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Interviews of the Margaret MacVicar Memorial AMITA Oral History Project

Cecily Selby

(interviewed by Jean Choi)

Dr Cecily Selby:

Choi: I'm here with Dr. Cecily Selby, and if you'd like to start by talking about your childhood, where you were born perhaps?

Selby: Well it's Cecily Cannan Selby because I was Cecily Cannan at MIT. I was born in 1927 in London, England to parents who had met at the University of London. They had met when my mother was playing Cecily in a school production of, "the Importance of Being Earnest." That's why I'm called Cecily. My father went off and spent four years in the trenches during the First World War. When he finished and finished his Chemistry degrees in the University of London, he was offered a position as head of Chemistry at the New York University Medical School. That's how we immigrated to this country.

Choi: How old were you?

Selby: When I was three.

Choi: Did you go back often to London?

Selby: Oh yes, we went back every three years. I went back there to school when I was eleven—boarding school.

Choi: How did that happen? Your parents just decided?

Selby: Yes, my mother was always homesick.

Choi: So your whole family moved back?

Selby: No, I went back. I was in boarding school alone. I was an only child.

Choi: Did you want to go to boarding school in London?

Selby: Yes.

Choi: You were very independent at a young age.

Selby: (Laughs) Yes, I guess so. And it was very boring at home because we had no relatives in this country, and I had no siblings and a very serious professorial father. So, I enjoyed—I don't remember not wanting to go. I was excited about the adventure. And I liked all my English relatives. They were all very nice, so I knew that they would be there.

Choi: Your parents remained here?

Selby: They remained here, and then the war came. So I left England on the last trip of the Aquitania, a very famous all Cunard boat. It was the last trip the Aquitania took before it became a troop ship. I travelled alone at the age of 12, having a lovely time on the boat because I could eat whatever I wanted, and I never got seasick. I have a lovely picture of me with all the women teachers I was seated with, travelling alone. My plate is just full of food! The school I was sent to in England was a very famous school because it turned into the headquarters of the American Eighth Air Force in the Second World War. We had beautiful grounds, lots of cricket pitches and lots of tennis courts; it was kind of the girls' Eden, but much nicer because it was in the country. I have met over the years one or two men who were stationed there during the war. They have a great love for the place because by our beds in our dormitory there was a button. It said, "If in distress in the middle of the night call the mistress." (Laughs) Oh, the men loved that. So I landed back in America at the age of 12, and

my mother took me around to the different private independent schools. She, luckily for me, picked another famous school but a very progressive school. Do you know what that means? 1939 progressive—student centered, not old fashioned, dictatorial, hierarchical, very much encouraging independent work, encouraging discussion with the teacher.

Choi: Wow, what was this school called?

Selby: The Dalton School. Still exists but it was the beginning of its wonderful career then. It was a nursery school, and we took care of babies for two weeks as ninth graders. I was given independent courses in math etc. Then I asked to go back to boarding school because again it was very dull and quiet at home, and I missed friends. So I went to Toronto for boarding school.

Choi: How did you choose Canada?

Selby: Boarding school in Canada was the same price as day school in New York. We were living on professorial salary, so that was the fact. Besides which it was the British Empire. So I had three years in Toronto boarding school. I would take the train from New York from ages 13, 14, 15 alone.

Choi: How long did the trip take?

Selby: 12 hours on the train, and full of service men. I was in Canada before Pearl Harbor, when Canada was at war but the States weren't.

Choi: What was that like?

Selby: Well, I lived for the war. I was an adolescent, but we thought about and dreamt about the war. My roommate and I had a bulletin board—we are still very good friends—I see her all the time when I'm in England. But we put every morning, we would look in the paper and see how many of our aircraft were down, how many soldiers were killed and that sort of thing. By then I was two years younger than everybody in school in my class. So I finished in Canada; I took what was called, "Canadian Senior Matriculation." At Harvard, that qualified me for the sophomore year.

Choi: What were the courses you were taking?

Selby: There, it was very traditional school. We had national exams throughout, like Advanced Placement. It was called, "Senior Matriculation" British, Canadian exams. Junior Matriculation was what you needed for McGill. But to get into Toronto University you had to have the senior ones. I took the senior one, and so there I was at 16 and placed into Harvard as a sophomore. When we were at Queens, Mother had had me skipped in public school, which people did then.

Choi: Because you were smarter than the others?

Selby: Well, apparently, I don't remember anything but, you see when I came from England at 12 I was put in the ninth grade at Dalton.

Choi: Already you were a little younger.

Selby: Two years younger (laughs). I had been always two years younger. I finished Harvard-Radcliffe at 19.

Choi: What was that like?

Selby: Well, it was lovely. I was very happy. I was very excited because I majored in Physics.

Choi: So you did Physics at Radcliffe.

Selby: Yes, well when I went to Radcliffe it was wartime. And Harvard had lost most of its students because the men were away. Radcliffe up until then had had Harvard professors who came to Radcliffe. But after the war, they needed students, so they were happy to have the girls. And they also had a lot of army and navy men, particularly in my science and math courses. So I was having a very nice time. No lack of dates! At Wellesley there was a great lack of dates whereas at Radcliffe we had all these men at Harvard!

Choi: So you had a fun social life! What did you do for fun?

Selby: Yes! Well, what did we do for fun? The Boston Symphony was normal. There were dances at the Copley, waltz parties. Nobody had cars of course. There were parties at the Harvard houses.

Choi: Did you live on campus? Did they have housing for women?

Selby: Yes, we had dormitories. Radcliffe had, right across Harvard Square from Harvard is the Radcliffe yard. Harvard calls it a yard, the campus. So the Radcliffe yard was a lovely building surrounding a lovely square. We would bike. The dormitories were further down the street; they were big buildings. There were 140 in my class at graduation. But my class was the first 200 to begin with, I have no idea, roughly. But ours was the first

to have our degrees signed by the President of Radcliffe and the President of Harvard.

Choi: Why is that?

Selby: Because that was the beginning of the merger because of the wartime arrangement. We had three semesters a year to enable the boys to graduate in three years. So I started in math, I didn't know what to do. (Laughs) I remember a famous math professor, Garrett Burkoff, the son of a famous mathematician. He put his sandal shoes up on his desk, when this little 16 year-old walked in. And he said—well we had these tutorials at Harvard—if you were in math, you had a tutor like at math Oxford and Cambridge. And you met with your tutor once in awhile. But he put his feet up on the desk and looked up at me and said, "Well, I guess we'll study the lives of famous mathematicians." (Laughs) And even at 16 I knew it was a put down. I wanted to do math! But he gave me a key to this special library for math. I felt that was pretty good stuff. My very first boyfriend was at Harvard then. I used to go to Physics classes with his roommate and him. So, I got to know the boys in Physics. So I switched to Physics. I was very happy.

Choi: It wasn't just because of your boyfriend (laughs)?

Selby: (Laughs) We used to call ourselves the Three Musketeers. And we are still friends. Actually, Alex Rich, who was chair of the Biology department at MIT for awhile, maybe in the 1980s, but you can find out, he was the roommate of my first boyfriend. Alex, Eddie and I would go to Physics

together. That romance faded away, but I got introduced to Physics through Philosophy because at my school in Canada, my science prize on graduation was a gift of a book called, "Physics and Philosophy." It was a beautiful book; I still have it. I loved the philosophy. After three years there I decided that—you see I was there at the end of the war. The nuclear physicists were starting to come back from Los Alamos, the place where all the nuclear physics was going on. So, I decided that I was not going to study just a piece of a nucleus, and I knew that particularly when they all came back from Los Alamos that it would be very competitive and focused in. So I didn't quite know what to do. I played around with—I also minored in Government. I got to be president of the Radcliffe League of Democracy. So I was thinking because my father was in science policy and governmental work, as he was very much a mentor intellectually at that point. So I played around with different things to do, and this is a good story. I went down to Washington thinking I have done all this damn studying, and I'm younger than everybody; all I've done for years is study! Maybe I would just like to play, maybe I should just have a job and discover Washington and social life and whatever. So, my father was head of a medical research at the National Research Council at the National Academy of Sciences then. So I went down to Washington to interview with various places. I discovered that a little AB in Physics, there were really not any jobs that would be not more than clerical. I couldn't type, and I was definitely looked at as too young as I was 19. So,

I came back to the Academy at my father's office. They were showing a film that had not been seen in the States before, that came out of Germany post-war. German microscopy had always been superb. And this was a film of a living biological cell dividing, the first vision of an actual dividing cell where you could see the spindle. It knocked my socks off. And I knew nothing of Biology. I had never taken a Biology course in college or school. I had never thought of cells. I just thought, wow. I thought it seriously. And I thought, Gee! I had thought Biology was just about classifying animals. I knew nothing about it. Then my father told me about Frank Schmidt's department at MIT which was in 1946. It was the first department in the country, created to use new technologies coming out of the war to look at biological material. Electron microscopes, x-ray diffraction, spectroscopes, things like that. He described it to me. We had a summer hold in Woods Hole.

Choi: I've been there! My friend had a summer home.

Selby: Oh, that's the biggest part of my life. I spent all my summers there. I still have a home there. So there I was in Woods Hole having a lovely time with the boys coming back from the service, acting in plays, playing tennis, etc. But I took the train up to MIT to interview at the MIT Biology department. Remember I had had no Biology in high school, none in college. But I had a lot of math and physics, so I guess they took me very quickly (laughs).

Choi: Even though you had no biology experience? That's wonderful.

Selby: Well they had one professor in x-ray diffraction for which you need some math and physics. That's how I got to MIT!

Choi: Is that the only place you applied?

Selby: For graduate school, yes.

Choi: So you really wanted to go?

Selby: I don't know, it was an option. I really wanted to go to Oxford or Cambridge. My father felt it would be difficult to get. It was right after the war I couldn't get any funding or a fellowship. I have the records that I wanted to go back to England, but when a new boyfriend was just coming back, the brother of a friend that I met at commencement, he was coming to law school. So I knew that it would be a friendly place.

Choi: Locally, he was coming to law school?

Selby: At Harvard. I was in comfortable in Cambridge. I knew the life. One of the things I've written is that in those days the biology department was small. It was in the main building right under the dome. There's a lovely double staircase leading from the second to the third floor. I must have been very happy there because when I came down that staircase I felt good, I was happy. And I've written this. I've said it was like the head of the department and somebody called Irwin Sizer cultivated a lovely climate. I don't know how many graduate students, maybe 10, 20, no more than that, maybe just 10—there was another woman.

Choi: I was going to ask if there were any other women.

Selby: Yes, she didn't stay. And there was one woman professor called Marie Jakus. I'm not sure that she was a professor but she was there. Because electron microscopes were the big deal then. The head of the department was world famous in his use of that. I should research...when I'm in Woodshole this summer, I'd like to go to archives to research Marie Jakus.

Choi: Do you know that we have the 150th anniversary coming up?

Selby: Oh yes, and I've been invited to be on an AMITA panel.

Choi: If you come you should let me know because I live in Brookline!

Selby: Oh you do? I'd like to, you could show me around the archives.

Choi: We can go to the archives together!

Selby: I've tried to find out about graduation, and I thought it would be so easy to know how many graduate women of class of 1950 there were, and nobody seemed to know. They sent me a newspaper article. It's a picture of seven women graduate students including me, but they didn't say that that was all of us. Oh, I'd like to do that very much.

Choi: I would be very happy! And you can also meet my boss who is actually putting together this whole project.

Selby: Well, Bonnie Keller, what is her job now? She emailed me with what I do have, the copy of the newspaper for that commencement. Irwin Sizer would invite us into his lab for lunch. And if somebody had a job or got a baby or something, there would be champagne, a taste of it in a little beaker. So I felt at home, you see.

Choi: So they were kind to you? They didn't discriminate against you at all for being a woman?

Selby: Very kind! No! I don't have any memories of any discrimination at Harvard or at MIT. Except for that, what the math professor said. It may be that I was too young to notice. It may have been that I was too happy to be doing what the boys were doing. I was the only daughter of a distinguished scientist father. I wanted to do what the boys were doing not what my mother was doing.

Choi: Did your parents encourage you?

Selby: Well, they didn't discourage me. Nobody ever said, well you're doing the most wonderful job in the world (laughs). They were very reserved and English.

Choi: Were they very outwardly proud of you? Because you achieved a lot at a young age.

Selby: Yes. The answer is that it wouldn't be our style coming from an old time English family. You don't boast. When I went to boarding school in England, an older girl asked me if I knew what the word "bumptious" meant. I wasn't going to tell her that I didn't. So of course I said yes. And the big rule was not to be bumptious. You don't show off. My mother I think in graduate school, when her best friend had a grandchild, I remember her trying to say very defensively, "Well it only takes nine months to make a baby, and it take four years—actually I took only three—to do a PhD!" So, I was certainly encouraged to work hard.

Choi: Because some women at that time were told to get married and have children very young, but your parents seemed to—

Selby: That wouldn't have been our culture. Don't forget it was war time. Very different.

Choi: I certainly cannot imagine it because, well, we are in a war now, but not one that affects the population as visibly as—

Selby: Yes, well all the boys were gone, all the healthy boys my age would be in the service. A couple of friends, like Alex Rich, who became head of biology, he was at Harvard in Physics, but he told me his story. He was recruited from the Bronx High School of Science to Harvard. Then you get someone who's good at math, and then they get into the navy. But then the navy would put them into science and engineering training, so I think that's what happened to Alex.

Choi: Would you like some more tea?

Selby: Yes, please, this is my favorite tea, lapsang souchong.

Choi: Really, my sister's friend gave her some.

Selby: It's smoky. My stories about MIT, you see, it was terribly new, thanks to Frank Schmidt starting that department. That's what I love about MIT, they can start new things. Frank Schmidt started the department for the physical, called "Physical Biology," the first in the country. 25 years later when I was invited to be on the Corporation with Jerry Wisner, Jerry Wisner started the media labs, he started STS. You can't do that at a Harvard or Yale. They are dominated by departments. So it was the

creativity of their thinking, and so everything we did in that MIT department, it was golden! Everything you looked at, well later I went into Electron Microscopy. When I'd left and was working at Sloan Kettering, everything we looked at under the microscope nobody had ever seen before. And when I was looking at x-ray diffraction of muscle fibers we were looking for something that nobody had ever looked before. We had these new tools, and now they're used many places, not so much x-ray diffraction. Everything was new, enabling us to see or observe stuff that had never been observed before.

Choi: That must have been very exciting. Can you describe what exactly you studied?

Selby: (Laughs) I studied the molecular structure of the adductor muscle of the clam. So I knew more about, like a scallop. You get a small clam and there's a small scallop holding the shell together. So when I was 20, I knew more about that particular muscle than anyone in the world except my professor, right?

Choi: How did you come to study that?

Selby: That was all his work. This was three years before Crick and Watson.

Choi: Wow!

Selby: My pictures look very much like Rosalind Franklin's pictures. Slightly different because they were different specimens, but the same thing. The same kind of thing. What Rosalind Franklin did I was doing three and

four years earlier in Cambridge, MA, whilst they were in Cambridge, England.

Choi: That's incredible.

Selby: Exciting! I was invited to discuss the play about Rosalind Franklin recently in New York. And I took my picture with me to show. It's just like photographs 51 to a lay person. A little detail different. And it was a scream, the audience had a laugh because here was a woman who 60 years ago had been doing the same stuff, and they thought it was just so cute (laughs). Some white-haired lady with a photograph.

Choi: So while you were doing your work it was very interesting?

Selby: They published in 1953, while my professor and I published in Nature magazine in 1951 of a different protein, muscle protein, not DNA. It wasn't as fine a picture because the muscle in the clam had many more impurities around it so it fuzzed up the picture. Whereas Rosalind Franklin's fiber was beautiful. The picture is much sparkling clearer and more information. So they got more information out of it. If I had gone to Cambridge instead of MIT, I would have been there in this particular lab, the Cavendish lab, when Crick and Watson arrived!

Choi: Really?

Selby: (Laughs) There were quite a few senior women in crystallography, the study of crystals of a sugar lets say would be crystal. During the war, the structure of penicillin was done through x-ray diffraction but a slightly different technique because the distances were smaller between a sugar

whereas in muscles and DNA you're looking at bigger structures. My professor and Bragg at Cambridge, not Crick and Watson, they failed to look at bigger things than crystals.

Choi: You were working with all these very high-level biology, x-ray diffraction things and everything, were you at all intimidated?

Selby: Now you know I spent most of my last 20, 30 years in education. Think of this a real fable that you have to learn this then that and that. Frankly, you learn when you need the information. At MIT I took histology, which is the study of structure of cells in tissues. I took embryology, which is wonderful, the growth of embryos. I took enzymology, that's more physical chemistry. I didn't learn anything about plants. I was interested in comparative anatomy, that's when you talk about how the heart developed from salamander to human, something like that. When you're an adult you can learn very quickly when the information is useful to you. So I don't know anything about classification, like I couldn't give you the name of the kingdoms and all that.

Choi: That's okay (laughs).

Selby: I learned the names of the bones of the body at Dalton School. I've never forgotten them. I've often in my work made a point of saying don't limit science education by thinking you have to have classify animals first and then learn all that then learn the structure of what we know about cells. In graduate school in using it, you can imagine how quickly you can figure out what's inside a cell. I didn't really learn much about what's

inside a cell until I was a postdoc. So you can keep learning all your life. If you're in science, you do!

Choi: That's encouraging.

Selby: Oh yes. A good scientist, I know men my age who when they get excited about something new, well I know a particular friend, an MIT professor, expert in her field, but she thought she'd like to know more about the brain! So she went to work and learned a bit more about the brain. As a very mature scientist working on something entirely different but wanting to find out if what's she's doing is applicable to neuroscience. You do that certainly in medicine.

Choi: Nowadays people think more in terms of you have to have these requirements.

Selby: I have a wonderful daughter-in-law who's now taking a three year residency in emergency medicine at the Jacobi Hospital in the Bronx. She's a blond blue-eyed girl from a small town in Maine, and there she is in the Bronx by choice, working with all kinds of people, all shapes and sizes. She has to know where all the muscles are. She has to know where the bones and nerves are. When someone says, "I've got a pain here, doctor where do I go?" She has to refer people, so she's got an awful lot of knowledge that she has to have. But it will get more and more.

Choi: Her residency, she's in her third year?

Selby: No, she's just starting.

Choi: My sister just started her residency in surgery and it's very difficult.

Selby: My granddaughter, her husband is now interviewing for residency in general surgery. Where is your sister?

Choi: In Albany Medical.

Selby: She's happy?

Choi: I don't think so yet.

Selby: They work so damn hard.

Choi: She's actually on call right now.

Selby: My Sarah was working 60, 80 hours a week all last year, no question.

Choi: It's very difficult but worth it.

Selby: No turning back, they love it! The two of them as a married couple they would scream, they just want to talk medicine.

Choi: Are they going to be at the same hospital?

Selby: Well, she was a little ahead of him so we'll see.

Choi: In March? Is that match day? He'll find out.

Selby: He's had some good interviews. I would like to go on record to say it was a real privilege to service the Corporation of MIT.

Choi: When did you do that?

Selby: During the 1970s.

Choi: How did that happen?

Selby: They were looking for women. I had moved from science and was managing a very large organization, so they found me. I was on a lot of boards then.

Choi: What did you do after? You did your PhD at MIT then...

Selby: I did a postdoc, it wasn't called postdoc then. I went to Sloan Kettering, to take a funny job. My mother wanted me to come home, and I was writing up my thesis at home to be a good girl. And daddy found me a part-time job so I could at least get out of the house at Sloan Kettering because he was a friend of the boss. I was really doing administrative work, and I discovered there was an electron microscope and no one was using it. I hadn't done that at MIT but I had learned enough, so I started using it. So for eight years I became a hot shot! I published a lot of papers.

Choi: How did you just pick it up? You seem to be very good at picking up new things.

Selby: Well, I was brought up to be independent. I've always been a risk taker. I seem to like thing I don't know anything about! I keep choosing things to do that I don't know anything about.

Choi: That's great though.

Selby: Then I went to Cornell Weill, taking pictures of cancer cells. The professor there, Don Forsyth, who then came to Harvard, said, "well look, if you want to learn more about the structure of cells, the best thing to do is teach it. Why don't you come to Cornell and be an instructor in histology for the medical students. Then you'll do research with me." So I did. By then I was married with three little boys within four years.

Choi: When did you meet your husband?

Selby: I met him at Sloan Kettering Memorial. He was a radiologist. We married in 1951. I got my degree in 1950. We had an apartment at Memorial because he was in the hospital and I was in the research area. They gave me time off to have babies and maternity leave and all of that because I was the only one there doing electron microscopy. And everything we looked at was new. I published on viruses. I published on skin, published on muscle—back to muscle. In those days it was right after the war still, so wonderful Scandinavian and Swiss women were coming as au pairs to see the country. So I had very nice help. Then I went to Cornell to be an instructor in histology. The funny thing there, I went to an ophthalmologist the other day. And he looked at my name and he said, “did you ever do any work in a hospital?” He remembered me! Of course I was the only instructor that was a female. I run into doctors in town who remembers my being the lady wandering around helping people with microscopes.

Choi: How long were you there for?

Selby: A couple of years. I published with Don Forsyth about heart muscles.

Choi: You were very independent and unique!

Selby: Then I left. By then my eldest was getting to be six. I knew I'd worked with such beautiful people. I knew I'd been totally spoiled. I worked at Rockefeller with the leaders, and I knew that to continue a career up the professorial ladder I had to stay quite obsessed like an artist, with the work.

Choi: Were you into it that much?

Selby: You have to, creatively. Particularly with the kind of work I did. I needed to wake up in the middle of the night and think about intercellular bridges. But what I really had to do was think about chicken pox and help my husband's career and entertain and whatnot for him. So I stayed home for a year.

Choi: Did he want you to stay at home?

Selby: I can't quite remember (laughs). He was nine years older. And I was very much in charge of the home and the children. He wasn't involved.

Choi: But you were also career-wise very successful at the time.

Selby: He did say, and I remember this. He was at the hospital, and he was proud of me. When I gave a talk at Memorial, he was in the back of the hall congratulating me. He said, "If you got the Nobel prize I wouldn't have to work so hard." There was no problem there!

Choi: So he was very supportive?

Selby: There's a difference between actively supportive and just accepting. He was proud and interested. It helped his career the fact that I was known. But I did leave and stayed home. That's when I moved into education. I've got a lot to say about science education. But that's all we could do sensibly do today. My last job was professor of science education at NYU.

Choi: Did you want to continue another day?

Selby: This is an awful long thing for you to transcribe!

Choi: Don't worry about me, if you want to say more that's completely fine. If you have other things you have to do, I can come back. I just want you to feel like you've said everything you'd like to!

Selby: Why don't we turn this off and relax a little.

Choi: We're actually looking at a book of your collected science papers. Are these all yours?

Selby: Yes. (Pointing at a photograph) You see this is the picture when you see in the book about Rosalind Franklin—doesn't that look like her picture [of the DNA helix].

Choi: (Reading underneath photograph) Richard A. Bayer and Dr. Cecily Cannan. Department of Biology, MIT. Wow!

Selby: What is that year?

Choi: This says 1951.

Selby: You see the Baldwin's (?) picture was published in 1953.

Choi: The last time we paused the tape we were up to the time that you were about 28 years old and you decided to leave.

Selby: Yes. I stayed home for a year to be with the children.

Choi: Was that a hard decision to make?

Selby: When you've got three children at home and a busy husband (laughs); we bought a little house.

Choi: Where?

Selby: On 87th Street. Everyday is just coping (laughs)!

Choi: Did you have a nanny?

Selby: Yes, I had good help. I don't remember it as hard.

Choi: It's just you did so much work.

Selby: I don't know how I wrote all those papers. That's what I really don't understand. Because that's a lot of writing, and footnotes!

Choi: You wrote all of this yourself?

Selby: Yes, you do in science.

Choi: (Reading another paper) "Human Epithelial Cells." Who is Ruth Berger?

Selby: She was a technician. We put technicians on the papers sometimes because they did such critical work.

Choi: So you also published in 1952.

Selby: That's the first electron micrograph of a cancer cell. Not that there's anything to be learned from it! Then a wonderful woman called Charlotte Friend, who died prematurely, she and I published a paper called, "Virus-like Particles." It's a long story, but she eventually identified what we saw in her cells as a virus, and it was known after her. That's one of the papers there.

Choi: This is at Sloan Kettering?

Selby: Yes, that was Sloan Kettering.

Choi: You published a lot.

Selby: (Laughs) Yes!

Choi: Oh my goodness. Did you teach other people at Sloan Kettering on how to use the--

Selby: No, we had a lot of wonderful visitors that came, but we didn't have any other students. We had visitors from Europe.

Choi: After you left, you took a year off then...

Selby: Then I taught science. A neighbor was a very well-known New York educator. She was president of a school and then became president of Barnard College. She said, "Why don't you look into the independent schools? That's the only work you could have where you can have the same hours as your children." By then I was home alone with two boys in nursery school. I would be pregnant with one and carrying the others up and down the stairs (laughs). Then I got a call from Radcliffe saying there's a little independent school here that wants a science teacher.

Choi: At Radcliffe?

Selby: No, in New York. You could do all the science teaching in the morning and have all afternoon to be with the children. So I went and interviewed, and it was a small school with 20 girls in each high school class. So I taught earth science, biology, chemistry, physics (laughs) in the morning. Then I went and picked up the boys from nursery school. And I could pay for an extra helper. I took that job to pay for extra help at home. Then they asked me after a year of that, they asked me to be the head of the school. So then I ran the school all the years my boys were in school.

Choi: Oh my goodness, how large was the school?

Selby: Very small. 12 grades of 20 kids. See what I mean about doing things I know nothing about!

Choi: How was running the school? How did you do it?

Selby: Well, I learned a lot! It was the perfect life if you wanted to be busy professionally, keep learning, because my sons and I went to school together, their school was five blocks away. I could go to every spelling bee, every little play, and they could have birthday parties in my gym, and I could use the school's station wagon in the summer. My eldest son, I asked him during those years, "How do you feel about a mother who's working?" He said, "Oh mom it's great we use your library, we use your this and that..." So that's how I became an educator. Then, after 13 years there, I turned it into a very, very creative, interesting school. As I said, with the boys, they would pick me up from school, and it didn't feel—that's how my generation of women and your generation of women differ. The women that take jobs in companies where there's a hierarchical structure, even in law offices, I felt so sorry for that type of tension that exists all the time. I could arrange my life. If one or two of the boys were sick, I'd go home for lunch. I could arrange my life around their schedules, have summers with them, have Christmas vacation. But then when they got to college, then I got a phone call asking if I'd like to be nominated to be national executive director for the Girl Scouts.

Choi: How did that happen?

Selby: Search companies in New York get to know you. I was president of an independent school association by then and on committees. So my eldest son was home from Yale that night, and I remember in the kitchen I said, "You know a funny thing happened today. I got this call from a search agency asking if I'd like to be considered for the national executive director of the Girl Scouts." He said, "What did you say?" And Norman, my eldest son looked at me and said, "Ma, If you believe all that stuff you say about socioeconomic issues, that's where you should be. That's middle America. That's where the action is."

Choi: What was it that you believed in?

Selby: Well, I obviously was talking worried about poverty and education— socioeconomic issues. Private schools are full of the elite, and apparently I wasn't talking so much about getting people into Harvard, although I did. Apparently that's what he said I was talking about at home. So I called them up the next day, and I took the job!

Choi: Did you have to give up your other job?

Selby: I moved from a staff of about 50 to a staff of about 7,000 (laughs).

Choi: Oh my goodness.

Selby: Across the country, all the various Girls Scout offices and counsels and things.

Choi: Was there a transition point where someone provided training, etc.?

Selby: No (laughs). I was brought up in the idea that if you studied the adductor muscle of the clam you learned certain principles of investigation that

are applicable to all kinds of inquiry. If you run a place of 50 people, you're learning principles that are applicable to 7,000.

Choi: Well, you also do great in the face of a challenge. Others might be afraid, but you have done great.

Selby: You asked about my parents, I was certainly given confidence. Nobody said, you can't do this. If you want to do it, you can do it. The point of that job was that this was the 1970s now. This is when all corporate boards were looking for women. It was the beginning of the Women's Movement. There was a great push for corporate boards to have women. And at MIT to have corporation members, that's when I was found and asked very quickly because I had that job that was managing a budget, and I had a staff. I believe for boards you need experience with management and bottom line accountability.

Choi: For management, did you glean information from when you were the head of the school?

Selby: Yes. I preach too when I write, it's not coincidental that at that time there were other women biologists. A friend of mine, a biologist, came out of Biology, then deaning, then president of a university in California. Look at the woman who is a president at Princeton now, a biologist. When I joined the Girl Scouts, it was the sort of fashion on management by objectives. It was the beginning of all the management consulting kind of stuff. If you do laboratory work at the bench, you're managing by objectives. I want to get this piece of muscle into this and then into that

machine, what do I have to do to get it there? So, I think I make a great case that the scientific education is superb for I can't imagine if I were a classicist or writer, I couldn't have done it. Writers have no experience in managing anything. Lawyers don't either. They aren't good managers. But science, if you're running an ER yes, but if you're just a surgeon, not really, but if you're head of the department, yes.

Choi: It's interesting.

Selby: Scientific investigation is management, particularly now. And you know from MIT, the labs with 20 postdocs and 20 technicians, that's management! You could manage anything if you have that experience!

Choi: There has been a shift because there has been an issue with my generation where there were a lot of students who were coming out as engineers, able to run labs.

Selby: Certainly engineers can manage.

Choi: But there sometimes was a ceiling that our administration was concerned about because people did not have good communication skills. They found that a lot of people get to the management level but couldn't move further because, well for you, you are very well-spoken and you also went to Radcliffe.

Selby: Boarding school could be good for interpersonal relationships!

Choi: There were a lot of students who couldn't hold conversations well, all they really did was study during their undergraduate years.

Selby: Where did you go to school before MIT?

Choi: I went to the Winsor School, a private school.

Selby: You see, I was a headmistress so I knew the headmistress at Winsor in my day! That's the boot I got into for 13 years. I learned a lot from them, some very good, some very distinguished people. And the camaraderie of the women mistresses—I became president of the headmistress association. That's how I knew the headmistress at Winsor. Those are the healthy years. I can't say I missed science because every day I had problems to solve.

Choi: You liked to be busy.

Selby: My late husband was retired, and he had been a college professor and a scientist. I could feel he was edgy, retired, and I said, "What do you miss?" He said, "People bringing their problems to me." I think that makes us feel that we have to get up in the morning because somebody needs you. Whereas a writer gets up because they have something to write about. That's how I was just running the Girl Scouts for a year, and I was invited to be a director of RCA, of Avon products, and two smaller boards. Then that's about after that, that's about when MIT came to me.

Choi: Did you feel overwhelmed?

Selby: (Laughs) I do feel overwhelmed sometimes but I can't remember if I did at the time. I have a picture of the MIT board that I want to show you.

Choi: What is this?

Selby: This is an adorable picture (laughs) I'm the one in the blue dress over here somewhere.

Choi: You are so beautiful! That's so wonderful. This is a picture of your class?

Selby: No, that's the corporation of MIT.

Choi: There's four women here.

Selby: Let's see was this Jerry Wisner. Wonderful Delsom, and Paul. I was so delighted to know them. I was just so honored and happy to be with these terrific people.

Choi: What was it like serving on the board?

Selby: Excellent meetings, and I was asked to chair the humanities committee meeting.

Choi: When you would chair the humanities meetings what kinds of things did you discuss?

Selby: What I do remember was that there was a problem with the writing program. This was after I had run a school for 13 years, so you get a lot of experience dealing with people's problems. Then I stayed on the boards. I left the Girl Scouts. I was proud in what I was able to do in management, but I wasn't good at working with volunteers. I'm so used to being a professional. And for some reason I really was missing science. So I got back to science.

Choi: How?

Selby: By taking a job. I also divorced my first husband around then and remembered my father in Washington. They were searching for someone to head an organization called, "Americans for Energy Independence." That meant nuclear energy. They somehow found me

and said, "You know something, and you're not afraid talking about physics and nuclear energy and squeaky clean politically." As someone who had been head of the Girl Scouts I sounded politically clean. So I did go to Washington and headed this. I believed in conservation, coal and nuclear. It was quite political, and I realized that really wasn't for me. So, I left after a year.

Choi: What was your position exactly?

Selby: President of Americans for Energy Independence. I think that's how I got back into schooling and education because then I came up to Cambridge, and a husband of a dear college Radcliffe classmate was then dean of Harvard School of Education. He thought of me as a physicist. This was long ago. He said, "They're starting a school for gifted kids in North Carolina, a state-run school for gifted kids in math and science." He had me meet Wassily Leontief, a Nobel Laureate in economics, and there were very good people interested in this adventure. So I went down to North Carolina and became the consultant. I set up the curriculum, hired the teachers. That was a wonderful year because you start a new school and you can use everything you've ever learned. It was fabulous. It is still fabulous. It was a tuition-free boarding school for boys and Girls, gifted kids in math, science, and technology.

Choi: What's the name?

Selby: The North Carolina School of Science and Math. I had one year where I was the dean, and it was a very rich year of wonderful experiences and good to get me out of New York City because by then I was divorced.

Choi: Did you like North Carolina?

Selby: Oh, they were lovely people. By then I also was a member of the New York Women's Forum. So I could immediately meet women there, women in interesting positions there. That's when I met my second husband! That was the love of my life. So he came down there and we married in 1981. That's 30 years after the first marriage, and I came back to New York. He said, "Why don't you become a professor?" Because he was retiring, "if you're a professor you can take all the vacations, and we can take trips together and it will be easy." By then the president of NYU was on the RCA board with me. So, I was made an instant professor (laughs) of science education.

Choi: I should look at your resume! You must have such an interesting one!
Well, yes you do, this is a very full resume.

Selby: For the last 25 years that's what I have been doing. This is the thing I'd like to give you, because this was my swan song for science education.
And that's a big subject.

Choi: What are you a professor in?

Selby: I was professor of science education, and that meant teaching New York City public school teachers. They would teach all day, get on the subway, come to NYU at night, and we'd teach class at 5:40, 6:20, mostly night

and afternoon classes. That was so wonderful because I got to know the teachers, and I got to learn so much more about science education. You can't really know until you get into it deeply.

Choi: You basically helped them with curriculum?

Selby: I taught courses like, "Science and Human Values," "Science and Historical Perspective," "Scientific Enterprise."

Choi: Did you create these courses?

Selby: No. It was a very interesting department. I wasn't so good at method, I only taught science one year. I could give the context of science. We believed that what science teachers most need is feeling of the nature of science. What is scientific inquiry? Then I had to retire there because as professor not on tenure track I was just there. Oh no! Then the reason I got that job was that while I was in North Carolina, the National Science board, which is the board of trustees of the National Science Foundation, Washington Federal, all the money for science, set up a commission in 1982, a commission on pre-college science, technology, and math education. That was the big deal. We had a budget of \$700,000, and we had a year and a half to work. We had to develop recommendations for the nation. I was made vice-chair because the chair was a wonderful man called Bill Comewither (?), the first black cabinet member ever. He made me co-chair because he said he didn't believe in vice-chairs. He was there, a Republican, a wonderful guy, I was there for the content. I was there to know some stuff. So he made me co-chair. I was married to my

wonderful husband then, and I traveled across the country with these meetings, commissions reports, etc. Then we wrote this report. It's fabulous. It's been used by the National Science Foundation to develop its budget in informal education and in technology. That's what I'm very proud of these last 25 years in science education. I wanted to give you this (holding a booklet from a Symposium at NYU called, "Science Education: Linking Science with Society"). In my remarks here you get my philosophical ideals. Take a look at what we put on the back page. The interesting thing from my life is that moving from the adductor muscle of the clam to this view of science teaching.

Choi: Can I read it out loud? This is the second paragraph; it is a quotation from you. "The dream of today's science educators is of communities within which science teachers, scientists, and all educators interact and bring a useful understanding of all modes of human inquiry and their products—literature, music, democracy, electronics, medicine, Newton's Laws—to everyone. If science instruction can be understood and promoted as sharing, with the arts and humanities, the goal of advancing personal and professional development, the outcome will be more confident and competent citizens, a larger pipeline of students prepared for advanced science study, and a healthier and 'open' democratic society."

Selby: So that's where I came out (laughs). That's the pipeline of my life!

Choi: That's really wonderful! So this is "Science Education: Linking Science with Society."

Selby: The speakers were all either students of mine, all with PhDs. I had three doctoral students in science education, and a couple of friends. What I asked was for them to speak about science education, and then frankly I did do the write-up, emphasizing what they talked about that I thought was most important.

Choi: (Reading in booklet) STEM: Science, Technology, Engineering, and Mathematics, there you are (pointing at a photo). So you joined NYU as a professor in 1984?

Selby: Yes. I think I had to leave when I was 65.

Choi: What have you been doing since then?

Selby: Well, I kept in touch with these people. I kept teaching on an adjunct basis a little bit. But in 2000, I was up at the Radcliffe Institute of Harvard University for a year. They invited me to do a Gender and Science in Society program. My husband by then had passed away in 1996. He got Alzheimer's and was in a nursing home. My neighbor in Woods Hole who is master of Leveritt house in 1996, invited me to be a resident tutor. I was the first Grandma resident tutor at Harvard.

Choi: You're a first in everything! You have a place in Woods Hole?

Selby: Yes! Tell me who you know there.

Choi: The Lawrences? They are family friends of mine. They have a summer home there.

Selby: There was 30 years I was away, but my second husband and I bought a house there on Oyster Pond in 1981. That's where I kept in touch. It's in Woods Hole that I keep in touch with science, to keep my thinking going.

Choi: How so?

Selby: There's lectures and people, the library.

Choi: You live in New York part-time, and Woods Hole part-time?

Selby: Yes.

Choi: Do you go back to London?

Selby: When I can yes. But not really. My relatives are all dead, but I have some school friends there.

Choi: Your family lives in the area?

Selby: There's nobody really left anymore. But my sons are all around here. I'm very lucky.

Choi: You stay busy! You're writing a book now.

Selby: Yes, I published three papers in the last five years because when I had no husband, no secretaries, no students, I decided, what are you supposed to do? You write! My writing was about science education, but it was very dull, but I wrote quite a bit. So I published three papers. There were some key points I wanted to talk about teaching and communicating science.

Choi: Where can you find these papers?

Selby: They're in the reference. I have copies if you'd like. They're also online. I can easily send them to you. One of them will be interesting because it

makes a point about diversity in science and makes the point that part of the trouble that some of the women have in academia is the discordance with their personal values and their professor's. I made the point that if you really look hard at another paper, "Scientific Inquiry," personal perspectives influence how you do science. They influence the questions you ask, how you decide to answer them. And so therefore, diversity and personal perspectives among scientists, to me, are tremendously important. Because the more ways you get to looking at a question, the more likely you're going to get good answers. Therefore, if they are important, it is important for graduate students to be able to communicate with their professor. And therefore it's not a bad idea to have personal perspectives that are okay, that are together. When I was at MIT, I had the name, now it's gone. It begins with "S." It was a physicist, quite well-known because someone told me he's in his late 80s now. I don't know, perhaps it was probably when I was on the board, he made the point that to get an "A" in physics you have to bind to the values of the physics professor. And I think that's tremendously wrong. I think in my files I have one paper by him. My youngest granddaughter when she was about 12, a couple years ago, we were lunching, and she's got a very interesting mind. She remembered my talking about my book. She said, "Grandma how is your book?" I said, "Oh Kristina, I'm not a writer really." She said, "But you tell such interesting stories! You know what Grandma, you write me some stories, and give them for me for my

next birthday.” So I did. That’s what I’m doing now, not writing the kind of writing I used to do which is professorial. I’m writing stories, rather like this interview. It might be interesting for my family. We’ll see if I can find an agent and if it’ll be publishable. I don’t know who would want to read my stories.

Choi: I’m sure a lot of women would want to read even this transcript. For me, I find it incredibly inspiring that you were doing so many innovative and exciting things and you were not bogged down at all by the stereotypical ideal that women should be at home and just raising their families.

Selby: Well, the messages I really would like to get out are how science should be part of one’s daily life, not this subject over here just for geniuses blah blah blah. That I think I can communicate well. I’ve got a lot to say about that. I hope my life shows that.

Choi: I think so.

Selby: I kept shifting because my ambition wasn’t to be the best of one thing. My ambition was much more whatever you pull out of my story.

Choi: I admire that trying everything out gives you a broader sense of bringing science together with education and humanities like you said. Only because you had such a broad experience and range of management and actual science and research, I believe that’s given you a vision that’s allowed you to teach so many people. Don’t you think? If you had only sat there studying your PhD work, you wouldn’t be able to convey this message to so many people.

Selby: Yes, I think I was very fortunate with my parents. My mother was interested in poetry and classics. My parents' culture was entirely mixed. We tried to use the gifts you're given.

Choi: You were given a lot of gifts. You're good at picking up new things.

Selby: I don't understand why I'm a risk taker. I think that's maybe one thing my story should suggest, don't be afraid of trying new things.

Choi: I get scared of trying new things so it's really wonderful to know you have done so.

Selby: Well I'm admiring how you careful you have been in making sure I identify things as I go along. You're a good communicator, but you decided to go away from communication!

Choi: Who was it that you said, earlier in this interview that after retirement he missed people coming to him...

Selby: That was my husband, yes, he missed their bringing their problems to him.

Choi: Yes. I definitely believe even if it's in medicine, communication is important. If patients bring their problems to you, you can communicate with different people and certainly make them feel more comfortable to describe their experience. So I think I can bring that together. But I am on a weird path, going onto medicine!

Selby: But you're having to take some courses?

Choi: I definitely need to. I am taking organic chemistry now.

Selby: That must be so hard to do out of context. It's the kind of thing you do if you're in love with atoms or if you just feel you have to do it.

Choi: My sister told me they don't use any of it in medicine, organic chemistry.

Selby: My husband when he was active in curricula things in the American Chemical Society, he recommended that organic chemistry be the first chemistry course taught in college because it's so simple, only carbon, hydrogen, a few atoms. Think of that a bit. You're only dealing with a few atoms, so in a way that is a building block course.

Choi: Yes, that's true. That's a good way to think of it. I like the idea of looking at things spatially. It's so different.

Selby: I shouldn't put it down (laughs). Partly I was against it because my father would say if I dropped a plate or something, "Oh, you'll never make a chemist!" So I avoided chemistry. I adored him, but I avoided his subject.

Choi: But you taught chemistry, no?

Selby: No. Just in high school.

Choi: Well I'm sure you could pick up a lot of things and teach it afterwards.

Selby: I liked physics because they're ideas and you don't have to memorize so much.

Choi: That's true. Organic chemistry you have to memorize a lot, but it's okay. It's all in the name of getting further.

Selby: I'm thrilled. There was a period where people went into medicine to be a great biochemist or discover great drugs. But the people I'm meeting now like you or my grandson and wife really want to help people.

Choi: Yes, that's what I want to do. But I admire people who can manage things from the top. Because it's ignorant of me, but I don't think of how people plan curricula.

Selby: Yes, when you run a house, that's why women have the edge! They are brought up, even if you don't run a house, your mother's running a house and that's management. Look around a bit, it's about understanding it and being responsible. If you don't have enough to eat, your mother is accountable that there's enough food in the house. If you don't have any milk it's her problem (laughs) whereas the men can have a lot of careers where there isn't a bottom line.

Choi: Do you have anything else you'd like to say?

Selby: I'm sure I'll think of things but for now I think we're fine!