour. I hate women in physics."

And sometimes in lab, the TA and the students would take my equipment apart when I went to get something in the storeroom.

Preisler: Oh, dear.

Rauscher: Then I had to figure out where the hidden fuse was that was removed. So there was—And then, in spite of the fact, I was getting some of the highest grades. Not all As every year, but most of the time. They wouldn't choose me as lab partners in physics.

Preisler: Just didn't want you?

Rauscher: So I had to do all experiments alone while they all had partnered up.

However, in chemistry, it was quite different. There was probably about 40 percent of the students were women. And it was much more casual and had comradeship. So you would have no problem getting a partner. And there were sort of like games like throwing liquid nitrogen down the hall and watch it slide all the way down to the end and stuff after class. (Preisler laughs) And you weren't supposed to talk and laugh [in the laboratory], but I'd just run out and laugh when something struck me as funny. And pull little jokes on each other. But it was very different. The competitiveness in physics was, "I hope you fail and bring down the grade level" is what every student thought of every other student. It was just extremely competitive.

And in my senior year, there was one other woman that majored in physics. But in all other classes—now because you have to take calculus for a number of fields, in my early calculus courses, there were a few women. But in—

Preisler: Okay. And then once you got out into the work world.

Rauscher: Well, same thing. Actually, I collaborated only with one other woman. I had all male colleagues. It was Beverly Rubik.

Preisler: That's with the psychic healing stuff?

Rauscher: Yes. She had gotten her PhD in biophysics at UC Berkeley. And she was part of my fundamental physics group.

So I'll go back a little bit more on no women in physics. There were a couple of women PhDs at the lab [LBNL], but they were mostly doing data processing. There were no other women really trying to do fundamental physics.

And there were a lot of reactions about it. Ignoring was one of the big ones. Like if you're at one of the teas before a lecture, cookies and tea, nobody would talk to you. You might be able to go up to someone and talk to him, but it was—

Preisler: They would not approach you?

Rauscher: They wouldn't approach you. And the other thing is, some would just come out and say they hated women in physics. They were very, very strong about that. Very negative.

Preisler: Yeah. I wonder how the field of physics is now if you're going to college now, if it's changed.

Rauscher: Well it's interesting, because about five years ago, I gave a lecture at Arizona State University in Tempe. So there was a group of six women at the conference. And they were going to the university, six students. But they all clung together, and they talked about having their equipment sabotaged.

Preisler: Really? Even still.

Rauscher: Except that there were more of them, so it made a difference.

Preisler: Right.

Rauscher: You weren't completely alone.

Preisler: Right.

Rauscher: Trying to deal with all this. It was strange to me why there was so much dislike.

Preisler: It doesn't seem to make any sense at all.

Rauscher: No. And I would say there's still some of the older professors that, actually, there's one guy, I won't mention his name, but I wouldn't teach at that university here because I wouldn't want to deal with him. I may not want to teach here anyway right now. I do like teaching. I really like students, and I enjoyed that.

Now when I was teaching at the University of Nevada in Reno and teaching grad students in physics, there's several professors I worked with that what it is, they wanted papers well written and published and well analyzed, so they were happy to work with me because I would get them [published]. There was one year we had 18 papers published. The next year I had left and they got none [published].

Preisler: (laughs) So you played a role in that.

Rauscher: Yeah, so I played a role in that. But there was one older professor. I was suggested for the chairmanship and it looked like a shoe-in. And then he dinged it. This one guy. And then he retired two years later.

So, and I saw guys sometimes get blacklisted. Not very often. But there was this one student that they didn't like. He was kind of withdrawn and kind of a nasty personality, but he knew his physics. And if it's based on physics knowledge; you don't give them a PhD based on their personality.

Preisler: Right. Yeah. (laughs)

Rauscher: And then there was one period when there was another woman getting a PhD in physics [at UCB]. And I would say she wasn't, she was sort of in the middle ground. She wasn't the best or the worst. But they flunked her orals and they said, "Don't come back." And yet the law says that you can schedule another oral if you have the standing [but they would not let her]. So that was unfair. And then she just started as a freshman all over again in biology.

Preisler: Just gave it all up in physics?

Rauscher: Yeah! And there was one very bright chemistry student. When she got her bachelor's, she said, "I'll become a librarian." And she would have been a good chemist. She knew her stuff.

Preisler: Right. Right.

Rauscher: So who says how many are just discouraged and—

Preisler: Give up. Yeah. Just give up.

Rauscher: Because it goes from about 40 to 50 percent. Now it's over half of the student bodies at the campuses are women. But at the PhD level, like in chemistry, I think it was 2 to 5 percent were getting PhDs. In physics, it was nearly zero.

Preisler: Yeah. One-tenth of a percent, or something like that. (laughs)

Rauscher: Yeah. So you have to say something's going on. It isn't that they don't want to do it. Because people are telling them to get lost and "I hate you" and stuff like that. That happens.

Preisler: And if there's no women on the faculty teaching, then there's no one to go to, no one to turn to.

Rauscher: No women to go to. And sometimes, because they're biting the bullet and having to fight their way up, they don't necessarily want to help someone else.

- Preisler: Right. Right. Yeah. And so it's got to slowly work it so that more women are in there, and then they can help you mentor the younger ones.
- Rauscher: Yeah. Then what they'll do is, in Russia, see, I think over half of the medical doctors are women. So what they'll do is they say, "Well, oh, medicine, that's a crappy field. You don't want to go into that." So I figure if over half of the physicists became women, they'll just downgrade the field. (Preisler laughs) I think it's pathetic and hilarious at the same time. It's really sad.
- Preisler: Yeah, yeah. When you think about it, when they shut you up because of your gender, then they're dismissing so much, they're dismissing—
- Rauscher: Yeah, and that's another thing. Some of the women in science do bring up where there's female and male science. I'll have to say I think there's science. But look at it this way. The Hadron super collider is, as one physicist pointed out, I'm trying to remember which one, he's one of the well known guy, someone like, I don't know if it's Steven Weinberg, but somebody said, "It's like taking two Swiss watches and smashing them together and then trying to figure out how they are constructed." And that's what a particle accelerator is. And I would say probably smashing something is more engrained in what we teach males to do.

When my son was little and he built something and it wasn't to his perfection, he'd smash it. And I said, "It's yours. You have your right to do, I gave it to you and you have the right to do anything you want with it. But it's gone now." (laughter)

I don't know. I think the answer is yes. And I'm concerned that about the whole educational system from the beginning to the end. I think when I went through it, it was the hardest. But it's been watered down at all levels. I think particularly grammar school and high school are just so watered down. And I feel like I love teaching and I always got good teaching recommendations. Teaching is an art and you really have to work at it. It's not just something where you just remotely, remote, routinely just say a bunch of things. You actually have to really connect with the students and impart the knowledge. And I don't know whether, I think at the curriculum, and at the teaching level.

If you want, I think a critical period [in a student's life] when I used to tour people at the Lawrence Berkeley National Laboratory, the ones that were the most inquisitive were between about ten and thirteen. They'd say, "Hey, what is this?" They're all excited. And if you tour teachers, they just went through the tour because they had to. That was sad. I mean, the teachers represent adults that have lost their desire to

know and their passion. I mean, I never grew up. That's the other secret. Never grow up. (Preisler laughs) Remain immature, curious and passionate and obsessed with knowledge and just go for it. That's my viewpoint, that it's partly an attitude and not settling down. You settle up.

Preisler: Right. Correct.

Rauscher: I might take a break for a moment.

Preisler: Sure. [pause]

Rauscher: You're not supposed to help them very much [Ph.D. candidates]. (Preisler laughs) You're not supposed to write the thesis for them.

Preisler: (laughs) Okay. Well, let's talk a little bit about sort of your non-work life. I know that you do enjoy writing poetry and you do enjoy doing art. Can you talk a little bit about—

Rauscher: Oh, yes. I am very good at art. Very good at drawing. And I thought you know, I also got some of the messages about the discouragement in physics at a pretty young age. So I thought about going into art. What was interesting is art's dominated by men.

Preisler: It's another gender issue there, too. (laughter)

Rauscher: A gender issue. So, and I did actually for a [short] while, [think about an art career] when I was between, you know, thinking about career, how many paintings can you paint per day, even if it's a third of a painting, and how much could you sell them for? Could you make a living as an artist? Basically pretty darn hard.

Preisler: Yes.

Rauscher: And I'd say the way it was in physics for a woman, pretty darn hard. That's kind of hard on the guys, too.

I mean, but in general, I mean, this case of this woman that they just told her not to take the exam again. Now, I'll come back to the art. But what I want to talk about is role models. Because there were none. I did read about Madame Curie, of course. But you're not going to dress like her. And I noticed that the few women scientists I knew kind of wore what I call old lady dresses and pearl necklaces. Pants were coming in. So I used to wear pantsuits.

I used to look at the people in the airport. They didn't all dress in jeans and T-shirts then. So you sort of looked for how should you present

yourself. So I wore browns and navy blue, both of which I didn't like, most of my early career. Very non-feminine clothes.

Now that I'm older and kind of, well, now that I'm older and famous, I can wear feminine clothes if I want.

Preisler: (laughs) Yep.

Rauscher: But it's interesting, because you sort of have to try to blend in. and there really wasn't, I like men, I've married twice and I like being a female. But also I notice when you're working with engineers, even your body language is important. And I always kind of had a mechanical sense. I liked to build stuff. And I made my chem lab, I had a pretty extensive chem lab in high school. And I tend to be kind of assertive in my personality.

Well anyway, so back to the art. I did both art and photography, which my mom got me into, because she was into it. And very, very good. She was one of the top ten amateur photographers in the United States. And I learned from her because she said, "How can you do it so well so fast?"

And I said, "I learned from you."

Preisler: (laughter) There you go. Good teacher.

Rauscher: Yeah. Good teacher. So she, you know, that's something I really liked to experiment with, and colors. I kind of liked the vividness of the intensity.

And then in high school, you could say, what did you get out of high school? I got nothing out of grammar school. I thought it was a total waste of time. However, one thing I did like is in third grade I went from the third to the ninth grade math in one year. And I really enjoyed it, because it was figuring out, once I could see how you could do these puzzles, whether it was applicable to anything. I kind of heard it was. But it was fun.

And then the astrophysics. I did meet an astrophysicist when I was about eight and he was talking about billions and billions of light years, and billions and billions of stars. All the great stuff. And growing up in the country, I actually could see the night sky.

Preisler: (laughs) You say, I can see those!

Rauscher: Constellations where planets were. And so, but one thing I did get out of high school was sophomore English. Sophomore, we had a course

in English poetry. And Shakespeare. And I just really was inspired by it. So I started writing poems. All kinds of poems. Some about the tragedies of my life at fifteen. Because at that point, I took the responsibility for the whole world on my shoulders, thinking everybody has to take full responsibility. I still do in a way, but I don't do it emotionally.

Preisler: Right.

Rauscher: But I really felt stoop-shouldered. It was a real burden. So I'd write pretty dark poetry. And then sometimes I'd write nice things about nature.

And one of my areas of writing poetry is about love. And I haven't figured that out yet. (laughter) Even having done it.

Preisler: So if you look at all the poetry over the years, I don't think too many people, even poets, have figured out love.

Rauscher: No, no. I just try it different ways, like after my first marriage ended in divorce, love lost, of course. Second one really worked out well for 20 years [until his death]. So I'd go through phases when I'd write poetry. And then I wrote some poems about physics. They may not make much sense to a non-physicist, but they have nice flow of words and imagery. It was sort of like painting that image [with words].

I really kind of liked, I went to a private high school, so I have four years of history, four years of English, four years of science, four years of math. And then we had various other courses, like I did take art in high school.

The other thing I found out, I actually took art in college, too, is most of the teachers taught their view of art. You weren't learning to express yourself in your own modality.

But what I was inspired by was Japanese painting. And there was a program on public broadcast when I was a kid on Japanese art painting. So I started doing that about eight. And I got really good at it. And Chinese. Chinese and Japanese and also Navajo. So there was certain influences that influenced by style. My son wants to make sure that my paintings [goes to him]. He doesn't want the physics papers. He doesn't want all those shelves of physics books everywhere. Please, Mom! (laughter)

Preisler: He wants to have the creative stuff.

Rauscher: Yeah. He wants my artwork. So I thought that, well, physics is creative. It may, in fact, that's a good point. How creative is it? When we say we're discovering the truth, the idea of science is to look for truth and to analyze and object group and make hypotheses. And what I find is dangerous is the idea we [in modern society] almost know everything. And later, when I talk about parapsychology, I'll mention that there was this article on my work in parapsychology. And David Saxon, a physicist, was head of the university [UCB]. And I had used the Woods-Saxon potential in my master's degree. I'm stepping out of order here.

Preisler: That's okay.

Rauscher: And so there was an article about me and parapsychology. And it had a photo kind of a looked like I was supposed to be a ghost, I guess. But not a very flattering picture. But the article was nice.

So David Saxon went out of his way to give a whole talk on how, particularly me, had to necessarily be wrong, because we almost know everything. So this came out in the alumni magazine. In fact, the other article was in the alumni magazine. This came out in the Daily Cal and the alumni magazine, saying that Charlie Tart, Jeff Mishlove and Elizabeth Rauscher are necessarily wrong because we almost know everything. And it's not what they're talking about. (Preisler laughs)

So then your career and everything sort of depends on, presumably, the head of the university professors doctors liking you. So what do you do? So I thought about it, and I said, in my view, we almost know nothing, and it's very fortunate, because we can learn all kinds of things. But I decided not to write a response. I decided to just leave that alone.

[My actions did not always reflect how I emotionally felt, particularly in college and at UCB, sometimes scared, frustrated and angry but I didn't act on these but what I saw as logical and took chances in spite of my fears.]

Preisler: Sometimes that's the best thing to do, just ignore it.

Rauscher: Yeah.

Preisler: Now you also became a follower of Eastern and world religions and philosophy. This is after, began, I think, after you visited the Arthur Young Institute for the Study of Consciousness. Is that correct?

Rauscher: Oh, no. It started when I was a child. I had an aunt and uncle, Alfred Mitchell and Dorothea Mitchell. He was a fine artist. He became a

very famous California landscape artist. And she particularly was into Theosophy and Eastern religion. Because that's where I first heard about it.

And my folks didn't realize kind of how I did it, but I made an arrangement to go visit them from the Bay Area to San Diego when I was nine. And they had driven up from San Diego to visit us. So they were going to drive back. And there was a back seat that was shared with their dog Mack. But I asked whether I could ride back with them, stay with them. My parents knew I was interested in art, but I actually was more interested in the philosophy, as well as the art. And then also, I really thought they were wonderful people.

So I get this arrangement that I was going to fly back alone, which was kind of an interesting experience at nine. So I'm asking him all kinds of questions, and Dorothea is telling some of her ghost stories. But in general they thought oh, I'm too young for this knowledge. So I'd have to sneak and read the books at night. Because they went to bed very early and got up at sunrise. I didn't have that schedule. I'd sneak and read their books that they're keeping in a closet. (laughter) As though they're going to destroy your brain or something. It's so funny. But that's where I got influenced and interested in Eastern art as well as religion. So that's really how that came about.

And then that's what I did with the Tuesday Night Club was to go ahead and have other young people my age, in their twenties, look at that and examine it. But, yes.

Preisler: And then the Arthur Young Institute for the Study of Consciousness.

Rauscher: Oh, yeah. I had, let's see, the order of things. We probably should put that under my Fundamental Physics Group [at LBNL] and Arthur Young kind of in that grouping.

Preisler: Okay. We can go ahead and talk about that in the last section, then. Why don't we go ahead and finish up this background education. I know at one point I read somewhere where you had said something to the effect that it only takes the birth of a child to find out that you believe in life. So I want to talk a little bit about your son and being a mom and that sort of thing.

Rauscher: Oh, yes! That's amazing. Actually what I was saying is like people discount in science [based on] one experience. You know you're born. Or you should know that. And you're probably likely to die. But that's one event. You're born. So you believe in that event. And sometimes it takes only seeing one black ghost to believe in ghosts. Now maybe

they're not discarnate people or whatever they are, but the image is there. And if you see it with somebody else [saw it too, William Van Bise, M.D. (Hon.)] that totally agrees with what you saw. So I wouldn't write a scientific paper on it, but I would say there's certain things I believe because I saw them. I also realized the role of illusion and that you have to be careful with that.

I got married to a fellow student in physics. We met in a junior level E and M class. I'd had an accident and broken [both my] legs. So I came in about halfway through the semester. So I had to find people that I could copy their notes and catch up with. But I didn't know he was a plant. He had heard about [me], by then, I had a blonde ponytail. Hair wasn't short anymore.

And so we got dating. Whatever that is, falling in love, it's not in Buddhism, but it's certainly a Western idea. (laughter) Romance novels. Then we got married and I had one son. And of course he was obviously the cutest baby there is.

Preisler: In the whole world. Yep. (laughs)

Rauscher: I mean, I don't know. I guess every mother sees it that way. I'd been brought up in a very strict household. And really if you weren't eating something or something like that, you were supposed to stay in your room. My sister raised her kids that way for a while, that they were just to stay in their room. They weren't really to share in the house. So there were a lot of rules like that about [not] giving respect to your child. [But,] I read a book [later] called Babies are Human Beings. In other words, whether it's a one-day-old infant or whatever, that you respect them as a full, valid human being. And that may be from conception.

And I think, I didn't say I'm going to raise my son the opposite of the way I was raised. But I was going to take each thing that I felt wasn't correct or useful to me and apply it to rethinking the whole thing.

And my son turned out very well in spite of me.

Preisler: (laughs) Well, probably because of me.

Rauscher: He's a computer engineer. He's very happy with his life. I have three granddaughters. I really enjoy them and love them. We just had a lot of fun together.

Preisler: You and I have been chatting for the last couple of months and it sounds like you really did a lot of things with your son.

Rauscher: We went camping together. One time we were camping out on a hill on a property that my dad owned in the past. But he didn't own it currently. So I wasn't trespassing, because I had let the owner know we were camping on the land, or asked his permission. But we were out on this hillside looking at the satellites.

So we got talking about UFOs. And he's about fourteen. And he was taller than me by then. So after we were talking about abductions and stuff, I don't know, that's one of my open questions is about UFOs. But anyway, he starts moving closer to me. And I said, "What, do you think I'm going to beat them up?" (laughter)

He said, "No. I think you'll be able to talk to them better than I will."

We had all kinds of—

[End Track 1. Begin Track 2A.]

Preisler: All right. This is tape two. And it still is April 27, 2012. This is Dennis Preisler interviewing Dr. Elizabeth Rauscher at her home in Apache Junction. And we're going to continue our conversation. We're going to go ahead and start working, go through some topics that are going to focus specifically on Dr. Rauscher's work at Stanford Research Laboratory, Lawrence Berkeley and Lawrence Livermore Labs. I think we want to start, maybe, with the Lawrence Livermore Labs. Is that a good—

Rauscher: The Lawrence Berkeley comes earlier.

Preisler: Lawrence Berkeley, okay.

Rauscher: When I was in high school, every six seconds my radio clock made a kind of a zipping sound. Turned out it was part of the energy produced by the accelerator at Lawrence Berkeley Labs [the Bevetron].

Preisler: Wow.

Rauscher: So I used to get on the bus as an employee when I was in high school and ride up [to "the lab," LBNL] and look around, and try to look like I belonged there.

Preisler: And they just let you through—

Rauscher: They just let me through. The thing is, at the gate, you had to show your badge. But on the bus, you could just get on and get off when it got down to the campus. So they didn't look for the badge. And so I'd

go with it to Bevatron studying about E.O. Lawrence and got my dad to go to one of Seaborg's talks when I was a kid in high school by telling him he was in charge of the intramural sports and football that my dad loved. No, I arranged for, I did science fairs and things like that. So I arranged to meet, I did meet some physicists in high school.

Preisler: These are when you would sneak into the lab there and you'd get a chance to—

Rauscher: Yeah, and I would just walk around, I didn't engage anybody in a conversation because I felt like I might give myself away. But no one paid a bit of attention to me. It was amazing!

Preisler: Uh huh. (laughs) They're so focused on their work.

Rauscher: Just focus on their work. I'd walk around the Bevatron, go to the control room, watch it. Then I realized the sound it was making in the control room was the same as I was picking up eight miles away on my radio alarm clock. So it was very interesting. I don't know, it's an RF source, a radio frequency source, that they use.

So one time I went up and they had discovered, I think this is probably when I was an undergraduate, Owen Chamberlain and Emilio Segrè had identified the anti-proton. So they were just drinking their champagne. I stood in the background and watched them.

And I had my mind on Lawrence Berkeley since I was probably fourteen or fifteen. That's where I was going to end up. That was my idea. And so I did. That's where I spent my time as a grad student, and then on as a staff member in a theoretical physics group.

And there were a few women, but they were not working [on basic physics], I wanted to work on fundamental problems, like the fundamental nature of trying to figure out what reality means. Which is not a scientific question, is a scientific question, but why, you're supposed to answer how and not why. But you have to ask why to even get the hows.

Preisler: Yes. (laughs)

Rauscher: I kind of see it all like the world of religion and philosophy, and philosophy in general, is the basis of asking what's the interpretation of quantum mechanics. And junior level quantum mechanics course, I asked what is your interpretation say of the way particle duality and the Schrödinger's cat paradox. And they said, "Just calculate." That's the Copenhagen view.

And so that led to seeds of some of the things I did at Lawrence Berkeley. And one was to start the Fundamental Physics Group.

Now also at the time, since I realize there was prejudice against minorities and women, and my dad's side of the family was Quaker, so of course they taught against prejudice. And my dad would hire blacks, [African Americans]. And most of the people I talked to as a child were black employees of his. And I'd watch him repair something.

I was always interested in machines. Like when we took the ferry boat, I'd always go to the little window where you could see the whole big apparatus of the boat running on the cam shaft. Just loved it!

Preisler: Fun stuff. Yeah.

Rauscher: At one time, I was about five or six, and my folks car was about four cars down. I said, "I know which car is ours." If Dad doesn't want to go with me, I want to go alone. So I was always interested in watching a guy do plumbing, whatever, you know, build a house.

Preisler: How they do it.

Rauscher: I'd stand there and watch.

So I got involved in working for minorities, working on minority rights, and particularly with blacks, but some Hispanics. And I had gone to an integrated school. It was a private school that was not fully integrated, but it did have minority people.

So in the nuclear science division, when my advisor that I'd done research with and published a number of papers with, John Rasmussen, left, to the Colgate Lab, then I was working with someone else who was head of the department. I'm not going to mention his name, partly because I can't remember it. But he fired me because I was teaching courses to minority people.

Preisler: Oh, that's too bad.

Rauscher: And I said I wouldn't teach the course to blacks only, it had to be integrated. So if they sat in the back, I walked in the back and—

Preisler: Taught back there.

Rauscher: Yeah. Taught back there. So couldn't get away from me. But I got fired that day. I walked across the hall from building 70 and 70A to building 50 and 50A and got a gig in the theoretical physics group with Geoffrey Chew and Henry Stapp.

And Chew says, “What makes you think you can figure out what’s going on about fundametal physics?”

And I said, “I’m working on it.” And then he tested me on the foundations of particle physics. And I wrote enough equations on the board he was happy and I worked there for five years.

I ended up working 19 years at Lawrence Berkeley, including my grad school years. And I started meeting, like one time Geoff Chew, the head of the physics department, walking down the hall. And we’d get these reprints. And so he had a report in his hand and he handed it to me and he said, “I think this is your stuff.”

It turned out to be a paper by Fritjof Capra on the Tao of physics. The beginning of writing the Tao of Physics.

So I start corresponding with him. And I actually got Geoffrey Chew to invite him over, because he was working on S matrix theory, too, or scattering matrix theory. So he was invited over [to the LBNL theory group].

Then at the Arthur Young Institute, I met Saul-Paul Sirag, Nick Herbert and then also George Weissmann was a grad student in the theory group. So I began to collect these guys together. And I thought about it. And I remember even the time I was thinking about I thought gee, maybe we should do some physics by community. Get a bunch of people together and explore.

And actually, what I thought is get a bunch of guys together, because there weren’t women. (laughs) But it would be people. Get a bunch of guys together.

Preisler: It would be white guys.

Rauscher: Yeah, white guys, too. They were. (laughs) One woman, Beverly Rubik [Ph.D., UCB in biophysics]. So by then I had access to a couple of secretaries. And I put together the Fundamental Fysiks Group. And I spelled it the way, I spelled [it kinda like] German in the way it sounds, with an “f” instead of “ph” [or fusiks].

And I had previously read an article in The Chronicle on people researching psychic phenomena. About Ed Mitchell, Russell Targ, Charlie Tart and about five or six other people, like Stan Krippner, Montague Ullman. And so I thought oh, this is the who’s who. These are the guys to meet.

And I always was interested in psychic phenomena. Although I was very skeptical, I was interested. And the "journal" that I had access to at the time, of course, was the National Inquirer, because there really wasn't anything else that I knew about. It kind of ties in with Buddhism and Eastern religion, too.

So the project with Ed Mitchell and Andrija [Henry] Puharich and Hal Puthoff and Russell Targ had started at SRI with Ingo Swann and Pat Price. And so I phoned up about 1973. At the time, I also was teaching at Berkeley as [an adjunct kinda like] an acting assistant professor, not as a professor. But no woman had been an acting assistant professor or a professor at Berkeley at that time. There'd been some women that were lecturers in the '30s. Just not in physics, chemistry or math, not at all. Verboten.

Then there was a French woman who started [later] teaching in the math department. And then Elizabeth [Scott, Ph.D.], let's see, what's her name. Anyway, there was another one in astronomy.

And then, we also began, through the affirmative action, to form the academic women's group on campus. So all that was going on at the same time, parallel process. [Scott did a comprehensive survey of women in science.]

So I called up Hal and Russell. And Russell answers and he says, "What's on my desk?"

And I said, "I see a ball and socket."

And it turned out it was a wooden cup, which he showed me later, with a crystal ball in it. Oh, okay.

So then I'm going to go down there and get together with them. And I'm meditating the next day and I hear the phone ring and I think oh, man, it's Russell canceling. Sure enough, it was Russell canceling. "We're too busy to see you."

But I had written my first book by then. And I had thought about how to reconcile physics with the nature of consciousness.

So I said, "Well, you've got to eat lunch." [I was invited.]

And so I went down. Of course I spent the whole day there. And Ingo Swann and, you know, I hadn't really met anybody that said they were a psychic. And I'm thinking, can you read my mind, you know?

And got involved with the experiments there. And the first one I went out as the outbound experiment to the target location but I was in an overpass with a cyclone fence. And I touched it. And when you looked up across the sky, you saw blue with the cross lines. And he [the subject of the laboratory] describes that.

He also describes that I was mad and cold and I said, "I forgot my sweater" to myself. So he read my mind. So the preponderance of evidence began to accrue.

And man, is it a strong phenomenon! I mean, Ingo Swan and Hal and Russell's design is terrific. And this was just the golden age of psychic research.

So I had done those experiments. And when I came back to the theory group and starting the Fundamental Fysiks Group was to address two questions. One was to do the remote viewing. And the second one, in 1971 I had met a John Clauser through a colleague of mine, Paul Leiber. And I was working on a navy grant through UC Berkeley with the ONR with Paul Leiber to actually do astrophysics and cosmology.

So I met John Clauser and went down, saw his experiment in the basement with duct tape and the black paper to block photons from not getting out of control so they weren't wandering around. And I was totally impressed. Because the EPR paradox was a statement that if quantum mechanics is complete, there's necessarily nonlocal interactions and John S. Bell in 1964, the EPR was 1935. In 1964 formulated it in such a way you could do an experiment. So here was John Clauser doing this absolutely extremely important fundamental experiment.

So that was the second thing, to look into the issue of non-locality. So I start with George Weissmann, Jack Sarfatti, who I met through Fritjof Capra. And I met Saul-Paul Sirag, Nick Herbert, Felipe Eberhardt was at the lab already. I knew Henry Stapp since '64. And then John Clauser and I invited him and I set up a meeting. There was a whole protocol where you fill out a little form to set up a meeting [at the lab.]

And where we met was E.O. Lawrence's old office. So that was a little meeting, it turned into a little meeting room. And the [current] director's office was much bigger [now]. So it overlooks the bay area. It's a beautiful little place.

And we ended up, oh, gosh, all kinds of people got involved. We had probably 40 people at its height. Of course, I was trying to juggle everything. I wasn't in a power position. I just wanted to make sure

that no one gets out of control. But the chief of police liked me a lot, so I used to get the skinny from him on some of the gossip. I found that in any working situation with any institution that's more than a day old, there's gossip channels. And I had my enemies and I had my allies.

And what would happen is there'd be some article that came out in the newspaper about me and some of the ESP work, which I'd done at SRI. And then the associate directors, there were 12 of them, would get together and decide that they weren't going to speak to me. So they would walk across the hall and shun me. And you know, who they were I mean, I was upset by it. And I would just act the same. I would just say hello.

And then sometimes they were nicey nicey. But I knew it wasn't, either way it wasn't real.

Preisler: Right. Right.

Rauscher: And I was kind of, I went through a kind of an appalling, being appalled when I was a beginning grad student that a lot of things in physics were not settled by the truth of the situation but by the personalities and the dominance and other matters that came in that reduced the objectification of physics. And in a full sense, science should be objective. But it's not. And what determines what you can study or not. You know, and that was about the psychic phenomena. I have a perfect right to study anything I want. But why should anybody that studies consciousness be blackballed?

Even the use of the word "consciousness," in the physics department, people would look askance at me. All males. Even the secretary, I think, when I was talking about these possibilities to the head of the theory group Geoff Chew and Henry Stapp, who was a senior person, I was accused of corrupting my elders. (Preisler laughs) It gets funnier all the time.

Preisler: Oh, well, it's one of those things where it's an accomplishment if you can corrupt your elders. (laughs)

Rauscher: Corrupting my elders. Another thing that was kind of strange, someone, I don't remember who called, and said they had heard I was a horrible radical. Well actually at the time, I grew up in a conservative Republican family and I was relatively middle of the road, you know. I said, "Well I must be doing a horrible job of being a radical if I'm a horrible radical." I just sort of hung up. (laughter)

Preisler: That was a good response.

Rauscher: It was strange. And I called [these people] pseudo-mod. People were wearing wide belts and bellbottom pants. But they didn't really mean the kind of things about, that were sort of evolving in the '60s about harmony and living together and the environment and so forth. Although to me, at the time, "How the Hippies Saved Physics," a book about the Fundamental Fysics Group by David Kaiser, MIT Press. I didn't consider myself a hippie. But I don't fit in the nerd category, either. But maybe that's being female, I don't know. I know female nerds, though. It's really weird. (Preisler laughs) But it is funny.

But all these things were fermenting. There was really the civil rights movement, the sit-in on Cadillac Row [in S.F.] in 1964, the summer of '64. The demonstrations that sometimes bridged into riots and were quite frightening. Tear gas at the university, indiscriminately. I had trouble because I had the secretary typing my first book on unifying principles in physics. Which is one of the major theory that put forward, I'm still publishing papers on it. [A Unifying Theory of Fundamental Processes, 1971.]

And what's interesting is one of the tenets of it was, and this was while I was at Berkeley, and also at a scaling law based on black holes. And at that time, I knew John Archibald Wheeler [in the 1960s, 1970s, 1980s]. And he was actually a very supportive person. And I went to him about my ideas, and he explained to break down the book into book chapters and publish them in journals.

And because it was very interesting to note, if you published under E.A. Rauscher and it was conventional physics, they'd write you a postcard saying the paper had arrived. And about six weeks later, the paper had been accepted.

But if you skirted around and had incorporated the idea of black holes and astrophysics, a little bit way out there, the paper came back with big red Xs through it. And sometimes it said, "Rewrite this because it's atrocious and we might consider it for acceptance."

I had one paper, I sent to Phys.Rev.Letters, and the comment rejecting it was longer than my paper. (Preisler laughs)

So I wrote back and objected to the objections. And answered them all. And they said, "Well, we won't consider it again anyway because we just don't want to." You know, they wouldn't even read what I had written.[Later, I got a paper published in Phys.Rev. Letters.]

So it was very interesting. Once you slide off the conventional route, man, do you get in trouble! I mean, I call it the fox hole effect. I didn't know there was a fox hole effect. But what there is, if you stick your

head up one day and you say the sky is blue on a sunny day, you're bound to get shot at by somebody. (Preisler laughs) I mean, it is wild. It is wild.

And I think it sort of comes, I realized in one sense that I already was in enough trouble being a female. So in a way, it might have encouraged me to take more chance. Because I was already blackballed.

Preisler: Right, right.

Rauscher: I don't know whether I would have been quite so wild if I'd been born male and accepted into the club.

Preisler: Yeah, yeah, that might have tampered some of that down.

Rauscher: I noticed like John Clauser, I mean his experiment and was [extremely] brilliant. And then I saw [Alan] Aspect in [Orsay], France and his experiment, which changed the orientation of the polarizers after the photons left. Excellent experiment. But they were sort of outside the mainstream. It was really interesting that they, highly significant idea of non-locality, probably as significant as the Heisenberg Uncertainty Principle as Henry Stapp said, was just so skirted around the edge and thought of being outside the mainstream.

And even John [Clauser], they were prejudiced against him. He was probably too good looking or something. He was a Nordic guy [who loved sailing which I did also]. And I don't understand that. I mean, yeah. You know, it just, I can see why women and minorities give up. Because it's just such an onslaught over the years. Particularly in that period of time in your twenties where you're trying to get established, between twenties and forties. You know, that everybody basically the big shots hating you. Not very friendly.

Then when I started working on a multi-dimensional geometry I thought of when I was 15, I thought there's got to be some way of developing a multi-dimensional space that incorporates a way of looking at the fundamental forces in the universe as a force combining space time and matter and energy. And the simple way of looking at it is I cannot have matter and energy without space time to have it in, but space time cannot be measured or observed to exist without matter and energy, like a clock or a chronometer and a ruler. So I felt that the way to look at it was [spacetime] as a more collective way.

So later, when I met John Wheeler, he said, "The arena of physics is the physics." So he was moving in that direction as well. But I noticed when I started coming out with this series of papers and my first book

that some of those ideas got adopted into other people's work without referencing me. And so that was the other thing. But I also did the experiment, for a long time I submitted under "E.A. Rauscher."

Preisler: Just to—

Rauscher: I had submitted one of my most quoted paper under Elizabeth A. Rauscher. That was in the early stages, on that plasma physics paper. So sometimes people would trace back and I got some kind of nice responses from guys who said, you know, "I found out you're a woman in science." And started corresponding with me, because there were probably no other women physicists to talk to.

Preisler: Right. Right. Now in the 1970s, you became involved with the parapsychology, which many of those projects, they were quite significant at that time.

Rauscher: Well, what was interesting is, I'll develop a theory. That is, [first] I believe some discoveries have in them the roots of parapsychology itself, like multiple ideas occurring in different people's minds. Number two is I have data which is in a patent pending. I have five patents. But it's a patent pending on how certain solar coronal ejections produce frequencies that drive human brains into alpha state, meditative state. And I believe that that is part of, there's a cyclical analysis with peace and war on solar cycles and active sun spot cycles. So I think that somehow there was a whole bunch of confluence of different ideas that allowed the occurrence to occur for parapsychology research.

And actually at the time, I didn't know it was being funded by the CIA through the navy [the SRI research.]. And at the time, you see, I also had this navy grant in the early '70s, through ONR, that was on, actually, the work that I did in the unifying theory of fundamental processes. [UCRL- 20808, June 1971, 203 pages.] So it was completely theoretical. And later they pass a congressional law to prevent the navy from funding purely non-military work. But at the time, they did. And I think it was to sort of make themselves look like better as good guys or something.

The other thing that was going on was the strong presence of the Cold War. And then there were several key books like Ostrander's and Schroeder's *Psychic Research Behind the Iron Curtain*. I'm not quoting it quite right. *Psychic Discoveries Behind the Iron Curtain*. And some of that was leaking out that they [the Soviets] were doing some kind of studies.

But actually, when I worked on the project, I thought it was funded by the navy. And since I had had a navy grant in general physics, it seemed okay to me.

Preisler: Right.

Rauscher: And that navy grant had been very useful. I spent four years doing that at UC Berkeley.

So after doing enough experiments, they had this thing called the four choice trainer which was a device that statistically measured whether you could guess the next color correctly. And I did exactly at chance when I first met up with it, before I'd [conducted] any parapsychology research. And then when I studied this stuff and decided it was real, and I thought about it. I thought about its implication and I thought it's not so much the truth of it, because my philosophy was open-minded to whatever the truth is, I'll change my philosophy to fit the facts.

Preisler: Right. Right.

Rauscher: But it was how people looked at it. I mean, if I go to the director of Lawrence Berkeley and say, "Hey, we can do remote viewing and psychokinesis," I'll be fired out of there so fast. It's like this conundrum between the truth of something that may be extremely important, and the conflict and opposition to it.

Then people like Jack Houck from McDonnell Douglas [now Douglas Aircraft] came to the lab, and people would visit me from the CIA community because I would get good results, too. That was replicating the SRI work.

Not a lot of, some funded by SRI. But a lot of the work I did on my own.

Preisler: Now with the SRI, that was when you were doing the PSI lab work and stuff like that?

Rauscher: It was the radio physics laboratory.

Preisler: Radio physics. Okay.

Rauscher: Radio Physics Laboratory. So I did work down there from, I think it was '73 to, oh wait, [to] '76. And some of it I wasn't paid for. Some of it I just did because I wanted to do it.

Preisler: Okay. And with some of the parapsychology, you were involved with the global coherence monitoring system?

Rauscher: Oh, that comes later.

Preisler: That comes later? Okay.

Rauscher: That comes later. There's several groups of, well, I think one of your questions was about that era. Now the era from the early '70s, and actually, interestingly, I went to a talk by Uri Geller at UC Berkeley and that spurred a bunch of interest. And that kind of even helped cement the interest in the fundamental physics group. Because it brought the language of considering the nature of consciousness into the vocabulary. And obviously from the beginning, when I first started researching, I mean, the idea at four years old, basically, is to understand consciousness. But it was relative to the physical world. And to understand the basis in reality, which that is. And then I figured 10,000 years, I might understand consciousness, but I might as well get started now. So it was kind of back to bringing that together [physics and consciousness]. Not only in the research area but in my life. So it's really the pursuit of my life goal.

And what's very interesting to me is why at eleven I was interested in being an inventor and then I ended up inventing stuff, medical devices, noninvasive medical treatment devices, and a very sensitive non-superconducting magnetometer field detector with my late husband William Van Bise [M.D. (Hon)]. Now you can say I just decided I was going to be an inventor and became one, but it's almost like a psychic [thing], that there's a forwards backwards relationship in space and time.

I started the International Tesla Society and got kicked out. Now I'm kind of invited back in. But the guys kicked me out. I've started groups and ran them like the Fundamental Physics Group. There's a lot of nonprofits I've gotten elected president, but they already existed. I started the International Tesla Society and got kicked out. So I have all kinds of variations on that. I wasn't happy with it. I complained for a couple of days.

And then, as I say, it was kind of nice. They invited me back. It's got about 400 people that go to these conferences. Some of it is, to me, too flaky. I mean, just because you decide one thing is true doesn't mean everything else odd is true. I found that there are accepted truths and unaccepted truths.

Preisler: Right. Right.

Rauscher: And there's also accepted falsehoods and unaccepted falsehoods. And a lot of what they said was false turns out to be valid. And it really starts seeing [psychic abilities], I mean, it has implications about

social structure, how we relate to each other as humans, how we relate to our life-giving system the earth, the living earth, sun and moon. It relates to not having war. It relates to peaceful relationships, communication, finding the basis of communication.

And one thing that remote viewing and psychic phenomena said to me is you can't lie. Because people can read your mind.

I'll give you an example. I won't name the guy, because he might not—well, yeah, I will. One time I was sitting on a bench with John Rasmussen. And I had done a radio program [KPFA, Berkeley] that talked about psychic phenomena and education and communication. And he was, he was talking about the nucleus as the basis of reality. And I hadn't really said much about PSI on that program, but he, I was thinking why he was talking to me. Well, really, in a way, this consciousness is more fundamental than nuclear physics. And he read my thought. I didn't say anything. But he said, "But I'm looking for truth, too, in nuclear physics."

Preisler: (laughs) Uh huh. Uh huh.

Rauscher: So the pattern is this. It was very interesting.

Preisler: Yeah. Yeah. How—

Rauscher: Finding the truth is my goal.

Preisler: Yeah.

Rauscher: And at certain points, I did experiments to find out whether my parents were consistent or not [around 7 or 8 years old]. I didn't do a lot of experiments. But I found out they were inconsistent. Now I could have had that thought and they didn't like it. Where do these feedback loops come from? And why is it that synergy of one case but inharmonicity or harmoniousness in another case, you know?

So what I felt was in terms of gaining and disseminating knowledge and making the world a better place, my job was not to convince somebody of psychic phenomena, but expose them to the idea if they wish to pursue it.

But I had people when I was doing television and radio come up to me on the street and yell and scream at me, telling me to convince them it was true. I said, "That's not my position. You need to deal with this. It's not my problem. Whatever you believe is your problem, not mine. I mean, I'm not here to convince you of anything."

- Preisler: Right. And people like that, there's no way you can convince them, anyway. If their mind's already made up that it's not—
- Rauscher: No! And I gave one talk and there was this one engineer in the balcony yelling and screaming. And I thought about it. Because some of these guys, some of the professors in physics would be interested and say, "I'd like to talk to you about working with Uri Geller." And I had laboratory-grown crystals that were contained in a box so he couldn't touch them. And he had effects. [I measured them with a scanning electron microscope (SEM).] And I had them analyzed in four major laboratories. And there was a distinct difference between Uri-broken crystals and the ones that were broken mechanically.[They also made electron micrographs.]
- And then they'd say, "I want you to talk to me about it." And then the next time they had decided that was the work of the devil and they'd run away.
- One guy, I just wanted to see how far he ran, because I sort of ran after him. And he just kept going. I mean, it was, it was bizarre. And sort of creepy.
- And it was socially disturbing to me. Because you're ostracized for being a woman, and then you're ostracized for what you say. And there is the power of words. I'm amazed. I mean, there's a lot of stuff I don't believe. But I don't go around to wherever those people are and say, "I think your stuff is bunk and you shouldn't talk about it."
- Preisler: The old saying, stick—
- Rauscher: Because I think if they, if they want to do it, it's their right.
- Preisler: Yeah. Yeah.
- Rauscher: I mean, to me, people meddling in other's people business like that is unconscionable and insane.
- Preisler: Yeah. It's not necessary in the least. I mean—
- Rauscher: No, it isn't.
- Preisler: Yeah. Now when you were there, at what point did you develop the theory of eight dimensions?
- Rauscher: Oh, okay. What happened was, when I, I even thought about it somewhat before, I went to see how nonlocality correlates events. I

wrote about an eight-page paper where I thought the way to explain macroscopic non-locality is by a hyper-dimensional space. And I have not had my dreams yet [of how to formulate this]. I realized it should be a complex dimensional space. [I had a key dream of the way one needed to have a multidimensional space to accommodate consciousness on psi.]

But then I wrote the paper to present it to Hal and Russell on making that proposal that that was the way to show that not only does physics not deny the nature of consciousness, it may actually accommodate it and explain it to some degree. Because I had given a talk at Berkeley [on remote viewing] and a grad student followed me to the copy machine and was banging on it saying, "I can't say how you're wrong, but I don't believe what you're saying." (Preisler laughs) And pounding on the copy machine. I'm thinking, God, I've got to copy this Phys. Rev. article. I don't want you to bust it before I copy it.

Preisler: (laughs) Go pound on the table over there!

Rauscher: But it was denied by the main body of physics. But that got me thinking that really I've got to show how it fits with our bridge to our current view, that physics doesn't deny its existence. So that, that work, I had proposed. And I knew of Gary Feinberg's work with tacksyons. And so I took that and then my book on, the Unifying Theory of Fundamental Processes when I saw Hal and Russell.

But then that's why I got the position. I was supposed to work on the theory. But I said in order to understand the theory, I need to understand the phenomena. And I wanted to do some experiments.

And it was interesting having other people know these facts. Really even the precognition, knowing facts about your future and being that accurate. Really amazing, a psychic remote viewing, me at Macy's Department Store, [before the target was randomly picked and I went there as an outbound experimenter.] the protocol of the experiment, we can probably find it somewhere. But basically what it is is you have someone that's not connected to the experiment any other way. Find geographical locations that are accessible. Unique enough that you can tell them from another place. And that you can go to for 15 minutes as an [outbound] person [that goes to the target]. And you put those [targets] in opaque envelopes, shuffle them, and then you can number them and use a random number generator to pick one. So even the outbound team doesn't know where they're going to go until they get in the car.

And then [subject and mounter (with the subject)] wait 15 minutes while the outbound people get to the target, or a half hour. And the

subject person, usually in my case, was a secretary that was free for lunch or an engineer. And that was true in some cases [for]Hal and Russell [but they also] had their experts, but one of their best subjects was a skeptic. So they would have their friends do the remote viewing. Or somebody they met. And sometimes you just met the remote viewer and talked to them. I used to like to go to lunch with them, because then there was sort of more of a connection. So I used to take my remote viewers to lunch.

And they'd [the subject] describe in detail where you went and what you saw. Like in Hella Hamid's case, I saw a great big red brick building. You could see the white mortar between the bricks and a big archway that you could drive through with a carriage, which was all true. And there was a little stream that I didn't see when I was outbound, but it was there, and she talked about it. So I went back and looked. [Macy's Department Store]

Someone that is the subject and you named a place correctly or you described it in detail. It works. It does take practice. It's like a J-curve. It's like a learning curve. I know when my cousins would come down, we'd shoot the pistols. [I had that beginner's] luck. And then as you tried harder, you got worse. And then there was a learning curve. And that's sort of true of remote viewing. There's a learning curve. And if you don't practice it for a while, it's not as easy to do. So it has some parallel to that, sports.

Preisler: Right. Uh huh. Now who did you, when you were working on the theory of eight dimensions, did you collaborate with anybody?

Rauscher: Ok, Jeff

Preisler: Jeff. Mm hmm.

[End Track 2A. Begin 2B.]

Preisler: Okay, so here we are on side two. And we're going to continue talking with Dr. Rauscher. The theory of Descartes space. Can you talk a little bit about how you developed that theory, who you worked with on it and what the implications were with that?

Rauscher: Well, it started with this idea that came to me when I was about 15 in high school. Somebody had given me the Dover book on Einstein, Minkowski and Lorentz. And I think it was my first brother-in-law. Or maybe a grad student I met on a Sierra Club trip or something. I couldn't read the equations, because I didn't know differential equations and tensor analysis at the time, but I could read the content.

And I ended up trying to explain special and general relativity to kids in high school, which didn't turn out to work very well.

Preisler: (laughs) I can imagine.

Rauscher: Trying to explain that a car moving near the velocity of light is foreshortened in the direction [of motion, Lorentz contraction] and has more mass [mass dialation]. But it was interesting. I just tried it once and it didn't seem to work. (laughter)

Preisler: It's a tough idea to get your mind around, yeah.

Rauscher: Yeah. But I was very interested in Einstein and the relativity theory. My mother was very nice. When Einstein died, she gave me a book on his life and times. In '55.

So from that, I could see that there might be a way of organizing a scaling Law from small to large in a cosmological sense in some kind of a solution, called Schwarzschild solution to Einstein field equations. Which was the first solution developed by Schwarzschild in 1916.

So I was playing around with these ideas and reading Spinoza and Descartes. And Descartes suggested there was not just space and time, but matter and energy, momentum and so forth, made up dimensions. The space-time idea triggered Einstein. And he said that later, he was inspired by Descartes to look at the Minkowski metric, which Minkowski developed.

And it's a very simple idea. If I'm going to meet you for pizza, I say where and when, so I specify space and time. So they're intimately connected.

So then I thought well, what about velocity, momentum, energy, can I develop a geometry in terms of these that will have something fundamental, per se, about a relativistic theory in quantum mechanics. In other words, working on a model of quantum gravity.

I haven't decided after all these years exactly how close I am on that. I'm not. Or how close anybody is. Because I don't think anybody's got the answer yet. But it is a way of looking at the origin [of the universe]—(coughs) Take a vitamin C, I suppose.

Preisler: Oh, okay.

Rauscher: The origin in terms of the formalism, in terms of the classical Hamilton Jacoby theory, which leads to the connonically variables in quantum mechanics and the Heisenberg uncertainty principle. It also

leads to the formalism of general relativity, which I put in my new book that came out, *Orbiting the Moons of Pluto: Complex Solutions to the Einstein, Maxwell, Schrödinger, and Dirac Equations and Einstein's Theory of Complex Eight Space* by World Scientific last year. [2011 on my complex eight space.]

So I realized that there might be a way of looking at this [on my ten and eleven dimensional space.] So I went on a lichen trip, to photograph lichen in a cow pasture with my mom [in the late 1960s]. So we spent all day in a cow pasture. And the lichen was incredible. I mean, it would be bright red, bright yellows.

Preisler: Amazing.

Rauscher: And you'd get close-up lens, you actually see the structure of the lichen itself.

Preisler: Wow.

Rauscher: So we went back to our hotel room and I always used to sleep with a pad of paper and pen beside my bed or a pencil, and I'd take down notes. I used to do that for many, many years. Still do it.

And I was dreaming about the stress energy term in Einstein's field equations. And I realized there's a fundamental force in there F equals C^4 over G , the gravitational constant, where C is velocity of light. I dreamed the equation and saw how it fit. [This led to my work on multidimensional Descartes spaces.]

Preisler: That's amazing.

Rauscher: And then I thought oh, I know the universal constants, I'll put them in. So in my dream, I apparently divided by zero. And that was the age of the old HP calculator. It had the big red arrow bar that came up.

So I woke up and wrote down the equation, realizing that I'd put the numbers in incorrectly. I'd made some kind of an error.

And the trick is to be able to wake yourself up when you've got the idea. Actually, I think the red arrow bar, what woke me up that time.

So I did figure it out. But it became a very fundamental part of my understanding of Einstein's field equations and how to reconcile them with the current cosmology, cosmological ideas.

And I had met, Sir Fred Hoyle of the continuous creation idea. The Big Bang model was not so dominant at that time. And he, so there was still arguments, although he was in the minority.

But I realized if, to solve Einstein's field equations with consistency, but the Big Bang doesn't work, this was before Guth's inflationary model, there is an intrinsic non-consistency. Not only the 94 percent missing matter energy, but the consistency of the evolution of parameters, which I calculated on my scaling law from the mini black hole of Planck unit all the way to the larger thing, the universe itself [obey the black hole solution.]

And this worked out. And actually I'm publishing a couple papers right now on modifications of that idea, and how to fit it into a group theoretical framework.

One thing that I'd sort of decided, although I spent quite a bit of time working on and studying particle physics, it is very complex. And you could probably devote yourself to just some aspect of that. And I decided that obviously that has to be addressed in any unified theory, but I'm not really spending most of my time on that at this point.

So anyway, that, you know, I was driving along at night realizing that in some sense I had an idea that no one else on the planet had. And whether I could put that together, which I did, obsessively worked on it, for years.

When I was getting the book in, [in 1971], I denied myself sleep. Like I'd stay awake two nights a week. So I was really sleep-deprived. I had to get the book in on June first. I stayed awake for five days, and that is really nutty in itself.

Preisler: I was going to say—

Rauscher: That's a real serious altered state of consciousness.

Preisler: Yeah. Yeah. I did that a few times when I was in college. (laughs)

Rauscher: Oh, man! And Bill, my late husband, did it, actually as an experiment. I did it because it was a side effect of what I wanted to get done. But God! Dreams get superimposed [on physical reality]. You start hallucinating. And the real problem is, it was one of the most fearful things in my life, I couldn't, when I wanted to go to sleep, I couldn't sleep. And it took me a long time to be able to get back [to sleep] again. It was pure will. I didn't take speed or anything. I just drank caffeine.

Preisler: Yeah. (laughs)

Rauscher: And I was commuting an hour, too, each day. Two hours. An hour each way. In order to get this manuscript done.

Preisler: Right.

Rauscher: I have more to do on the work. I haven't got as many followers in that area as I do in the complex geometry. That's becoming much more mainstream and much more accepted of the two major multi-dimensional geometries I've worked on. But it does fit in with some of the current grand unification theories and the super symmetry models.

Although my feeling is some of the directions that are taken do not make sense to me. I mean, I know the history of them because really, I'll say Berkeley was some swell place to learn about physics. It was really, I mean, all the big, well known people came through there. More Nobel Prizes per square inch, you know. (Preisler laughs) They just, a Mecca to meet anybody you wanted to meet. Murray Gell-Mann and Yuval Ne'eman and a whole bunch of, all the people doing work in physics.

Preisler: Now you also, you also did quite a bit of work studying the effects of electromagnetic and EMFs on the human biosystem?

Rauscher: Oh, God. And then I, sometimes like I did give a talk on the theory, several talks, to the American Physical Society on the complex Minkowski space. And then I set up a meeting in 1976 for Hal Russell, Hal Puthoff and Russell Targ had them give talks with me on remote viewing experiment and theory. It was very well attended, and they didn't throw tomatoes, which I thought they might. But in general, of course, your audience for, in the physics community, was really small for some of that stuff. It was like a phenomena. So I used to speak to other groups.

And then I heard of, well, I knew of Robert Becker's work on electromagnetic effects on biological [effects of electromagnetic fields.] And he, and there was another guy named Bob Beck. And I did make outrageous claims like very low intensity low frequency fields could affect biological systems. Probably not more outrageous than psychokinesis. But the thing to do is investigate it.

I mean, I started everything as an open-minded skeptic. And I was very skeptical.

Then I was introduced by what later turned out to be a KGB CIA [double agent] guy in Canada.

Preisler: In Canada. (laughs)

Rauscher: So I met my second husband through, I was going to, can always write that for women's love column, how I met my love of my life. Go through a double agent. (laughter) Not many people can brag about that.

Preisler: No, I was going to say. Can't think of that.

Rauscher: But anyway, so this guy put me on the phone with William Van Bise. And at the time, he didn't use the Van, so it was Bill Bise. And I thought god, this guy, he's talking about his research with an earlier form of our detector. And electromagnetic fields on living systems. And he had a sexy voice. I thought he sounded cute. (Preisler laughs)

So I went, and he was married at the time. So of course this was professional. And so I spent a whole day making a field test with him to just make measurements, to see what's out there. And I got a Honda generator for free from this guy. I said, "I want to test your Honda generator." So he gave it for a whole week. I didn't even have to pay for it. And we went and made the measurements. So that was the first big field study.

And it was about the time that Mount Saint Helens was active.

Preisler: That's what I was going to, my next question was you started working with him on—

Rauscher: So Mount Saint Helens was talking to us, [electromagnetic precursor signature to its eruption.] My gosh! And what happened is 30 percent of the lava, or the ash, was magnetite. Ferro magnetic. It would stick like a magnet on the cars. But the geologists [USGS] said there was no magnetite in it. But we were measuring pure magnetic field. My gosh! Well now we go off into full scale [on our oscilloscope] I mean, compared to the background. Boy, when that mountain talked, it talked!

And I had always been interested in geophysics, and had taken some geophysics. And there were earthquakes in Yosemite. Mount Baker and Mount Hood were venting steam. So actually, before Mount Saint Helens erupted, I sort of felt something was going on anyway.

So Bill was just making his measurements and talking about his data. He had done a whole series of experiments. This was '79 and '80. But he had done a whole series of experiments from '76 to '78 on volunteers at the Oregon State Graduate School of Medicine, [Portland, Oregon] using continuous wave radio frequencies. And found you

could increase or decrease the alpha intensity of brainwaves. And I had studied some about brainwaves so it was data that I understood.

But I was very skeptical. So he zapped the heck out of me. Man! That stuff is dangerous. It is profoundly dangerous. You can cure them or kill them. And it is amazing. It's very hard to find the good frequencies. But that's what we spent our time on. Looking for the good frequencies. And looking for the [health] benefits.

And that has sort of been my rule. Because when I went to Livermore Labs, where I had a Q clearance, I didn't work on any military projects or anything that I thought would cause harm. It was mostly plasma physics and nuclear physics.

But anyway, back to looking at this, of course through a whole series of experiments, I was amazed. I mean, there were some frequencies that, two-thirds is absorbed by the human body. In other words, you just have a person walk in front of a beam and it just cuts it off. And it can have profound effects.

So what we spent our time was, he had discovered this completely pulse magnetic, external pulse magnetic field pacemaker. And so we worked on making a pain reduction device. So I actually analyzed and mapped neurons. The piezo electricity of the bone and the hemodynamics of the blood. And that's where we started patenting the applications of E and M fields which is the measurement side of what's going on in the world and the healing side. And as I say, unfortunately you can find more things that are harmful than beneficial.

So we talked about effects [of E and M fields]. And I actually, we both got a navy grant with Eldon Byrd as the contract monitor. Bill did an experiment and I did the theory. And I came back from Africa, in a conference on the World Professors Peace Academy, from Fez, and I had put my transparencies, I was supposed to give a Pentagon briefing the next day. And I put it in my suitcase, and my suitcase had gotten lost. So I had to stay up all night, reconstruct my talk, and this is like two-star generals and what not.

So there's this one guy that's sent in as a shill to counter everything I say. So I start talking about the data that we had collected. And this was a very controversial time. This was in the early '80s. The grant was in '83. And I'm defending the grant for Eldon Byrd in '84. Or, I think it was later '83.

So every time I start talking, and of course I hadn't had any sleep the night before, just got back from Africa, this guy would interrupt. And I thought about it, but I also had been meditating for years, and I

actually had taken a little bit of martial arts. More the philosophy, not the kung fuey part. But I had learned a thing of bringing the light through your arm and having two full-grown men try to bend your arm and not be able to do it, things like that.

So I thought about it. I was kind of, you know, I was tired and a little bit ticked off. So I just went over with the thought form of menacing him. So I just stood over him for about a minute and then I said, "Shut up. I'm giving this talk. You can have 20 minutes at the end and say anything you wish. But just shut up for now."

And I leaned over him. And literally, the snot was coming out of his nose. His eyes were tearing. And he sat trembling. (laughter) I thought, man, this stuff works!

So I gave my talk. And then he didn't say anything at the end. But I found later from Eldon that he was put in to ruin the project. Who knows why. Whether someone else wanted control over it, whether they thought it was nonsense, you know. But it got in the category of psychic phenomena that it was not believed.

The trouble is, it's so profoundly true and it's so dangerous. But it can be used for benefit. But when I gave talks on it, I was threatened with a guy who was head of navy research for the whole navy. Paul Tyler [head of Navy medical research with an 800 million dollar budget]. If I spoke on my research, this was on the Capitol steps, they would destroy my work and my life. And my God, every contract [at the time] got canceled.

And I didn't. I stopped doing radio and television with Bill. But that's when we were married [after his wife divorced him]. This was in the mid '80s. And I'm thinking, God! You know, I mean, I grew up in a Republican family that believed in this stuff. I believed in this country and the constitution. I'll tell you what. There are some really nasty folk out there.

Preisler: Well, yeah, I always say it's a very fine line, you know.

Rauscher: Very fine line. And the way I look at it is stay out of the way. I know a lot of stuff I'm not going to talk about. And there are certain things I've decided I'll probably go to my grave with. Because I'm not willing to have my life threatened and have guns pointed at me like I've had in the past. I just don't want that in my life.

Preisler: Right, yeah. Yeah. It's scary.

Rauscher: And I'm thinking, my God, it's just a voice! It's ideas. I mean, the fear. And it is about prejudice. It's not just minority people. It's minority ideas. Why are they so afraid? Why, I mean, I will say, psychic phenomena does talk about telling the truth. And if people want to spend their life lying, it's fine. They're not going to be too interested in that kind of idea.

Preisler: Right. Right.

Rauscher: And it is about really individual ability and power. Power for good. But unfortunately, power for evil. And what are the forces that run the world? Fear and guilt. And I'll tell you how I discovered that. When I was in high school, the Catholics were told if you'd kiss a boy you'd go to hell if you don't get to confession. And I realize religion runs by fear and guilt, to a large extent. And I thought about it. And I felt guilty being born to my parents, because we didn't get along. And then I thought, that's not my fault. They were messing around one night. And it's their fault. If they'd just waited 24 hours they would probably would have been somebody else. It was pitiful. I will blame it on them. And then you get into reincarnation that you chose them [your parents]. And I'm just going to say, I'm not bothering with worrying about that. (Preisler laughs)

But it's amazingly insidious control mechanisms. And we're in the vital time. I mean, there was the chance like the Silent Spring [book by Rachael Carson] for the environmental issues to come forward. They did get rid of DDT, but now of course, now you have bedbugs come back. But there's so many issues. And it's still the issue of getting off of fossil fuel. It hasn't changed [my mind] one iota since I was in high school.

Preisler: Right. Oh, exactly. I remember—

Rauscher: It's just going at a faster rate. And what the heck, I mean, I will say I took courses in reactor physics. I got a master's in nuclear engineering. And if I promote reactors, I say something controversial for the physicists, I don't feel like it. I just feel the nuclear waste thing isn't solved. And it's a lot safer when you count the man hours of people in the coal mine and how young they die and all that.

Preisler: If you pull the whole picture in.

Rauscher: If you put the whole picture in. But if you take being next to Three Mile Island or Chernobyl, or Fushima—how do you pronounce it?

Preisler: I don't know. (laughs)

Rauscher: Fukushima. Japan.

Preisler: Right.

Rauscher: And then they say they're hardening the reactors to be able to be without power for three days by having a big bucket of water above them and dropping that on the core. And then they're storing the spent fuel rods in the same container. So it isn't just ones that are in the reactor. No. There's some really sloppy stuff. And it isn't right.

Preisler: Yeah. Yeah. Yeah.

Rauscher: And will they harness fusion? Probably not without, my way of looking at it the other way around. And I may not be able to do it, either. I may not be right. But I have someone interested in funding me on that technology. We'll find out whether they'll do it. I don't know if they will or not.

Preisler: Right. Right. Right.

Rauscher: And the way I say funding, it won't be at a level that will probably solve the problem.

Preisler: Right. It will just be enough to get some, a few things done?

Rauscher: Enough so I can think about it. But it's such ingrained thought in the society that people accept without questioning. And it's part of that educational system that's at fault. Because what did happen in grammar school is shut up and believe me [the teacher].

Preisler: Just repeat what I say.

Rauscher: Don't say anything that you think of on your own. Don't interrupt anything.

Preisler: Right.

Rauscher: That's totally abnormal. And when I met the indigenous people's kids, it was totally different. There really truly was a sense of peace in Hopi land. There really is a sense that you can achieve a utopia. And the statement is, "The garden of Eden is here."

But really, you have to allow the creativity, the person to develop as a full being. And their intellect and their emotions and their spirit. And if you don't allow that, they're not going to be whole people. They aren't going to be able to function in a way that's productive to themselves or to society. Or the world as a whole.

Preisler: Right. Exactly.

Rauscher: So those are some of the conclusions about some of the general things. I think, I wrote a thing that said, [anything can be studied with the scientific method]. And I said if you do it [study it] with a scientific method, it is. Anything's a science. Now whether you can study religion as a science, I'm not sure about that. But that's an interesting one, which is part of a schism in our society. But the trouble is, too many of the people, I think, are mechanists. You've got three kinds: a mechanist, a dualist – mind/body dualist – and a spiritualist. And I think you have to bring it all together. And live as a whole person.

Preisler: Right. Right.

Rauscher: You can't just subdivide things out as piecemeal. But you have to look at the picture as a whole. What is compassion? It's rational to be compassionate. And look at those kinds of things, instead of saying, rationality, compassion has nothing to do with rationality. And divorce it. So these are the kinds of things that I think need to be examined.

And we have such fantastic potential. I mean, we're on the cusp of a total new age. And I think, although I can see a lot of things going wrong, I'm optimistic of great possibilities of taking the more spiritual psychic aspect of being and melding it with technology. And each emphasizing and taking the better parts of each to make the whole.

Preisler: Yeah. You're sort of developing sort of a symbiosis.

Rauscher: Synergy.

Preisler: A synergy.

Rauscher: Symbiosis. Synergy, yeah, of the whole.

Preisler: Well should we go ahead and break for now?

Rauscher: Yeah.

Preisler: It's been a while, so—

[End Track 2B. Begin Track 3A.]

Preisler: Okay. Today is May 1, 2012. This is Dennis Preisler and I'm interviewing Dr. Elizabeth Rauscher at her home in Apache Junction. And we're going to go ahead and continue from the interviews we did last week. This will be tape three here. And we're going to discuss a little bit more about, we had started a little bit talking on the last tape

about non-lethal weapons and some of the activities involved with that. You had mentioned that one time you did some collaboration work with Chris Dodge.

Rauscher: Yeah. Yeah.

Preisler: What was some of the, what role did he play in [static obscuring voice] general discussion about non-lethal weapons.

Rauscher: Okay. William Van Bise and I, my late husband/partner/co-patenter/co-paper writer, about co-everything, including co-shopping together, house fixer-uppers and stuff like that. Actually, Bill met Chris Dodge before I met Bill in 1979. And I met Chris Dodge independently of Bill. And he was working for the Library of Congress. I don't remember exactly what his title was. It's somewhere in these papers. Vitamin C to keep things going.

Anyway, Chris was, I think Bill was one-fourth Seminole, and Chris was also one-fourth Seminole Indian. And Chris worked for the Library of Congress for 30 years. And he started a project called Project Migraine. And what it [the project] was is trying to see whether there were different sensors available, like our T-1050 sensitive, non-superconducting magnetometer that might measure precursors to earthquakes. And then you had people that apparently thought they got headaches and so forth before earthquakes. And of course there is a Chinese work where snakes come out of the holes in the winter, and animal behavior changes before a big seismic event.

So we reported to him over the years our predictions. So he was one of our main prediction center. We also reported to the United Nations to program on hazard reduction headed by Dr. Marie Cole. And then Jean Chu was a friend of mine, and she was working on that project.

Do you need a pen, paper?

Preisler: No, I got it.

Rauscher: Okay. And so then after we got involved with that program that started up later than Chris Dodge's program, which I think initially began about the late 1970s. And then the Marie Cole project began in the 1980s. So we would report to them and sometimes we would report to the USGS. But they didn't have any real formal earthquake registry. And before Chris Dodge died, I was trying to get what his statistical analysis was. And I don't know what became of his papers. But of course he had a lot of in with Congress and so forth. So he'd keep us abreast of all kinds of things.

I can't remember whether I told this story before on the tape, but before the first Gulf War, we were measuring signals which we wanted to look at the natural signals. And we were getting like in some cases, runs of an 89 percent hit rate as to the magnitude, approximate magnitude, of an earthquake, its approximate location [Earth Quake Prediction]. And sometimes we'd get about a six weeks warning period. Then it would go down to a two weeks warning period, and then a two-hour warning period. With different signatures of electromagnetic fields in the ELF and VLF region.

So we would – [telephone interruption]

So we kind of worked through the programs that were synergistic and were trying to take data. And we had some really good runs when we were able to, you know, not be on travel so we'd miss data. And that sort of thing.

And like for the Loma Prieta thing, since it was nearby our Nevada test site in Golden Valley, relatively near, being in California, on the coast, we had a good bead on that one. And we gave a countdown [to Chris Dodge and Jean Chu].

And what was interesting was, my mom lived in the Bay Area so she wanted me to come down. But Bill didn't want me to go because he knew the earthquake was coming. So that was kind of interesting. But she needed some help. And I had been looking after her, so going back and forth between the Reno area and the Bay Area, San Leandro. So I figured well, I'll go down and get back before the earthquake occurs.

But I got down there and I had to go shopping. And I was in this big shopping mall. And we're expecting this big event. In fact, I sort of pictured that Highway 17, which is part of 880, would collapse. Because every time I drove on it, the road went up and down and your car would bounce up and down and I could see cracks in the side. So I always drove on it thinking my God, I hope it doesn't collapse this time. So that was another prediction based on factual information.

So then, I'm at the shopping mall and the earthquake hits, the Loma Prieta event hits. And I think it was an 8.7, but that could be looked up, I don't know exactly. It was one of the longest, it was 45 seconds. It was one of the longest earthquakes I'd ever experienced. And people were running out screaming like they do in the movies. Which by the time you got outside, the quake would be done. But little bric a brac things were falling off the ceiling.

And a person behind Orange Julius counter where I was getting an Orange Julius, said, "What do I do?"

I said, "You can stand under a doorway. You just have to sort of avoid the stuff falling off the ceiling."

So oddly enough, Marie Cole was in California at the time, and she experienced the quake. And we both agreed it was kind of fun.
(laughter)

But it was so funny because about a half hour before I walked into this place and they had put up more kind of bric a brac decoration and I thought oh, man, that's going to fall down in the quake.

So then I left the place and the floor had been tilted up so one whole side was buckled up against the other side of the floor. So it was sort of slanted to walk out. Man, I mean, I said, "Boy, this looks like the one that was going to happen."

Preisler: A big one, yeah.

Rauscher: So of course the idea was to rush home and make sure my mom was okay. So of course all the traffic is jammed up because there's no lights, no electricity. And I kind of went under an underpass that was for the Highway 17 freeway. And I thought man, I'm not stopping under there.

So I stopped in front of it so the traffic would go, so I could drive under it fast. And other people were just driving and sitting under it. And then after they saw me do that, they kind of did that. But I didn't know, of course, [at that time] it had collapsed [elsewhere]. I'm trying to tune in the radio.

So I get home and Mom, her mirror had fallen off the wall but it hadn't broken. But it was important because a book case had fallen over near her. My God, it was very close, but I could get it back up so she could get out of her chair. And then her stairs had come loose, so she might have tripped on those. So it was a good thing I was down there. But then I heard that 17 had collapsed. But we had registered that one.

And actually, signatures began about six weeks before the event. Which is usually, usually it's more like three weeks. But the bigger the event, the more they [the signature data] precede it. And then also there's certain frequencies that will appear that kind of give you not only where it's going to be, [we have direction finding capabilities] what its magnitude is going to be. But they do give the magnitude to within plus or minus one on the Richter scale. I mean we really, I mean, we can say it's around 7 and it might be 7.5 or something.

So that's how I got involved with Chris Dodge.

But then, before the first Gulf War, the whole band of frequencies was just blanked out by these two-hertz frequency [intervals on our spectrum analyzer]. I mean, the whole thing was just like a close knit picket fence. You couldn't see anything. So Bill and I knew it was manmade, and probably the military. So we talked to Christ it because it was a problem.

And then later, Chris Dodge called us back at two AM. He'd call up in the middle of the night. And since he was on east coast time and we were on west coast time, so that was five AM. But, and he said Congress was going to pass a law to say that you couldn't measure from one to a hundred hertz in your lab or house. And I thought about that, and I knew that was aimed at us. He knew it was aimed at us, because we told him about the Gulf War signals. And we identify it with the Gulf War. We didn't know where the war was going to be, exactly. We figured the Middle East. But it was to do with the fact that a whole bunch of movies about wars ahead of time about propaganda, I thought. And I noticed that there'd be different kinds of cycles of different kinds of movies that are popular.

So I said doctors can't measure your EKG or EEG, so you've got to not have this passed, it's ridiculous. And it won't get unpassed if it gets passed.

And I have a perfect right to measure what comes into my house. I'm not generating it. I'm not doing anything. [We have a passive field detector.] It's their problem.

So he did call the next day. He went to Congress. I guess it was a couple days later. And he said they didn't pass it because of my argument about EKG and EEG. So there was a lot of feedback that way.

And then, when the Challenger accident happened, we were doing the studies on measuring the space shuttle go through the ionosphere and excite the D, E and F1 and F2 layers. So we had done a formal program on that [with our detector].

And so we were taping, videotaping, each of the [space shuttles exits and reentries], so we get a time sync on the launches and the landing. So when the Challenger was launched, and I had worked for NASA before that [1983-1985]. So anyway, [I would draw pictures of] rockets [as a kid] and I was into space. You know, more the space cadet type. And so I was kind of enamored. And when I started working for NASA, they asked would I go on a space shuttle. Of course I said yes. After the Challenger accident, I thought about it. (laughs)

But anyway, what happened was, the night before, Bill got me up about three in the morning and said something about, there's something wrong. and then he was looking up at the sky, driving with his head out the window looking up at the sky. And he says, "Something's wrong."

So the teacher [to go into space] had said something like six up and one down on a radio program. So there was sort of some almost psychic stuff going on about it. But I mean, that's very unusual for Bill to do.

And then we went back. And the launch was five AM our time. And in the first film of the Challenger accident is going to go on its back so the shuttle's on the bottom side and the main hydrogen/oxygen tanks are on the upper side. And we saw a streak of light go in and then there was an explosion, the main hydrogen/oxygen tank which blew off the shuttle and blew the shuttle to bits. Oh, Kathleen [Christa] McAuliffe was the one that was the teacher.

Preisler: The teacher, yeah.

Rauscher: So of course it was shocking. But we videotaped it. And then of course we sat there for, we did the measurement, but we sat there. And of course we didn't get anything, because it didn't get up high enough.

But we watched the news. And the first scene, you can see both the solid fuel propellants that had no control, but they flew a normal path. And you could see sort of the flame coming up from the bottom. But apparently that happened on other flights. So I don't think it's the O rings. Because more than, Morton Thiokol was fined something like 7 million, but they were given 27 million [a few weeks ahead of the fine, Chris Dodge said.] And I thought it was a buy-out. Because the Russians had launched at a lower temperature with similar O-rings. So all the fuel [solid] propellants had them, weren't abnormal in their trajectory. And also, then they cropped out the whole side of the picture where the flash of light was, and they cropped out one of the solid fuel propellants going into his path. But I have the tape of both of them.

We don't know what struck it. It looked like it was struck. And we called Chris Dodge. And he had been in Houston [at the command center] at the launch. And he said, "What's that?" when he looked at the streak. He said, "What's that streak? What hit it?"

And they said, "You didn't see that."

Preisler: Oh. Wow.

Rauscher: It was very interesting. And of course we talked about [the Challenger] on the phone. And at that time, the phone was bugged. So they wondered how, whether there was a measurement or how we knew. But it was plain observation of a video, of TV. But I don't know what it was. I don't know whether it was a particle beam weapon going awry, a meteorite. But the trajectory came in almost straight. As it [the shuttle] leans over at about, I'd say, not quite, about 40 degrees, 35 or 40 degrees. So at that altitude where there could have been a meteorite or what, it's not clear what happened. Not clear at all. But then, you see, we sort of got in trouble for knowing too much, or just being good observationalists.

Preisler: Right.

Rauscher: So that's the kind of connection we had with Chris Dodge. And it lasted for years. We stayed at his place. And he would tell about one golf stroke in about four hours. (laughter) We kind of joked of whether he could out-talk my dad. I clocked my dad at sixteen hours straight talking once. That side of the family really did it [talked and talked].

But anyway, to non-lethal weapons, of course you have to go back to the period in the mid '80s. People were hijacking planes and terrorists were shooting hostages. So you have to go back to the era when you were thinking about how to solve this problem. Their whole implementation of searching people and all that hadn't been started.

Preisler: Right.

Rauscher: So if a hostage situation occurs, how do you deactivate hostages, I mean, terrorists, in such a way that hostages aren't harmed? And in a non-lethal fashion.

Now of course if you gave them tetany then a trigger they'll probably go ahead and flex [their finger] and pull the trigger. Or if they have a grenade or something and the pin's already pulled, there's some problems. If they don't have tetany, then they'll let it go. So do you relax them? And how do you get through concrete walls or the skin of an airplane? So there's all those questions.

So Bill had been working on the relationship between phonons and acoustons and electromagnetic phenomena, which I call, they call exatons, but I call acoustotons, because they're acoustic and electric at the same time. And whether that could deactivate someone, it would not be like a stun gun where you give them a huge shock and maybe give them a heart attack, but it would just stop them from doing something long enough to go in there and take their weapons away.

Preisler: Okay.

Rauscher: And of course some of the people we're talking to, like John Alexander and Ron Blackburn and others, Ron was with the air force. And the idea was to see whether, you know, this would be something to do. Because it was a real problem. I mean, it was enough of a problem that you did consider when you were flying, say, north-south, that you might end up in Cuba or something.

Preisler: Right, right.

Rauscher: So that program never went anywhere because it was given by the CIA to the FBI. But the FBI guy, I think they wanted it to use for crowd control, which is not what my intent was. It was really more serious situations and trying to save hostages. But at the time, [the FBI person] I wasn't cleared at the level of looking at our work, which we were just doing in our laboratory.

And I mean, it's very difficult to do. There was some work on acoustics, like an array, in France in the time of World War Two that they were trying to develop weapons to fight the Nazis. But that never apparently came to fruition. But there was some work at Los Alamos, they tried to do it. And the problem with it is, is it's really dangerous. Because it can backfire. If you don't have the array right, it will backfire to the person that's activating it.

Preisler: Oh, wow.

Rauscher: You could probably activate it remotely, but what it really is is a plasma speaker, large [trigger] speaker. Then you have an array that tunes the acouston in such a fashion that it is a charged soliton-like wave. And that's in the spook files.

The thing is that I had very strong feelings about not wanting to work on weapons. And when I went to Livermore Lab, I made it clear that I just wanted to work on theoretical problems in nuclear and plasma physics. And I did some work in astrophysics as well. I felt strongly about, you know, I didn't want to be responsible for people getting hurt or killed.

Preisler: Right, right, right.

Rauscher: That's why I kind of liked John Alexander's proposal of non-lethal weapons because, and I'll give you an example.

Nikola Tesla used to hang out with Mark Twain, or Samuel Clemens. And the two would go out to get all dressed up and go out and get

dinner. Tesla would get his three, six or nine napkins and they would drink a lot of wine and have fun.

So, Tesla took Mark Twain back to his lab in his New York apartment. And he said, "You might try that bed, but don't stay on there too long."

So the bed wiggled at about 7.6 hertz, which is one of the frequencies we find very fundamental. But the mechanical motion, it turned out, Mark Twain says, this really feels good. So he stayed on it too long, and he shit in his pants. (Preisler laughs)

But there had been some work during, I think, back to the first world war to see if you could get the enemy to shit in their pants. So non-lethal weapons has a gamut here. I mean, it's really weird.

But you know, it's such a complicated issue. I don't know, I know that there were really formal proposals by John. I knew John for years. I guess I met him sometime in the late '70s. And he was, you know, I'm not sure all of his motivation. He lives up in Las Vegas now. But I think it was along the line that we were thinking that, you know, if there were innocents around, you could round up those that were shooting at you and protect the other people that were in the vicinity that would get killed, or likely get killed.

And the program did have testing, it did have funding. I don't know to what extent. But I imagine if I multiplied it by a factor of 10 or 100, I'd be more accurate than what I think.

But I don't see much application. I think the stun gun is really a bad idea, because anybody that's got cardiac problems, and if they're innocent, you're killing someone anyway. They'll say it's better than shooting them. Perhaps, yes. But I think that that's such a, much less than can be done, because you can use certain frequencies and project them. And that was the idea of the acoustic weapons that you could project it more than a few meters. And cause less potential damage. Because presumed innocence is very important to me.

Now, of course if they're terrorists with guns, I mean, the presumed innocence doesn't apply here. You're presumed guilty until you resolve the issue.

Preisler: Right.

Rauscher: Then there's a whole group of guys that was Ron Blackburn and others from the air force that were involved in the Eyring Institute group in Provo, Utah. And it was interesting because of course I had the navy grant at Berkeley. But then that funding was through ONR. But I didn't

meet any, my contract monitor was a professor of physics and engineering. So I didn't have any contact with the military. And my grandfather had been in the army, but I didn't know much about it. But it was interesting, meeting these guys. And I had all these bird colonels and stuff. They'd come out and visit me.

And I had one meeting in E.O. Lawrence's old office with a group in uniform. And I think it was more to do with, you know, how to use electromagnetic fields for terrorist and crowd control, although there wasn't any specifics.

But it was interesting to me because everybody had their black briefcase, including me. And I said, "Oh, I see this is the black briefcase protocol." And they all did laugh. (laughter)

Preisler: Yeah.

Rauscher: So I kind of found out, you know, academia has its levels, and it's pretty stratified. Military is very stratified. So you know where you stand. And it's like Ron and some of these other guys in the air force would call me up and say when they got a promotion. And it was, you know, kind of nice. I could see, you know, how proud they were and how specific a lifestyle that is. So you kind of know where you're at.

When you're doing business, it looks to be like a free-for-all. Now maybe I don't understand it [business], but I can tell you, it doesn't follow anything that I call logic.

Preisler: (laughs) No, but everybody's very proud of their titles.

Rauscher: They are.

Preisler: Yes.

Rauscher: Well, that's when you're not the head of the company. When you're some pigeonhole where you [don't] get the corner office. But that's true of academia, whether you get the corner office or get a view or not.

Preisler: Right. Right, right.

Rauscher: That's the first thing I confronted was that offer of two offices and a choice between them. And one had a window and the other one didn't, so that clinched it. It was a nice view, too [of the LBNL Bevatron Building, pine trees and resident deer].

And then other times when, like Livermore Lab, when things weren't going so well, then I ended up in the center office with no windows. So I had to put pictures on the wall. My God! (laughs) So it varies.

And then I got another office, it was on the ground floor with two windows. That's how you could keep track of your status.

Preisler: Right, right. I remember when I got, one time I was moved from my window office to an interior office. And I felt terribly insulted, like [unclear] awful—

Rauscher: Oh, God, I tell you, I was, I had a good office. And then this, where you could open the window. It was an old building so you could open the window and let the air in. Then I got in this newer building and the thing was like a cage. And then I got in the interior and it was, not only was it no window, it was small! Oh my God.

Preisler: You think, what did you do to deserve this?

Rauscher: Well, that's an interesting question.

So of course there's so much on the non-lethal weapons thing, Bill and I did, since '79 until a little, about 2004, 2003, because he wasn't doing too well the last couple years of his life when he died in 2005. But I started as a complete skeptic that very low-frequency, low-intensity electromagnetic fields would affect biological systems. And I know some of the standard guys would go to the blackboard [to prove there are no effects- the proof is in the experiment]. But that's not where the fact is. The fact is in the experiment [and I have issued patents on it].

Preisler: Okay.

Rauscher: And I was surprised at the sensitivity. And we worked mostly on trying to find positive effects. Effects that would enhance biological systems.

Some frequencies are pretty benign. I don't know if they're benign to all life forms, because different life forms do somewhat respond to different spectrum of frequencies. And also yet they do have in common what the earth and sun moon system produce that they evolved in.

But there are some frequencies that produce altered states. I guess I'll put this one in the record because it's just too damned funny. Bill saw me as both [collaborative and] supporting our research, that is, getting

the funding as well as doing the work. But he also, I think, saw me as a guinea pig.

Preisler: (laughter) Oh, no.

Rauscher: Or a subject. And I said I couldn't sleep well at night. So he would take a generator in the other room and turn it to a certain frequency to see whether one of the frequencies would enhance sleep. Which I think it did, and I know what that frequency is [in one of my patents].

But he did some other ones where he would turn on some frequencies that were, that would make a person want to not be in the vicinity. Just sort of as a home alarm, you know, so people wouldn't break in while we're gone. (laughs) Because by then we had collected about, well, actually, in Nevada, I think we had about three-quarters of a million dollars worth of equipment. But we were beginning to really get some equipment.

Now I didn't go out and buy it all because when I did teaching at the university, sometimes I'd get some of their old or cast-off oscilloscopes, just an earlier model, and, in some cases, better.

But there was me, [Bill,] and one of our assistants. I've got a picture of him. I'm not really that good with names. It will come to me.

Preisler: Okay.

Rauscher: One of our assistants who was, sometimes we just had people drop by the lab and they needed a place to stay and someone to feed them and then they'd do certain things. So this was one of these young people that was, it was beneficial to have someone else to help do the stuff. And God, I wish I could remember his name. I may have to just come back on that.

Preisler: Okay.

Rauscher: But he was an interesting case. He said he was an orphan. But he kept visiting his sister. Well, she could have been an orphan, too. But his story didn't fit together very well. And there's this name for it which oh, I heard a couple of times. And that is, its sort of like a plant that kind of has someone keeping track of you and reporting into headquarters.

Well, anyway, Vernon Rogers is his name. And Vernon would volunteer. He said, "You can't change my state of consciousness with

electromagnetic fields. I've been involved with gurus in Indian for years." Of course we could.

And then our contract monitor, Jim Beal came by. And Bill altered him. And it turned out that he said, "Nothing's wrong. I'm fine." And we're trying to prevent him from driving his car because he's bouncing off the walls—

Preisler: Oh, dear.

Rauscher: --until it wears off, so we're trying to make sure [they are safe].

But anyway, Vernon Rogers knew Russian fluently. And he could really write the Cyrillic alphabet perfectly. And he kept saying he needed money. So we ended up giving him about 30 bucks a day and he stayed with us about seven months. Now some of my papers did disappear during that time. I don't know if he took them or someone else took them. luckily, I had Xerox copies. But we had several people come through and take stuff. I don't know how common that is, but it was weird.

So Bill set a frequency. I didn't know what it was [at the time. I've recently reproduced the experiment.] The generator, I think, was in the shop. I didn't even quite know where he would put the generator, either. So it was sort of like I'm looking to find what's going on here and he's being naughty and mischievous. But whatever the frequency was, which is not one frequency, it's a combination. But it has to do about non-lethal weapons. It's like a pot frequency, a marijuana frequency.

So Vernon, Bill and I are just laughing our heads off as we drive to go to a restaurant. But I'm thinking to myself, I am utterly nauseated, I feel like I'm going to throw up. So I'm thinking, it's just, Bill put on some zaps, so I'm not really [sick], I'm using my mind to try to overcome his effects. And see, Vernon said he could overcome anything. Well I didn't notice him doing that, either, because he was acting crazy.

Now this scene is one for the movies. So we sit in Denny's and we're laughing and acting very stoned. And I was kind of enjoying it, except for the nauseous side effect. But it's a very interesting thing. It even goes back to some of the history of discoveries in ancient times like the Ionians and the Greeks.

So Vernon, the waitress comes over and she kind of gets a contact high and starts laughing. But every time she came over with menus or an order, he'd pull a banana peel out of his shirt. And why he had a

banana peel, he had three of them [I do not know where he got them]. And it was just hilarious. And I mean, other people in the restaurant got a contact high from whatever, you know, I kind of tracked down what I think the frequencies are, and what their wave forms [are. I tried the experiment later after Bill died and it worked.] See, it's the wave form, the intensity and the frequency. But it was definitely, there wouldn't be many terrorists that would do naughty things under that effect. (laughter)

The nausea went away by the time my dinner came. But it was interesting because I couldn't just mentally make it go away.

Preisler: How long would you be exposed to it before—

Rauscher: Oh, I think we were exposed to it only a few minutes, because he turned it on as we were leaving. And I would say the effect lasted about a half hour.

Preisler: Okay. Okay.

Rauscher: And maybe 35 minutes. Because you're sort of in that mood, I think the nausea went away within about 30 minutes. But the whole meal was peculiar. So that was about an hour and a half. But I think part of it was, we were laughing about laughing. So some of it was—(laughs)

Preisler: Self-induced?

Rauscher: But I mean, we can cure them or kill them. And I feel like we should cure them. I feel like we can transmit frequencies for our electromagnetic age that can either be completely benign, which they're not. Some are very dangerous and they do flatten alpha. You could even have everybody healed. But is that mind control? And is that not their free will to say that they don't want that? It's like putting fluorine in the water. I think that they should choose to use fluoride toothpaste so that those who don't want it aren't subject to it. Chlorine's another matter because you'd have too many outbreaks of diseases and stomach ailments and children getting sick and dying. So where do you draw the line? And frankly, it's going to take some really conscientious people.

And the other thing that's interesting is that this is all denied by the establishment.

Preisler: You know, when I was working for the power company, they had, we talked about EMFs from like microwaves and things along those lines. And they all said, "No, it doesn't do anything."

Rauscher: It turns out the microwave frequency, [in a microwave oven] of course, with the door closed, you're probably pretty well protected. And I don't use a microwave very often, but I do, because I'm not going to cook anything. I'm too lazy on [the] cooking deal. I cooked for two husbands. That's enough. Next guy has got to cook for himself or go get a hamburger. But that's the problem. The cell phone frequencies are not good. They flatten alpha. But if I went public with that, and when I did in the past say things were wrong, and there were spike waves and triangle waves on the power lines, I just lost contracts and got in so much trouble and got threatening phone calls. I'm not willing to go public. This will go down in history as my statement that some people would be paranoid enough to say it's deliberate. I think it's money and greed and they don't give a damn. And I don't think they really—

It's like me. I mean, until I experienced it, I would argue that, it doesn't mean I won't believe in something, because I'm an open-minded skeptic. But then people get their philosophy fixated on a belief system. And then they're not true scientists because they're not willing to explore the answer to find a truth. And the thing is, if you have to change your philosophy to meet what the truth is, then you change your philosophy.

And I've had several [times in my life]. One is the psychic research, and another one is this area. And this area wasn't such a big change in philosophy. But it was an awareness of what does one do as a world as a social citizen. And of course, the thing is, scientists tend to blab. And that can get you in a lot of trouble.

Preisler: Now is this similar to when the, for healing processes, when they attach electrodes to muscle groups, something like that, to—

Rauscher: Yeah, it is. You're talking about the TENS device. The thing is, it doesn't penetrate deeply. It's more like a Ben Gay effect where you feel electrical stimulus. And an example is my son [when he was 4 or 5] stubbed his left big toe. And I said I could stomp on the right one and that would distract you. (Preisler laughs) Well, of course, he knew it was a joke and we laughed, and that kind of got rid of the pain.

But the point is, to get the deep tissue effects, you have to use pulse magnetic fields. And it needs to be a complex interaction. So by the time they're in the interstitial tissue and in the, next to the bone and affecting the neurons, they need to mimic the neuronal process, the hemodynamics of the blood and the piezo electricity of the bone. And that's why the astronauts and people that don't move much get

osteoporosis, because you have to keep flexing your muscles. And that produces its own current flow.

And I know Norm Shealy that invented the TENS device. So I'd say between our technology uses pulse magnetic fields at very specific frequencies, very specific wave forms and intermixes that were sort of in competition. I don't really worry about that so much, but some people do.

There are devices on the market currently that I wouldn't use, that I think are bad for you. And some that probably don't do anything. So that's going to be a whole area of [new] medicine.

And I expect that, for over 30 years I've expected revolution in thinking to be more in medical terms. For several reasons. The forcing function is the cost of medicine. And in some sense, because of that, the exclusivity of poor people to adequate medical treatment, I've seen both kinds of cases, where I thought poor people didn't get adequate medical care, and then other cases, they did. But that, to me, is a big, unresolved issue. And there needs to be a gentler, non-invasive medicine. It will never [replace] surgery, or setting a broken leg and so forth, but it's a complementary medicine that I want to be real.

Now there are some things that I've looked at that I personally didn't find anything. But that doesn't mean it doesn't exist. It just means I didn't find anything. And homeopathy is one of those. I spent two years studying that, and I could see no benefit or effect of it.

On the other hand, certain herbs will even alter your consciousness. I mean, I'm not talking about pot, but other kinds of herbal medicines from Japan and China.

Preisler: Right. Some of the ancient—

Rauscher: Some of the ancient stuff. So whether the alteration has any benefit or not, you have to look at that.

I think one thing is, the key is people need to get out of their little cycle of being and see the larger world. And I think it's very important to be a world citizen. And what I mean by that is you travel around the world and you're a guest in all these other people's countries and their homes. And you see the commonality and not the differences.

Preisler: Right.

Rauscher: And the kind of thing that I see no sense in what's going on with these wars. I have no understanding except it didn't work out for oil in Iraq. And Iraq is said to be the center of Western civilization in the Tigris and Euphrates Valley.

Preisler: Right.

Rauscher: I think it's more than that. I mean, I think there's more locations. Like ancient Persia and the Greeks and so forth. They're the foundation of much of Western thinking. But I see that as a huge disaster [the war in Iraq]. But I didn't really realize probably how huge a disaster the Korean War was or the Vietnam War [at that time]. But it's hard to say what to do about it. I think about it, and I think about if you were president, what would you do. And the fact that you're not really free completely to do what you want anyway. You've got all these controls. And then what if. And things like that.

Preisler: Right. Right. Yeah.

Rauscher: So a mission completed made no sense to me, because it wasn't. And Saddam Hussein, as I understand it, this is gossip, it's not fact, I don't know. But I hear he was put in by the CIA.

Preisler: It's one of those things that might not surprise me. (laughs)

Rauscher: And then they killed a whole bunch of people taking him out. Now I would say if I was somebody that was coming down [my] street with tanks and I had nothing but rocks in my front yard, I think I'd throw them. I wouldn't do any good, but it's a very complicated way in which people are judging what they think is best for people in another country.

Preisler: Mm hmm. Let me just pause here for a quick second and turn the tape over because we're just about over on this—

Rauscher: Okay.

[End Track 3A. Begin 3B.]

Preisler: All right. So this is side two. We're going to continue on. Now when you and Bill were working together on the different frequencies, were you just testing different frequencies and trying to get a feel for how it affected—

Rauscher: Well we had some theory behind it. He had his own theory that I incorporated into my theoretical work. So there was some ability, there was some basic experiments that led to know what frequencies to look for and what not to look for, what was harmful. Now, I don't know

how much to say, because I'm thinking of doing some more patents. I've got this patent pending which is not the complete copy, so I'll have to get another one.

And also, I don't want people to misuse some of these frequencies. They're actually, well, you have to have a certain experimental technique to know how to find them.

Preisler: Right. Right, right.

Rauscher: And looking at the rapidly changing brainwaves or EKG is one. And then also the slower varying parameters that we looked at, like endorphins and enkephalins and dopamine and serotonin [production].

Preisler: So these were the types of things that would affect all those—

Rauscher: Uh, yeah. In fact, what's in the patent they issued in [November] 2011 last year and the patent pending, the big patent pending, is on positive effects of the frequencies, what organs they affect. And how to utilize them in increase in the rate of wound healing, surgical recovery, reducing pain, enhancing health. So that's really what I concentrated on.

Preisler: So there's this whole side of this that's beneficial—

Rauscher: Oh, yeah, yeah. And they're very specific, and they [the frequencies and waveforms] relate to each other. And I have, in the earlier patents that issued, I have the theoretical model. So I can use that to search certain areas. And then of course Bill and I generated, oh, 20 lab books of data [effect occurred], at least. So then I can look at those and see what the frequencies we used and the brainwaves, etc. and analyze that. And the cardiac system.

Preisler: Right, right.

Rauscher: So there's a basic model behind it that has to do with the Purkinje process and how the endocardium and the heart is affected. By the 7.6 [Hertz signal]. Some relate that to the Schumann resonance, but the actual of the Schumann resonance varies from about 7.4 to 7.8. In other words, it doesn't stay as a single frequency. But it's in that band [range]. And that is actually the first full organ that really forms is the heart in the fetus. And the Purkinje cell is the ovum, nucleus of the ovum, is the Purkinje cell. And the hind brain is full of Purkinje processes. And it's the connection of the mind/body.

And I think it's the key to, as I say, a gentler, non-invasive medicine. And right now, well, what the FDA said, they allowed our studies

because our patents were the best they've seen. And also, our request, the report that had gone into FDA, was the best they'd seen. So they allowed us to do the studies in the late 1980s [and early 1990s.

And so they, I think, I think the threshold isn't quite got here yet. It's taken 30 years for anybody to even start looking at this stuff. Now of course there were people in the past, like Saxon Burr and Robert Becker and W. Ross Adey, we knew Robert Becker and Ross Adey well. And they did the same thing. They warned against the bad frequencies and said there were some beneficial ones.

But [Robert Becker] would argue with us over, he wanted to do DC, and we said it's AC. But it's DC and AC. AC, alternating frequency, or frequencies with a DC bias. It sounds like the Tesla/Edison argument over AC and DC.

Preisler: Uh huh. I was going to say. (laughs)

Rauscher: So we, Bill had surgery and so Becker suggested to put a silver mesh on [the wound] so it was conductive and put a DC current in. We did that, but we put the AC in as well. And then he, you know, it's so cute how people have their ideas. You know, it's interesting. And yet, you know, those guys are the daddy of looking in this area.

I think that their advice was a step in the direction. But it doesn't do deep penetration [with DC]. But I think, of course the drug companies don't want this. Surgeons, there was a doctor friend of mine that went to a cardiac course at Stanford [University]. [We] told him about our completely external pulse magnetic field pacemaker, asked him if they would research it, what would they say about it. And they said they would say it didn't work, even if it worked, because they wanted to keep this money from the surgeries. That is definitely not real doctors.

Preisler: No.

Rauscher: That's awful.

Preisler: Yeah.

Rauscher: He was shocked, too, Norm Borenstein, M.D. [who verified our findings]. Then, of course, it grades into people that are interested in homeopathy and herbs. It's not clear, because now it's showing some of the herbs interact with prescription medications. And you have to look at these things. So it has to be taken seriously. I mean, I think well over 50 percent of the people use alternative medicine at some point [in their lives].

- Preisler: Right, right.
- Rauscher: And the conventional medicine, there's many problems it's not solving.
- Preisler: Yeah, I think a lot of times the conventional medicine sort of, they put the Band-Aid on it without actually curing things.
- Rauscher: Well, in allopathic medicine, you treat the symptoms in general. Now, you do treat the disease sometimes, like a broken leg. The problem is a broken leg, so you set it. So you're treating the symptoms and the cause. But in general, I don't exclude one to the other at all. Because I find some things in conventional medicine will save lives. I think there's too many tests involved. But it will save lives. A friend of mine had a stent put in after a heart attack and it saved his life. I mean, that just was like that.
- Preisler: Yeah. But at the same time, sometimes I don't think they always look at the whole body.
- Rauscher: They don't look at the whole person, their lifestyle.
- Preisler: Right, right. That's what—
- Rauscher: And there seems to be no time for this. Even the more compassionate doctors I know, and I know some really good, compassionate doctors. It's like it's very hard to make a living and spend the time to really find out what the person's [problem is], I mean, it's the conveyor belt mentality to make an office work, or a clinic or a hospital work. But that's not going to be the answer. The revolution hasn't got here yet, in my view. And it's not Obamacare. It's a deeper personal change that needs to be made within everyone to start by looking after their physical body. But it's mental and spiritual as well. It isn't just one facet. Just looking at the whole human. A big toe may be swollen, but it's swollen on a human. Sometimes fixing the toe solves the problem, but it may not.
- Preisler: Right, right. If the toe, the reason the toe is big is because something is in the body that's a little bit—
- Rauscher: Well, gout would be a good example. If the toe is big because of gout, if it got stubbed, then, yeah, it's probably a local event. But then does the person need glasses so as to not run into things, nonlocal to the toe, when the toe gets fixed-local or not].
- Preisler: Exactly. Or people with back problems. Is it because their back is bad? Or is because maybe their legs are a little bit off, or their shoulders.

They don't look at it, they look at their back, but they don't look at the--

Rauscher: They don't look at the whole thing. There was one guy that had a knee replacement. And what [the problem] was [caused] in the office he was in, he shut the drawer with his knee for many years. And finally he needed a knee replacement because of his habit.

And if you notice, some guys, they'll wiggle their leg. They've always got that leg going. And it's probably some kind of nervous energy. But if you think about it, babies, dogs and cats stretch when they wake up. People learn to not do that. I've got it automatic again. I stretch when I wake up. I guess that piezo electricity going to [the biological system].—

Sometimes, relatively simple, but they are habits that you need to develop. And we do lead to sedentary—(laughs) sedentary lifestyles. Sedimentary, too. That's our sedimentary rock reality

Preisler: (laughs) And we get lazier as

Rauscher: Sedentary lifestyles. I wrote two physics books kind of in a row. And, man! I mean, my biceps were going. I mean, I wasn't doing anything. So I'm going back to slowly working up to exercise more and move around and flex the muscles. Because that's actually the natural process the body needs to keep functioning.

Preisler: Right, right.

Rauscher: And so I don't do [give him advice] too often, but I called up my son. I said, "you need to exercise." (laughs)

Preisler: Now when you were doing some of this work, you were also, was it translated into some stuff with earthquake and volcanoes—

Rauscher: Well, some of the frequencies we measured from the earth are related to the frequency we use in healing. And I wrote a paper [with Mark Busier] on that. It's not published yet. It was going to be published in a journal in Brazil, but they didn't get the copy in time. So I'm not sure, see, this is something to think about. Publishing and communicating, lecturing and so forth, because, you know, that's how we get new ideas infused into the society. The people choose to come to the lectures or listen to the TV and radio. But what I'm thinking is some of it I do want to patent, because I want to try to control how it's brought into the society for good. And I haven't made my decisions on some of that. So some of the stuff that I do know about and the harmful and beneficial frequencies, I haven't written that stuff up. I have it in the

lab books and I'm not sure in some sense, like some of the more dangerous stuff, whether to not have that exist. Someone else might discover it later and use it for nefarious purposes. But I have to decide what's right for me to do.

Preisler: Right. You have to have your own ethics and morals and decide how you want to present that stuff.

Rauscher: Right.

Preisler: Now when, the Indian Ocean where they have the pirates that come out and they were capturing these ships and that sort of thing. And at one point, they were using blasts of sounds and that type of stuff to try to ward them off. Is that in any way related to this type of stuff?

Rauscher: Not acoustic lasers. I think you can have some very irritating sounds that are not necessarily irritating to everybody. But fingers on the old blackboards, you can't do that anymore because they're white boards now. But in some cases, like in Guantanamo, I understood they were playing rock and roll music really loud. And I must admit, sometimes I'll do that when I'm driving around in the car. So it has different meaning to different people. But you know, if some neighbors are having a party all night with loud rock and roll, it's quite annoying. And it depends on the kind of rock and roll, too. It's evolved over the years. I mean, the Beatles and Elvis Presley, "Elvis Pelvis", come out quite benign in all the old thing. Now you've got rap stuff and gangsta and—

Preisler: Yep. Death metal and everything else.

Rauscher: Yeah, heavy metal and the whole thing. So I think they were using more that and you know, you can actually produce a loud enough sound, you can make a person go deaf. But that's not an acoustic laser.

Preisler: Right. That's not with acoustic lasers.

Rauscher: Because they're not really recovering from it.

Preisler: Okay. Okay. So the acoustic laser—

Rauscher: Or so actually, to tell you, to be factual, I don't know exactly what they were trying to use on the Somali [and other] pirates or not.

Preisler: Mm hmm. Yeah, I don't know, either. I knew they were trying to do different things—

- Rauscher: They were trying different things. I don't know, I haven't heard much about the piracy recently.
- Preisler: I think they started moving the drones in there that scared them off.
(laughs)
- Rauscher: Well that is sort of interesting because it's war without, well, without potential loss of life. It's potential budget problems, because those things cost money. So government funding is a resource as well as a GI's belt buckle. You know, the count goes up for the GI, but—
- Preisler: Right, right.
- Rauscher: I don't know. When I was young, I remember hearing about World War Two. And it didn't make sense to me. However, I think there's no choice with the Allies in that case. Because the confluence of events was so overwhelming and there were so many people being murdered, millions being murdered, that I don't see there was any other choice.
- Preisler: Yeah. What was happening both in China and in Germany, you know with the Japanese just going through there and just doing horrid things to the Chinese.
- Rauscher: I know.
- Preisler: And the Germans were doing horrid things to the Jews and the gypsies.
- Rauscher: One of the steps in that whole thing is to dehumanize the enemy. The enemy becomes less of a human being.
- Preisler: Yeah.
- Rauscher: And that's, even that's true with some of the soldiers that have shot up civilians in Iraq. And some of them have really tried to make connections to the people. And I do think something has to be done about some of the vets and their getting integrated back into society.
- Preisler: Right, right. But you know, things with atrocities, I mean, that did happen, American soldiers would get so angry during the Second World War that they also went out and did things, you know, as revenge. It just wasn't ever reported or discussed and that sort of thing. But you know, there are stories—
- Rauscher: That's true. I know that.
- Preisler: --if your buddy got shot, then the next three Japanese you saw, you made sure—

- Rauscher: That you blew them all off in the face.
- Preisler: Right, right, right. And so—
- Rauscher: Yeah, I know. And revenge is interesting.
- Preisler: But wartime puts such psychological pressure on people that you know, the soldiers, that you have to be able to say it's a different world.
- Rauscher: Well, the post-traumatic stress syndrome I think [it does not] always occur. But I think it's extremely prevalent. Partly because of the noise, too. And some of these soldiers are having a really bad time. There are several people I know whose children committed suicide when they came back. So that needs to be dealt with, because we don't want to lose another generation.
- Preisler: Yeah. Well I know that when I was doing this research for this Civil War book that I did, and my great-great-grandfather wrote the letters. And you know, he came back from the Civil War after serving and seeing all these horrid things. And the family rumor is that he was always such an unhappy man his whole adult life. And back then, you didn't have post-traumatic stress, it was not an identified thing. So you never know if he was just an unhappy guy to begin with, or all the impact of being a soldier interrupted his life.
- Rauscher: Well I didn't meet a lot of World War Two vets, but I knew one guy that was a very good friend of mine and Bill. Just a very good friend. And it was interesting, because I could see World War Two written on his face. He was so serious. He just never laughed.
- Preisler: Yeah, and you don't know whether it was—
- Rauscher: I think it—
- Preisler: --my great-grandfather's as well.
- Rauscher: I suspect it was the war. And he talked a lot about it.
- Preisler: Oh, okay.
- Rauscher: Which was interesting. He [our good friend] served under George S. Patton. He didn't like Patton. And—very interesting. [I think Patton was key in winning the war.] Then, of course, Bill had been in the service in the army air force for the Korean conflict. And he didn't go overseas because his wife was ill. His then-wife. He, so then when we went to the VA, that that gave me—and the generations were very

stratified. You could tell who had been to Korea, who had been to Vietnam, and then some of the younger guys.

- Preisler: Yeah, yeah. It's interesting now seeing the Vietnam veterans. I envision them as these young men, but now they're—
- Rauscher: They're old!
- Preisler: They're old, yeah.
- Rauscher: Oh my God, I know. You think of them as young hippies and stuff.
- Preisler: (laughs) Well why don't we take a quick break here and I will switch tapes. [pause]
- Rauscher: Non-lethal weapons issue. It's a path to what I would like to do is, if I said obliterate war, that sounds aggressive. But make war so people didn't want to do it. But people do want to do it or it wouldn't happen. That's what I realize. Even though people say they're against war, it wouldn't occur unless somebody wanted to do it.
- Preisler: Right.
- Rauscher: Non-lethal weapons issue is sort of a path to making it less gruesome or gross or damaging.
- Preisler: Right.
- Rauscher: Because look at Europe now with the European Union. And that's not too long, I mean, World War Two wasn't that long ago. World War One was not that long ago. So it's a very, you know [interesting], because some of the younger Germans can't really understand what was thought about the Nazis because it's not part of their life.
- Preisler: They've written it out of their—
- Rauscher: They've written it out. And so maybe it's a path towards peace. But actually complete peace with no conflict is probably not possible at all. Because within one's self there's conflict. And part of life is that. It's making a value judgments, opinions and ideas of what to do. The fundamental background to all this, it seems like this, as Patton stated: "the age-old war." There seems to be in people's mind good and evil. Physicists usually don't address that because they don't want to deal with evil. But I know for a fact, evil exists. And it usually has to do with killing and torture and maiming. And there may be some other forces deeper than that. And so is it, as some people argue, to have free will. But how much free will do you really have? If you choose vanilla

ice cream over chocolate, it may be because I would say I'm choosing vanilla. But maybe I'm not. I just like it better, so therefore it's sort of chosen by being me.

But whatever amount of choice there is, I think we have to examine it very deeply. And the drones are sort of part of a war in which people are less involved. Now whether that goes to eventually non-lethal weapons, but then I worry about it in civil situations with crowd control where people have a right to demonstrate peacefully. But is it, you know, if you start messing with the crowd, then they're going to be more unruly. I mean, where does it go and what are the constitutionality of it all?

Preisler: Right.

Rauscher: Okay.

[End Track 3B. Begin Track 4A.]

Preisler: All right. This is tape four. This is Dennis Preisler interviewing Elizabeth Rauscher at her home in Apache Junction. The date is May 1, 2012. And we're going to continue talking a little bit about Dr. Rauscher's collaboration with other physicists during her career. I know that at one point, a very interesting, exciting time was in the '70s when you became part of Ira Einhorn's distribution list. And how he was starting to, it was almost like a list-serv that we use today. But it sounds like he was sending out newsletters or—

Rauscher: What Ira Einhorn did, he knew Andrija Pujarich knew him well. And actually I met Ira Einhorn at Andrija's Osining house. And he [Ira] had this most gorgeous long black hair down to his seat. And he really was the instrument to start Earth Day. Although he got a senator whose name would have to be looked up, because I don't know it. I've heard it once or twice. Anyway, he really started the first Earth Day. A million people came.

Now he worked for AT&T. And he'd send out the mailings under E.Mailer. E dot mailer. So—(laughs) that was his pseudonym. And what you did is you mailed in some of the papers that you thought you were working on currently and were important. And then he'd sort through his list. And then he'd make a list, make a list of everybody he sent your paper to. So either you got a really long list, a whole bunch of people got your papers, which I got on my cosmology papers in the early '70s. But he mailed that out to other people. Some of it was published papers. Some of it was unpublished. Some of it was ideas. Most of it was people's scientific papers, though.

So he'd mail these out. And it really made a, it was sort of like before the internet. And DARPA net became the internet. It was a way of people with like interests of being able to know who was in the field. Or they might know somebody but they might not have a copy of their latest work or their latest thinking. So it combined all kinds of people. Mostly physicists and some Nobel prize winners. Most of the people on the mailing list I knew. I kept a copy, a couple of copies of them, just because I was interested. But it was really a very interesting, very interesting, because it was actually very useful. And it went on for years. And it did exclude topics like UFOs or Nikola Tesla's work. It included some of that.

But if you really analyzed most of the papers, they weren't conventional, they were forward thinking, but they were primarily physics papers.

Preisler: Okay. And this is stuff that, I mean, the mainstream physics journals weren't necessarily publishing some of these pieces?

Rauscher: Well, some of it was published already in mainstream journals, or was going to be. It was sort of like a preprint. But some of it was people thinking about, kind of like a white paper of what they were thinking. And not necessarily what would end up in a formal publication. So it gave, it was a way of receiving ideas maybe one or two years ahead of if you were in a formal journal. Or people thinking about their own work and other people's work.

Preisler: Yeah, I know that—

Rauscher: And speculation.

Preisler: In the field of physics it's very important to have that continual exchange of ideas between physicists.

Rauscher: Right. It really is. And of course one of the big things is going to meetings. I find it very useful because it's not only going to the lectures but talking to people in the hall, getting together for lunch. That sort of thing is very important and may lead to collaborations. And I think there was just a whole group of people, I guess about a fourth of them ended up in my Fundamental Physics Group that were on the mailing list.

I think it was Saul Paul Sirag I heard about from, or Nick Herbert, one of them.

Preisler: I know that you have been, from going through the material that I have for archiving, that you have been an active participant in a wide variety of different conferences all around the world.

Rauscher: Right.

Preisler: And that these conferences played an important role in the exchange of ideas and that sort of thing between physicists. Some of, can you talk a little bit about some of the notable conferences you attended and some of the places you went to?

Rauscher: Well, I know when I was seven I met some people that my parents took me, you know, I guess they couldn't get a babysitter. I was about seven. And they took me to the house of some well-to-do people that had a huge house with a stream in the backyard. I made note of, it was pretty fancy and the people were really nice. And they gave me a book on Man's Right to Knowledge because I had apparently said something that triggered that. So I got that book. But what they talked about was like what you'd talk about as a world citizen. They traveled all over the world.

And that got me thinking. My mother had done some traveling. And my dad had done extensive traveling in the US under his government job of land and water resources for the seven western states. But I thought it's very important to connect with people around the world. I mean it was not only for that inter-connection and inter-relationship to make the world a better place, but really my curiosity and fun, and so I was very fortunate that I got consulting jobs and invited to conferences all over the world. So I mean, what better way to travel? You get your way paid. Someone takes care of you. Basically you sometimes end up staying in people's homes so that you really get to meet families and so forth. Or fancy hotels. And you know, four stars and stuff like that that I couldn't afford on my own. But it was again to disseminate knowledge and communicate.

There was one in Spain on quantum mechanics and consciousness. David Bohm, Fritjof Capra, a whole bunch of well known people were there. Let's see, George Weissmann from the Fundamental Physics Group. A whole bunch of people.

And sometimes, in some conferences, people give their paper and then leave. But sometimes it's really communication. And it was held where King Ferdinand and Queen Isabella gave Columbus the go ahead to go to India, except it was America in the way. Shucks. (laughter) Shucks, oh dear.

Preisler: (laughs) Native Americans never knew what hit them.

Rauscher: No, they didn't. It was really a bad situation for them. So, the beads weren't worth it.

That was a very interesting conference. There was one that was in North Africa in Fez that was on physics and spirit, but it really was the world professors' peace academy, a group trying to start up, and how to bring about world peace. And there was really, it was a lovely conference. And also an attempt to do that [bring peace]. There was one in Mumbai, India. And it was on all aspects of physics and spirituality. It had neurophysiologists, physicists, Buddhists, neurochemists, all kinds of people. And the two groups that agreed were the physicists and the Buddhists. And the neurophysiologists were the mechanists. I found that there were sort of these breakouts of these different groups. So that was interesting.

And some lead to published books and journal articles.

And when I went to Madras, India, I met T.M. Srinivasan and he came back with me and spent quite a bit of time in the States doing research. He was doing a project for the Russian government researching how to overcome frostbite of the feet using electromagnetic fields. So he was using rats and had quite a bit of a lab setup there in Madras.

And I always wanted to go to Madras because I had this aunt and uncle, Uncle Fred and Aunt Dorothea, Alfred Mitchell, involved in Theosophy. So I wanted to go to the Theosophical center, which I did. I bought a book, a couple of books, but actually I ended up giving them to a friend of mine.

But I found it very interesting, because they [the invited conference participants] all seemed to involve the struggle for truth. The struggle to understand what's going on in the world. And it's their unique fashion, whether it's a mechanist or a spiritualist or a dualist or whatever. They were coming from their belief system, and that seemed to be very ingrained. In some cases, people did open up and change. But it was very interesting. Very interesting. The different personalities involved and the struggle for truth.

David Bohm, I've been thinking about him a lot. He came and spoke at my Fundamental Fysiks Group. And then I got together and spent a summer at Birkbeck College, University of London. And the Birkbeck College is the physics department of the University of London with John Hasted and Basil Hiley and David Bohm.

And David Bohm got involved with Theosophy as well. Of course there's Annie Beasant and Ledbetter. But the name of the guy that they thought was the second coming of somebody, whether it's JC or what,

I never got that. But anyway, Krishnamurti! Yeah. There was Krishnamurti. And I met Krishnamurti through David Bohm.

And I think in a sense, when one starts as a child looking for truth, or maybe absolute truth, when you get older and you find that there's still many questions—which actually, I'm going through that phase myself – then what's the next step? Because it looks like you're not going to find absolute truth. At least in the physical body, in a finite body. But the search is still there, and the meaning is still there. But I think some of the older people I met in science did go through sometimes a disillusioning phase which had to do with reexamining the path. Not that it was wrong or right, because I think it was right, but what is its interpretation? What is its meaning?

And the purpose-driven life is a very interesting statement, that book title. Because it is, it's like life is a wonderful thing to have. But it's also that purpose driving that gives a certain art and value to it. And passion. Passion for art, passion for truth, a passion for expression, passion for communication.

And I feel very fortunate. There's sort of a group of people that were a generation or two older than me that I met. Like I met Warner Heisenberg. And then there was the group that I grew up with, many of my colleagues that I stayed in contact with and new colleagues that have come into my life. And it's very interesting how the paths kind of match this woman's house. Like there's a lot of books on bookcases. In my folks' home, there's a lot of books on bookcases, and magazines. Some have more clutter than others. (laughter) Or floor-organized files, we'll put it that way.

And it's interesting how the seed, kind of the intellectual that's very going outside the box, has a certain set of things they collect that are very similar. And like little knick knacks from all over the world on their travels. I've got plenty of those. And honors and awards and things like that. I don't have enough space to put up all the diplomas and honors.

And I like the sense of people that are grounded in hard science but open to all possibilities. [Note that these many conferences had few or no other women participants.]

Preisler: Now when you went to these conferences, did you usually travel with somebody?

Rauscher: No. I usually traveled alone.

Preisler: By yourself.

- Rauscher: Yeah. And then I tried to, what I would try to do was instead of having to take a train or something, or a bus or a taxi, I would try to get someone to come meet me. Like, you know, places like the Shinjuku Station [in Japan] is so big, I get lost in it when I'm coming from the airport in Japan. So I'd try to get some grad student or someone to come pick me up. And they usually did.
- Preisler: Oh, well, good.
- Rauscher: And sometimes they put you up in hotels. Sometimes you stay with a family. I mean, and I enjoyed it all.
- I stayed in so many different hotels that I'll actually have dreams about trying to find a front desk. It's really weird. (Preisler laughs) Because every one's different. And you land there and you try and figure out where your room is, where everything is.
- My dad said he'd dream about school and having to take an exam and he wasn't prepared for it. I haven't had many of those dreams. But the lost hotel room is one of those.
- Preisler: You okay?
- Rauscher: So I think it was just really a wonderful part of my life, getting to meet people.
- Preisler: You also were really participant in the Ossalon?
- Rauscher: Esalen.
- Preisler: Esalen. Esalen. I'm sorry. Esalen workshops.
- Rauscher: Okay.
- Preisler: Can you talk a little bit about how did that all come about? Because it sounds like a fascinating—
- Rauscher: Well, when I started my Fundamental Physics Group, some of those people knew Mike Murphy, who started Esalen. And I'm not sure how it came about, because there were two partners. But I think, I know that, I think it's Mike Murphy inherited some land or something. But Esalen is named for the Esalen Indians that lived along the coast below Monterey, down Big Sur. It's a fantastic place on the cliffs. Beautiful gardens. And man, it's like everything goes! There's conversations from hard physics to the most esoteric stuff and drug use and all kinds of stuff. (laughter) It just bridged the gamut. But people let their hair

down and hugged each other when they greeted instead of formal shaking hands.

Preisler: Right, right.

Rauscher: And the hot tubs were amazing. I think sometimes there's healing qualities, some minerals, but just being in a hot tub and laying out in the sun and getting your vitamin D.

Preisler: That's what I always heard was that if you didn't get enough sunlight in your head, it didn't get the dopamine release so that you—

Rauscher: That's it! Yeah, and it really is. I know I love to sit in the sun. I haven't been doing it because I've been writing books for the last couple of years. I've got to go back to sitting in the sun because that really, we're sun-driven. That's the life force giver.

Preisler: That was, when I was in Chicago and I'd work, and you know, because the way the light, the sun would come up in the wintertime, you'd never see the sun.

Rauscher: No, you don't. Not in Chicago.

Preisler: And then, yeah, and then people would say why is everybody so grumpy and down. And they would say well, they don't get enough sun beating on their head.

Rauscher: That's true! (laughs) Man, I tell you, I was grumpy when I lived, I lived in Illinois for two years and I was grumpy. I think it was, yeah, for the last couple of days, sometimes it's just kind of weather that bothers my allergy and it takes the form of my motor turning over roughly [my throat].

So yeah, what can I say? It just was great just going and meeting everybody and seeing the world and seeing the indigenous [way of] life and the animals and plants. There's sort of a band of, you know, different kinds of plant along the middle of Mexico. Goes over to Hawaii [to India]. And you see that same kind of vegetation around that band of the world.

Preisler: Right. Mm hmm.

Rauscher: Saudi Arabia was one of the flattest places I ever saw. Man! It looked like a salt flat, but it was a sand flat. And you know, people living in caves and proud of their house. And have an oriental rug on the floor in Africa and serve mint tea. And everybody—it's interesting, we have to recognize everybody's right. And you're a guest in that country.

You're a guest in that house. And I think if there was just more compassion and politeness, that would make a lot of difference.

Preisler: Now how many years, approximately, and I know this is probably written down somewhere, but did the workshops go on? And did you always participate in the workshops there?

Rauscher: No, I didn't go to all of them, partly because later I moved to teach the grad students in the University of Nevada in Reno. So I didn't always drive down to Esalen. But I did go to a number of them. And I mean, I'm not sure, let's put it this way. I can probably say some things without names. But there were scenes that I saw that were funny as all get out. I never tried acid and I don't plan to, but it does alter people. (laughs)

One physicist is walking around with a robe on looking like a guru with his hair sticking straight up. And that was Fred Alan Wolf, and Jack Sarfatti's throwing rose petals in his path. He's high on acid. It was so hilarious. I'm just standing there thinking man, I just smoke pot once in a while. (laughter) I can't make this out, it's just too funny for words. It's ridiculous, it's so funny. (coughing), excuse my allergy. I was going to try to have you come over when I don't have it, but—

Preisler: It's kind of hard to [unclear]

Rauscher: It will probably be the last couple of days.

Preisler: Let's kind of finish up with, the last thing I'd like to talk about is know you were a delegate at the UN. And that must have been a very interesting and exciting situation.

Rauscher: Yeah, I did, well, kind of three projects for the UN. My view was who's in charge here. So I went to Washington. I met with the people in the Pentagon. Met in those rooms where they have these movement sensors so if you move too much you set off an alarm. So you're sitting there stiff as a board.

And then at this briefing, I needed to go to the bathroom. And so I was thinking what, you know, I was supposed to be escorted to the bathroom. Is this guy going to come in or not? (laughter) He didn't. Naval officer. God, it was so funny.

Anyway, so I had met, through Andrija [Puharich], the Dupont, heir to the Dupont people, Dupont Chemical. And there was a United Nations program on renewable energy sources and you know, the whole delegate from all the different nations. I would say out of the over 200 nations, maybe 125 were represented. This was on long term energy

sources and renewable energy. And this was in '89. Let me think it was '79.

Preisler: '79, okay.

Rauscher: Very progressive. So like the guy from India was talking about burning cow flops, which probably would not solve the American energy crisis. (Preisler laughs) The guys in Chad wanted a nuclear reactor [maybe they should use solar]. So some of it was unrealistic, but there were these huge booklets. I mean, it must have been several thousand pages from the different countries.

And one of the booklets I lost and I'm sorry I did, because even now I think they would have some meaning. Because some of the suggestions were more practical. But the issue of energy and pollution and the environment was well recognized. And what I found is after going to Washington and meeting vice presidents and senators and congressmen, I sort of felt like maybe the UN is, you know, if you're going to go find a guy that's in charge. But here's what I think of the UN. The people I met there were marvelous. Well minded, well thinking. I was very favorably impressed in their effort. But it's very under-funded. There are so many projects. They're so vastly under-funded. I mean, how do you get rid of world poverty? How do you get rid of—

Preisler: Disease.

Rauscher: --disease and so forth. But the idea of renewable energy was put forth. So that was the first work that I did with the United Nations. It was very interesting, because the US was sitting here. And the Russian delegation, the USSR was in front [of me]. So I was young enough that I was wondering about the Russkies. And the Russians are coming and stuff like that, like that movie title. So it was very interesting. So I, they were a couple of days late for the start of the meeting. And it would start at nine AM. They had a break for a banquet type dinner. And then we talked until about midnight or one in the morning at these cocktail fests. And I kind of got tired. But then part of the deal was to go to the cocktail hour. And I found it very interesting, cocktail hours.

So it turned out the guy that sat right in front of me with a big Russian hat and a coat and everything had been at Berkeley when I was at Berkeley. He knew some of the people I knew. I knew some of the people he did. And I kind of hung out with the Soviet delegation and talked about all kinds of things. Families and everything else.

The second time I got involved with the United Nations on renewable energy. United Nations environmental pollution, but more on energy

systems and very good talks. Very good presentations. Again, the problem with implementing it and getting it into an action component, and that seemed to be the problem. It's like the earthquake prediction stuff I did with Marie Cole [at the U.N.] There was, seemed to be a very low budget and no way to really implement it [the third time I got involved with the U.N.].

And then of course, then there's the responsibility how well can you protect earthquake like a course of, weatherman isn't usually that accurate, but the consequences aren't as great. So when do you predict a quake that's big enough that you think evacuation should occur and who handles that, what kind of social systems come into play? And those kind of things.

And as I say, I was really impressed with some of the work in the papers in the different countries. But it seemed like it was, I've noticed that before in other situations, where a lot of these conferences would take things a step forward, but they were not as big a step as I would have liked to see. But I think that's part of it. At least there's an effort, there's a trying—

Preisler: Some kind of movement in some direction.

Rauscher: Some kind of movement. I remember when they were first recycling newspapers, I thought, yes, that's a good project. However, what about the ozone hole? What about some of the major, major factors that we need to address? Water pollution, and how vast a problem that is. What a vast problem that is.

Preisler: And some places, there's no way to address that issue at all.

Rauscher: Well there's one place in California, in the inland valley, the land has dropped by 75 feet because they pulled out the permanent aquifer for agriculture. But the problem is, you can't just re-infuse the water because the particles are so fine that it won't seep in between them.

And so it's like here, there's three wells in Apache Junction, and they're pulling out the permanent aquifer. What's the going to lead to, what kind of crisis? What can be done about it?

Preisler: You can look just south of here, in Florence, where they have the old Casa Grande ruins that were done by the Anasazi. And you go out there and you say there's just nothing out here. It's just flat, there's desert, there's no trees or anything. How could these people live here? And then you realize that they've pulled the aquifer down so far that all the trees died.

Rauscher: There was one hill on the way out to where I lived in the country [outside Napa, California at Lokoya]. And it had a whole bunch of oak trees on it. There were redwoods and Douglas fir and pines and madrone, manzanita and all kinds of other trees. But on this hill was mostly huge, huge green oak trees. When I went back there many years later, I could see the oak trees slowly dying as the water was pulled out for Napa County. And finally, there's not an oak tree on that hill.

Preisler: Yeah. That's [unclear] there used to be, you know, they would have mesquites and all kinds of trees out there. And it's all gone. Just nothing but sand.

Rauscher: I know.

Preisler: And like you say, you can't just simply say well let's pump water back in there—

Rauscher: You can't.

Preisler: --because that aquifer has to fill up over centuries.

Rauscher: Over eons. It's amazing. And what it is is it's a combination of fine sand, loam and peat. And it just will not be absorbed into it. It's not like a sponge that will go back up [and refill].

Preisler: And then if you're in California and you attempt to try to put the water down, they're just [unclear] they're saying now that might help with the plates sliding. (laughs)

Rauscher: Oh, it might make the San Andreas go off. I don't know. I mean, the fracking problem, though, is (sighs) you know, how much that will do to water pollution. It's scary when you really think about it. I think that you know, I'm thinking of writing a major paper on what I think of the environmental issues, but it's going to take me a couple of years. But I'm not sure what good it will do. It's like, what do you do as an individual? People can do the recycling, which I approve of, but it's not solving the major problems. And that's a whole infrastructure thing.

And I would say I'm not 100 percent sure that the Iraqi war was over oil, but I'm probably 80 or 90 percent sure it is. But it didn't work out. I mean, it's made the situation worse.

Preisler: Mm hmm. Yeah. That whole thing ended up making the situation worse.

Rauscher: And then what do you do? You have this pipeline that's going to come down from North Dakota and so forth, all the way down to Texas. So there would be environmental impact of that is going to be major. And then you're just using up a permanent [oil], you're not using something that's renewable. It's just a certain amount of fossil fuels. But do you get more independent so you don't want to do wars over oil? I mean, how do you play that? And now that pipeline isn't going to be done. But it probably will be done sooner or later. Because when they stop the offshore drilling, which has made an absolute mess in some cases, like the big one in the gulf, it's just going to be done anyway. So I don't know.

Preisler: You don't know the ripple effect. There's, you do something here and effects, you know—

Rauscher: Well that's what a lot of physics said. The non-locality issue in physics to me is extremely important. And thought forms are real and have real physical consequences. I felt that way from a kid. I was looking at my cat thinking, I know my cat doesn't think in English. But what are the decision making processes? Watching detailed behaviors or animals and my dog and so forth. But they would make decisions. My dog would want to go out to go to the bathroom, but when he saw the rain—so I left the door open so he's going back and forth, trying to make up his mind. Geez, that rain looks pretty wet, and I need to go. [He was a husky and german shepard mix.]

Preisler: (laughs) Yep.

Rauscher: Now normally I'd just push him out. But I didn't. and I think I waited five minutes, and he didn't make up his mind in that five minutes. So I pushed him out and shut the door.

Preisler: You made it for him.

Rauscher: Well I made up his mind for him, so I'm the greater god. But I mean, what the heck, the guy's trying to make a hard decision there.

I feel another whole area is the educational system, which I think is completely failing. I think I've mentioned that before. I feel like if you don't allow the creativity and passion, if you kill the passion in the children to learn, the innate desire, by being so regimented and with so many kids in each class, and "shut up and listen," then you're going to lose that [creativity and self awareness] for a whole society as a whole.

Preisler: Yeah. Yeah.

Rauscher: But the controllers believe it's dangerous to have people think. But every society that isn't growing is decaying. Because you really are not going to make a perfect stable environment. It's never stable. It's either sattva, rajas and tamas, growth, maintaining or decay in Hinduism. And either a thing is growing and getting stronger, or it's decaying. It can be doing sometimes both at the same time. But there's no completely stable in between.

And I predicted the wars over oil. I did not predict a water problem in high school. But it's worse than I imagined, although I knew we needed new energy. We needed a new way of doing it. But I even decided before I got my master's in nuclear engineering, back in high school, that I felt that nuclear reactors were not the answer because of the waste [problem]. I hadn't studied the reactor accidents at that time, so I didn't really know much about them until I was in grad school at Berkeley. But we have to find an answer because our civilization is so thinly a façade that really depends on all these things [energy, water, etc.]. And then you have these young kids that think well, I'll get a bicycle and ride out of town when the end comes. However, there's a little problem with that. How are you going to, if you've got all the camp food, who's going to stay awake to take care of the hordes. (Preisler laughs) It's probably better to look for a positive solution.

Preisler: Right.

Rauscher: And I think there's a great opportunity, that we're on a unique frontier. There was a situation in the '60s when it was sort of coming together to be more environmentally involved with the life-giving substance of the world and new ways of thinking. But somehow it, in my view, was overtaken by drugs and personal desires. The vision didn't surface then. But it sort of had a way of surfacing in the '70s, which was the study of consciousness and its attributes. And how much we can make change? Our power for good. This one, I think, because everybody's expecting something. And they got all the stuff on history, too, it's negative, the end of the world, the Mayan calendar.

I actually met some Mayan elders and we got along great. I really respected this aborigine medicine man. I met some wonderful people all over the world. Gad, maybe that's really important to say, because it's important to realize what a diversity you can make friends with. I had diversity of animals and plants and diversity of life, involvement with the feeling of compassion for all life.

But data, we're on this expected frontier. And I have the data for 50 cases of where the heavy particle coronal solar ejections produce brainwave changes. It's called the, I actually, solar coronal injections drive us into alpha [brain waves]. If we can realize that state, maybe

we'll come up with some creative ideas to become in harmony with nature and all of reality and God's creation. So I'm really hoping that this is an opportunity [of 2012].

And actually I feel optimistic. Not extremely optimistic, because I see a lot of blots on the horizon of truth. (laughs)

Preisler: Right, right.

Rauscher: Against truth. So it's going to, you know, expectancy is part of thinking about change and a new way of doing things.

Preisler: Right, right, yeah, yeah. I mean, there's always that concern that if the changes come, are the changes going to be beneficial or—

Rauscher: Let's put it this way. Sometimes change is really uncomfortable. But it might work out for the best.

Preisler: Yeah, yeah.

Rauscher: Because sort of you're moving against the complacency. The desire to have the certainty of uniformity. But if you really realize there is no certainty at a level, you don't have to address it every day. But that's the case. I think if, I'm hoping there will be a creative, positive explosion.

Preisler: I think as the world, we get more inter-connected and we get exposed to different parts of the world, different ideas and thoughts, it's got to help stimulate—

Rauscher: I think going to the [different] countries, but I think that in a way it allows many more people to have that experience with the internet. And the internet is playing a very big role in a lot of things now. That I think that that's something in the '70s that wasn't thought of. But that, that role of communication.

Preisler: Yes.

Rauscher: And even the idea of Facebook, the inter-connection with people that you would probably never get in touch with from your past. And how that's going to play out as a societal process. It's very interesting.

Preisler: Yeah. I think like what ended up happening I think in Libya where they were using Facebook to broadcast to the world things that were happening that you would not otherwise have seen—

- Rauscher: Oh, yeah. That was true with the whole Arab spring, summer, fall and winter and spring. Because that ability to connect and get things out that were atrocities. I think that Facebook really and Mark Zuckerberg and gang, see, I think are worth what, 53 billion or something, I don't know. Anyway, he did a good turn for those people.
- Preisler: Yeah, yeah. I mean, there's the positive. I look at him and I'm going you shouldn't be making that much money off of some silly little thing. But at the same time, there's the positive.
- Rauscher: Yeah, it's kind of interesting. Yeah.
- Preisler: I'm not quite sure what I think of Facebook.
- Rauscher: I don't know what I think of it, either. I was talking to my son, because he's on Facebook. I've been invited to be part of this intellectual one [Linked In]. But I don't have time to get on that. I mean, it can really chew up your time. Computers can chew up your time really fast.
- Preisler: Yeah. I always think of Facebook as being some kind of strange voyeurism where you're looking into everybody's lives. But then they're putting it out there and they want you to.
- Rauscher: They do!
- Preisler: And so I'm like going well, wait a minute. Some things should be—
- Rauscher: It's definitely a social experiment. And it's interesting. Because if you compare that to the '40s, how many people really were talking, I will have to say, though, in the '50s, I noticed that when my relatives got together always, "How's the kids?" And they were all older folks. One of the main process was what I considered was very boring gossip. So I guess they were doing it then, but not to the degree.
- Preisler: Well, communication, I think, as a business historian, I've looked at communication from, you can go back to the nineteenth century when telegraph emerged and the postal service, that sort of thing. And that started the sort of thing where people could not communicate. And then when you look at the '70s, where what was going on with the groups that were sending out the newsletters and that sort of thing, they were just using the US mail. So there has been this continual increase in the last 130, 140 years—
- Rauscher: Really, yeah, amazing.

Preisler: More and more information is getting out there and is more accessible. And that's why when we talk about the future, I mean, I think that's the whole thing is just the amount of information that's out there and the accessibility of information. It's just accumulating and going faster and faster and faster.

Rauscher: Some people worry that if you can Google anything, or look it up on Wikipedia. But I will say that what I usually do is don't memorize, some stuff I don't memorize, but I know where I can find it. I know which book to look in. I even sort of remember close to what page it's on, like in the textbooks. So my library is part of my Googling, you know, from where I knew where detailed physics is. So I don't think that's bad. But what I think is you need to learn enough of the framework of how items fit together in school so you can use that information bank. And that's what I'm concerned with. Because I didn't think education was very good when I went through it. And I mean, at the grammar school level, I thought it sucked. The teachers weren't interested in teaching, and they didn't give a damn.

At the high school level, I went to a private high school, so they [the teachers cared more about teaching.] did. And in Berkeley, I learned a lot. But there was a lot of rote stuff. And it was harder then. You had to do two languages for a PhD in physics.

Preisler: Yeah, I had to do that for history.

Rauscher: And now, man, oh. That was one of the hardest things was learning German. Oh my God!

Preisler: (laughs) Well I almost didn't get my PhD because I could not pass that stupid French test. (laughs)

Rauscher: It was awful!

Preisler: I thought what does this have to do with—(laughs)

Rauscher: I know! But I saw some of it, getting rid of some of it okay, because it was ritualistic. And there were papers in German more than in French. And I will say, yeah, I learned enough French I could sort of understand what was being said at a conference in technical terms. But boy, that was my big barrier, was language. [I can translate some scientific German.]

Preisler: Yeah. I've always been fascinated with people who can speak two, three, four languages.

Rauscher: I don't know how they do it.

- Preisler: I'm totally in awe of that. Totally in awe.
- Rauscher: I am, too!
- Preisler: And that they can switch from one to—I'm just like—
- Rauscher: I have no idea. And I mean, my son was very good. He took, I think seven years of French. And when I went to Mexico with him, I just asked him to order my food. He could do Spanish. Man! He learned Japanese and spent a year as an exchange student over there, but I don't think he remembers any of it anymore.
- Preisler: Japanese and Chinese are two amazing languages.
- Rauscher: They're so different! He could even read the kanji. Oh my God, thank goodness, because we would get lost.
- Preisler: (laughs) So whenever people say that the Chinese are going to take over, I say not with their language. (laughs)
- Rauscher: It's very hard to do a Chinese typewriter.
- Preisler: Yeah.
- Rauscher: They all went to 1, 2, 3, or Arabic numerals. And I tried doing algebra with Roman numerals and it didn't work. I couldn't figure it out. I thought that was interesting. That just the different terminology made it possible to do algebra. But it wouldn't work in Roman numerals. I tried it several different times in my life.
- Preisler: Yeah. That's the whole thing is being able to devise the means to communicate, whether it be mathematics or language or anything. And you have to have it simple enough and flexible enough so that it, and I think that's one of the reasons that within the European world, printing a book and that sort of thing, because they simplify the alphabet down enough so that you could actually do typesetting and do something like that. So the communication could happen. Whereas you look at—
- Rauscher: Yeah, if you have a finite collection of alphabetic letters so you get to repeat. And that's really the importance, because of course I guess I don't know, probably at least 100,000 Chinese symbols. And then of course it's katakana (kanji) and Hargana (kanji) in Japan, so there's actually two languages. one is a common language.
- Preisler: Yeah. That's why the—

[End Track 4A. Begin Track 4B.]

- Rauscher: --language like cuneiform and hieroglyphics would mold that ability to record and disseminate stuff through carvings in clay or on a palm leaf or, you know, it's, I was trying to think of, it's not only in stone and so forth, but the different forms of recording of language.
- And of course the Rosetta stone was such a key. [I saw it in the British museum.]
- Preisler: Yeah. That's one of the things that does amaze me is that the native people here in North America, most of them never created any kind of written language.
- Rauscher: Yeah, I was thinking of that. They didn't.
- Preisler: And so it's like, well, it's just an interesting phenomena because you ask yourself, why not? What was it that—
- Rauscher: What was the difference?
- Preisler: --would not stimulate them to create, because almost everywhere else in the world, people did get to the point of wanting to write down their thoughts.
- Rauscher: Well it has to do with like the native indigenous people in America did not build big monuments. But other places, they did.
- Preisler: Mm hmm. And they stamp the names and the stories of the great rulers.
- Rauscher: Yeah, they showed everybody who ruled. And because the tribes of the Indian nations were not unified, that may have been a factor. I don't know. And of course the codices for the Incas and the Aztecs and so forth were destroyed, which is too bad. Because it would be interesting to know more about what their stories were.
- Preisler: Right, right, yeah.
- Rauscher: But if you look at what's happening now, paper lasts for a fair amount of time. Papyrus seems to last really a long time. Copper's pretty good. Gold is really good, [but people tend to melt it down]. So now we've got digital formats and stuff gets lost so fast. It's interesting how, what does that really mean in terms of history and a future of people looking at historical—[floppies are no good; you need CD's and DVD's and then what next?]
- Preisler: Yeah, it's within—

- Rauscher: How it was copied down, like *The Iliad* and *The Odyssey*. And Socrates and Plato. I mean, how important that was to developing the Magna Carta and the constitution of the United States and developing a democracy as an idea. But I don't know what's going to happen. Because I know that from my experience with storing digital data, it didn't last very long.
- Preisler: Yeah. There's a real issue with it. But in the archival community, we're facing that because things aren't being generated. If you just look at the office of the president of the United States, you know, people would go, if you wanted to go to Dwight Eisenhower's, you know, look at his presidential papers, it's all papers. If you want to look at Barack Obama's presidential papers in the future, it's not going to be papers. It's going to be some type of storage disk. I mean, there's going to be some papers—
- Rauscher: Well, maybe he ought to print it out.
- Preisler: (laughs) Yeah. Well, that was one of the things that was very interesting during the Bush administration. There is a the National Archives records administrator. He's under mandate from Congress that he has to archive the stuff from the president of the United States. So he was going to go over there and he was telling Dick Cheney be as vice president, he wasn't archiving his stuff. So the national archivist went to Dick Cheney's office and said, "You know, there's a law that says as part of the office of the president of the United States, you are supposed to archive your material."
- And then Dick Cheney came back and said, "No, actually, I'm speaker of the senate." (Rauscher laughs) And so I'm not part of the president's office. So I don't have to archive my stuff.
- Rauscher: How interesting!
- Preisler: And there was a constitutional crisis over this sort of thing. Did the vice president's office fall under the presidency? Or does it fall under his realm as the head of the senate?
- Rauscher: Yeah, I know, and you think about this. If he could potentially be president, then his venue of being vice president, he's collecting information that might be very valuable for achieving that. But that's lost.
- Preisler: But that's the way you can twist this thing around. But at the same time, I was watching a show the other night on ancient Egypt. And they were talking about one of the pharaohs that you know, he was the one that started the religion with just the one god and the whole thing.

- Rauscher: Oh, that's Pharaoh Akenaten, [about 2640 B.C.], yes, the sun god.
- Preisler: But when they didn't like him, what they did—
- Rauscher: They scratched it all out! They erased him! And you know why? He threw out the priesthood. And they didn't like that. They got pissed.
- Preisler: Yeah.
- Rauscher: And they said, we don't want this monotheistic religion. We're going to kick him out and scrape his picture off the face of everything we can find.
- Preisler: So you can have a situation where you can lose, like a library can burn down. But you could also, in ancient times, even if it's written on stones, you can [unclear]
- Rauscher: I know [the Library of Alexandria]. And then those two Buddhas that they destroyed, that was sad.
- Preisler: Oh, yeah, yeah. I mean, it's just amazing how information, it's there and sometimes you think well, this is pretty permanent. If you put something, carve it in stone, it should be very permanent. But you know, nothing—(laughs)
- Rauscher: No, and there was some woman pharaoh that taped on a beard, and they tried to write her out, but there's still some information on her.
- Preisler: Yeah, yeah.
- Rauscher: but there was one object of Akenaten, a little statue about that [five inches] high. It looked like it was silver, but I'm not sure what it was made of. But it was in the Tutankhamen display. But actually it was Akenaten, they didn't know that. But I studied enough Egyptology to know it was mislabeled.
- Preisler: Oh, okay. (laughs)
- Rauscher: So even the best guys, but it's, the recorded history, how fascinating, how totally fascinating. And what role it really plays in doing your job as a living being on this planet.
- Preisler: Yeah. Your history makes up a big part, your language and your history makes up a big part of the culture that you live in, you know. And it really helps to set parameters. And the language in particular is a key part of developing any culture. Because how do you express your culture but through your language?

Rauscher: I mean, you think about how different French is from German. I mean, German poetry was an oxymoron to me.

Preisler: (laughs) It can't possibly be—

Rauscher: French poetry was fine. (laughs)

Preisler: But you can't possibly have something written in German that could be poetic.

Rauscher: Of course people were getting after me for that one. They'll string me up alive. Let's see. Well, I think the important thing is evaluating myself and a life well lived. Really try my hardest. And now I'm on the next phase. I've got immediate things to get done. And then the long-term goals, still setting those. I feel very fortunate. I feel I had a really, really bad childhood. A very bad one. Really rough. But I feel like I've gained great opportunities and meeting wonderful people all over the planet. Visiting magic places. And had the opportunity to try to make the world a better place. And in some cases, I probably succeeded.

Preisler: Mm hmm. Mm hmm. I think it's fascinating, because you've been able to live a life where you had constant intellectual stimulation. You've always been striving for new knowledge and new things. And moving in a forward, you know, you never seemed to be satisfied with just sitting there and letting the world go by. Engaging in it at every turn.

Rauscher: The last couple of days, though. But now I've got to get my derriere in gear and go for it [more knowledge to gain and create].

Preisler: (laughs) Well this has been a fascinating discussion. And I think it will be valuable for generations to come.

Rauscher: Oh, thank you so much. Thank you a great deal.

[End of interview]