CHEMICAL HERITAGE FOUNDATION

SALLY CHAPMAN

Transcript of an Interview
Conducted by

Hilary Domush

at

Barnard College
New York, New York

on

5 and 6 January 2009

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Oral History Program
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SALLY CHAPMAN

1946 Born in Philadelphia, Pennsylvania on 28 July

Education

1968 A.B., Smith College
1973 Ph.D., Yale University

Professional Experience

University of California, Irvine
1973-1974 Post-Doctorate, Chemistry, under Donald L. Bunker

University of California, Berkeley
1974-1975 Post-Doctorate, Chemistry, under William H. Miller

Barnard College
1975-1981 Assistant Professor, Chemistry
1981-1986 Associate Professor, Chemistry
1986-present Professor, Chemistry
1989-1994 Ann Whitney Olin Professor

Honors

1970-1973 NSF Pre-Doctoral Fellow
1978-1980 Alfred P. Sloan Foundation Fellow
2002 AWIS Metro-NY: Outstanding Woman Scientist
2005 AWIS Fellow

ABSTRACT

Sally Chapman's oral history begins with a discussion of her childhood in the Philadelphia, Pennsylvania area and her early aptitude in math. Chapman's interest in science was fostered both by her "tinkerer" father and by the nationwide interest in innovative science education that occurred after Sputnik. She chose Smith College and, after some first-semester difficulties and courses in both physics and chemistry, Chapman found her love for chemistry. She worked for the Quaker Chemical Corporation, where she assisted technicians and experienced basic, day-to-day activities in a lab. Although her senior year thesis on calorimetry was an experimental nightmare, the project did provide her with computing experience and knowledge. Realizing she was not ready for graduate school as she completed undergraduate work at Smith, Chapman became a computer programmer at Metropolitan Life Insurance Company in New York.

After her stint in New York, Chapman decided to pursue graduate school; she chose Yale University, where she worked with Raymond Suplinskas on Hot Atom Chemistry. But at the end of Chapman's second year, Suplinskas left and the physical chemistry faculty at Yale was decimated. Chapman continued with her graduate work, providing much detail about this period of time in her studies, and benefited much from the work and assistance of John Tully and Richard Preston. At the end of her graduate study, she undertook two post-doctoral positions, learning about the practice of science from her advisors. After the post-doctoral positions, Chapman faced difficulties in the job market, including being interviewed only because she was a woman, and not because she had any chance to get the job. This made her think about and reflect upon her experiences as an undergraduate tutor in Mississippi and her other experiences during the Civil Rights Movement.

The interview concludes with Chapman's beliefs about the atmosphere at Yale for women, along with a discussion of the trajectory of numbers of women faculty at other universities. She recounts her impressions of the factors that went into her hiring at Barnard College: the role of Bernice, Segal, the woman who hired her; the close relationship between Barnard and Columbia University, especially between the chemistry departments; and Barnard's status as an undergraduate university. In addition, Chapman talks about her work in the community of women in chemistry, which has included the Committee on the Advancement of Women Chemists (COACh), advising and mentoring students, and various other activities to strengthen the community of women in science.

INTERVIEWER

Hilary Domush earned a B.S. in chemistry from Bates College in Lewiston, Maine in 2003. Since then she has completed a M.S. in chemistry and a M.A. in history of science both from the University of Wisconsin. Her graduate work in the history of science focused on early nineteenth-century chemistry in the city of Edinburgh, while her work in the chemistry was in a total synthesis laboratory. Hilary is currently Program Associate for Oral History at CHF, where she combines these two divergent academic paths. Her current work focuses on the Pew

Biomedical Scholars and Women in Chemistry oral history projects. She also contributes to the podcast *Distillations* and the magazine *Chemical Heritage*.

TABLE OF CONTENTS

INTERVIEWEE: **Sally Chapman**

INTERVIEWER: **Hilary Domush**

LOCATION: **Barnard College**
New York, New York

DATE: **5 January 2009**

DOMUSH: Okay. Today is 5 January 2009. I am here at Barnard College with Dr. Sally Chapman. I'm Hilary Domush and this is the first day of our Women in Chemistry Oral History interview. I wanted to start out talking a little bit about your childhood and if you had any interests in science as a child. I don't even know…you said […] that your mother lives in the Philadelphia [Pennsylvania] area. Is that where you grew up?

CHAPMAN: I grew up in the Philadelphia area. I grew up in a community called Chestnut Hill which is within the city limits, but is very suburban in flavor. Both my parents grew up in the same area and so I have long-term roots in that area.

DOMUSH: If it was, kind of, suburban, but still in Philadelphia…many people talk about when they were young their interests in science stemming from wandering around in the backyard and finding bugs, or frogs, or things like that.

CHAPMAN: You know, it's hard for me to say what…I mean, I liked school when I was young. I liked to read. I liked doing well in school. Math and science were always things I enjoyed. I don't remember early on having had a sense of a calling for science the way I read biographies and somebody would say. My father liked tinkering with things. He had a workshop in the basement with saws, and lathes, and that kind of thing. There are four kids in my family. My brother is the eldest and then I have an older sister and I have a younger sister. My brother was into this kind of thing and I was as well. My older sister really wasn't…again, I was just enjoying tinkering. I liked understanding what made things work. I've always loved nature, but I don't remember, sort of, thinking of that as being really…

DOMUSH: Not science.

CHAPMAN: …related to the science that I was, you know…my family had…still has a vacation home in the Pocono [Mountains]. I spent most of my summer there and loved being in the woods and so on. Again, I don't think of that as being part of, sort of, a calling to science.

DOMUSH: It seemed different than the school education that you enjoyed.

CHAPMAN: Right, exactly.

DOMUSH: You said that you really liked school when you were young, was there anything in particular that you liked more?

CHAPMAN: I was always good at math. I went to a private school [Springside School]. I went to a girl's school. Math was, sort of, where I could excel and I liked being good at things, so I enjoyed math. Science…I don't remember being particularly excited by science really until high school. I characterize myself as a child of the Sputnik generation. You know Sputnik went up…what was it, 1957. I think I was eleven years old. This country—at least as I understood it at the time and I think this is correct—was utterly horrified. There was a huge, huge effort to think about education in science and so on. When I got into high school there were all sorts of very exciting innovative programs in high school science. I know that I had two absolute, wonderful science teachers, Mrs. [Lillian] Koltnow, who taught physics. I think I took physics in ninth or tenth grade. I don't remember. It must have been tenth grade. Then, Mrs. [Florence] Kleckner, who taught chemistry and they were both wonderful, wonderful teachers, but they had each gone off for a summer institute. The physics was PSSC—Physical Science Study Committee. The chemistry was CHEM [Chemical Education Materials] Study Chemistry. It was—to use, sort of, modern terminology—very inquiry based. These teachers were so excited by it and we were excited by it.

It's funny when I…I now occasionally will go to a conference and people will talk about science curricula and so on. It's when I have been bold enough to sort of be nostalgic about PSSC Physics or CHEM Study Chemistry that the people who are seriously Chem Ed types are very dismissive. They say, "Oh, it was elitist. It was this. It was that. It was the other." Well, it was […]

DOMUSH: It worked for you.

CHAPMAN: Absolutely dynamite. It was. I mean, I remember being in the gymnasium with these giant slinkies with looking at wave motion and with these ripple tanks. I think it was much more experimental then…of course, I didn't have the previous curriculum, but the degree to which the teachers were excited by it. We actually at our school had… it was a little school but we had two different high school chemistry courses. One was, sort of, the honors and the CHEM Study, Chemistry was the honors section. My understanding just from talking to people, it was night and day. One was memorizing valances and memorizing things. The other was sort

of very, very…I remember the first lab was sitting and looking at a flame and writing things down and trying to observe and trying to think about all the things that were going on and so on. So, those were very exciting. Then there was this…as I said there was this whole, sort of, *Zeitgeist* of your country needs you. Science is important and they'll go into it. So, there was this being pushed into science that in a lot of ways I was always resistant to being pushed into anything. It was an exciting time to study science.

DOMUSH: Did other subjects…the science courses sound very exciting. That sounds very, very appealing to me right now even. But did the other courses, kind of, get…did they seem less exciting all of a sudden because these seemed so much more exciting?

CHAPMAN: No. I mean, I loved history. I wasn't particularly…I love reading but I wasn't particularly fond of the study of literature. I mean, I enjoy reading the book, but I remember being very frustrated at trying to…that I was supposed to understand that this meant that and this meant that. It was, sort of, this hidden code and so on that…and poetry has never done anything for me. No. I enjoyed other areas as well, but you know I like that sense of understanding something.

The thing that…today as a scientist, but also as a teacher, it's that as I joke with my students taking Intro Chemistry that that, sort of, flash of "I get it," which I think…when something's hard to understand and then suddenly it clicks and you understand it. I'm sure there are that, kind of, those "ah-ha" moments outside of science but I'm not familiar with them. In science, I understand how this works or I see that and that's very exciting.

DOMUSH: You had said that you went to an all girls' school. Was the high school still an all girls' school?

CHAPMAN: I went to the same school all the way through. I went from kindergarten through twelfth grade. [laughter]

DOMUSH: Oh, wow. Were your sisters at this school as well?

CHAPMAN: My sisters were also at this school. Yes.

DOMUSH: And not your brother.

CHAPMAN: No. My brother went to an all boys' school that my father had gone to.

DOMUSH: Oh, okay. Were your parents particularly encouraging of your education?

CHAPMAN: Oh, my parents cared very much about education. I mean, the fact that we went to private schools. We certainly weren't wealthy compared to the other people…many of the other people who went to the schools we went to. There were lots of wealthy people around us. On the other hand, we were quite well off. I mean, the fact that we could go to private schools. My parents, my father in particular, always made a real point that the tuition, the cost of the tuition to go to private school meant that we had to be pretty frugal and so on. But going to this school that education was the most important thing […] yes.

DOMUSH: That education was the priority.

CHAPMAN: Absolutely, yes. Even though…I mean, the school I went to is an interesting and funny place and as I say, it had a lot of very wealthy people and a lot of…I really got a very fine education. When at one point, years before my father had in some frustration had joked about it being a debutante factory. It had some of that, I think to it. At the same time it really…we had wonderful teachers. I had terrific classmates. There really was an excitement, enthusiasm about learning all the way through. So, it was a fine education.

DOMUSH: What did your parents do?

CHAPMAN: My mother was a homemaker. My mother now says sometimes…I don't know, I'm not sure I'll say "regretfully," but I don't think she's ever earned a paycheck in her life. My father was a chemical engineer. He worked at Atlantic Richfield [Company], what was the Atlantic Refining Company when I was little. Then it was Atlantic Richfield and then it was Arco. But basically he worked for the oil company in South Philadelphia all of his professional life.

DOMUSH: Of course an engineer, the image that it has in my mind is something that's…someone that's, kind of, tinkering with things…

CHAPMAN: Oh, absolutely.

DOMUSH: …and then him going home and tinkering with thing makes sense.

CHAPMAN: Absolutely, yes. In some ways, I had a rocky relationship with my father and I sometimes joke that I became a scientist to spite him not because of him. But at the same time very much so, that he was always fixing things. I think the whole sense of wanting to know how anything works was something that, you know he'd be taking something apart and look at this. This does this and this does that. So, from a very early age that was, sort of, something that you did. If you were interested in how something worked, you took it apart and maybe you could get it back together, maybe not. [laughter]

DOMUSH: Hopefully you can get it back together.

CHAPMAN: Right. I do remember once taking apart one of these Dymo Label Makers. There are all sorts of springs inside. You open it up and springs just, you know. Sometimes you take things apart and you don't get them back together. [laughter]

DOMUSH: Well yesterday even, we weren't really taking anything apart. We were we putting all the TV cables and DVD cables into a different power strip so that we can turn the power strip off at night. All of a sudden, my husband says to me…he hands me a cord and he says, "What do you think this was for?" I don't know. [laughter] Everything has a light on. I have no idea what it's for. I guess we'll find out one day when something stops working.

CHAPMAN: I know. It's very strange. You know I think…and this is digressing somewhat, but I said this many years ago and I think it's less true today, but I think it's still true. I think that one of the disadvantages that some women have going into science is when they hit whatever level in school or something they haven't picked up a screwdriver, or wrench, or even as you say, "plug something in" or something. When I teach lab courses and, I mean, I do things that sound very silly…but take the equipment apart and make sure that the first thing the student has to do is to plug the cords in the back because some of them really have never done that. If you've never done that, and the first time you do it is in a lab and people are standing around you looking, you're a little nervous and you feel like a fool…then you're not going to do it. So, that this, sort of, being comfortable doing things with your hands and being comfortable trying things out, I think is something that at least historically in my generation I think that guys were much more likely to have that experience than were girls. Whatever other things I say or something about my upbringing…I mean, my father in terms of this…there was absolutely no sense that "this is for boys or this is for girls."

DOMUSH: I believe you said you were the second youngest of the four.

CHAPMAN: Yes.

DOMUSH: How far apart in age were you guys?

CHAPMAN: My brother is five years older, my brother Bill [William]. My sister Diana is two years older and then my younger sister, Marie, is seven years younger, so there's a big gap.

DOMUSH: Oh, big gap all of a sudden. When you're in high school and you're doing these science courses which sounded really, really exciting and you're starting to think about going to college, your older siblings they'll probably have just finished.

CHAPMAN: Right. Bill went to Bowdoin [College]. [...] You say you went to Bates [College]. I remember going on the college trip when he was looking at colleges and one of the places we looked at was Bates. That must have been nineteen…oh my, gosh, he graduated in 1959. I don't know, but that was a long, long time ago when Bates was one of the places he looked at and he ended up going to Bowdoin.

Diana [Chapman Walsh] who is two years older than I, went to Wellesley [College]. She absolutely loved Wellesley and Wellesley was a terrific place for her. She said, "You've got to come to Wellesley." Actually, I think I even did apply at Wellesley, but finally decided that I had been two years behind her in school for all of my life with teachers inevitably making either, just calling me by the wrong name and I thought this is dumb. I don't need to go there. There are enough colleges. I don't need to go to the same college she's going to. She until recently was President of Wellesley College.

DOMUSH: Oh.

CHAPMAN: So, she did like Wellesley.

DOMUSH: She really did love it.

CHAPMAN: I mean, she did many other things, but she stepped down a year ago from a fourteen-year term as President.

DOMUSH: Oh, wow. How exciting that must have been.

CHAPMAN: You know, I looked around and of course, and I say this to my students today and they're shocked. I graduated from high school in 1964. At that point, one [a woman] didn't have the option of going to Princeton [University] or Yale [University] or something. I was a very conventional person at that point and coming from a fairly, in some ways narrow world. So, I thought about the Seven Sisters. I thought a little bit about maybe going to California, going to Stanford [University]. I don't think my parents were very keen on that idea, so I didn't press that very far. I ended up going to Smith [College]. My brother had a girl friend, a friend, a woman from the same place in the Poconos where we spent summer that I just thought the world of. They were no longer together, but I just liked her so much and I admired her so much and she was at Smith. My grandmother had gone to Smith and so there was, you know…although at that point she was long since dead. But Smith sounds like a nice place.

DOMUSH: But there was some familiarity.

CHAPMAN: So, there was, you know…so, I can't say that there was a great deal of thought that went into going to Smith. It just made sense.

DOMUSH: When you got there did you have any sense of…you know, these science classes in high school had been really great, I hope they continue to be great. Or did you go in just, kind of, being very open to.

CHAPMAN: I went in very open. I mean I went in very open and remember my freshman year. I must have said something on some form about maybe being interested in science because my freshman advisor was a member of the chemistry department. His name was Mr. [George] Fleck. He was an utterly delightful person, whom I got to know very well later. The head mistress of our school, high school had sat us down shortly before graduation and had given us this lecture and I sort of smile when I think about it.

Her name was Mrs. [Eleanor] Potter. She sat down and she told us all, "We're very proud of you. You're all going to fine schools and so on. You've all stretched and are going to very competitive places. I just want you to be aware of the fact that when you get to college, you're going to be surrounded by people who are very bright, and very good, and you should not expect to do as well, as you have done." As a teacher today, I sometimes wish that my students had had this lecture because the ones who are devastated when they get a B or C, God forbid, in Intro Chemistry didn't get Mrs. Potter's lecture. I got Mrs. Potter's lecture and I really took it to heart. I thought, okay. I'm going to Smith and everybody at Smith is going to be smarter than me. It's going to be hard for me to get good grades, but that's all right. I also, ended up…I don't remember exactly what I took my freshman year, but I was in the wrong calculus course because the math course I had taken my last year at Springside was some bizarre thing that was sort of made up along the way. It really was…it was very incoherent. It was sort of calculus but not really calculus. When it came time to decide what math course I should be

in and I don't blame my advisor, but we looked at this thing and I ended up taking Calculus II. Well, that was a terrible mistake because I really hadn't had formalized Calculus I. We had written papers about [Isaac] Newton's fluxions. We got all this, sort of, weird stuff that was dancing around calculus. We really hadn't done nuts and bolts calculus.

DOMUSH: So, it's not going to help you for calculus.

CHAPMAN: So, I was over my head in calculus. Oh, I took Intro German. Why did I do that? [laughter] Somebody had told me that if you're going to go into science…well, it really thought that you know that you needed to know German and languages were never my strong point. Then I was taking a political science course that I loved, but it was a lot of reading. So, I remember going into my advisor halfway through my fall semester freshman year and I think I was getting a D in calculus. I think I was getting a C in something.

I was all smiles, you know, and I remember Mr. Fleck saying, "What's wrong?" I said, "Oh, nothing's wrong." He said, "You know you were valedictorian of your class. You shouldn't be getting these kinds of grades." So, I said, "Well, Mrs. Potter said…" and it was something that was very funny. [laughter] So, he you know, "No." He said, "You really…you should be doing better than this." You know, and by the time the semester was over, I landed on my feet and was doing okay. I did very well in college.

I think in some ways when I look back on it and I've talked to some of my friends and we joke about it, I think I was very resistant to advice at that point in my life. So, the minute somebody said, "You should be a scientist," and I remember my…Mrs. Kleckner, who I said I admired so, sitting me down and saying, "You've got to go into science. You're really good at this." Part of me was very flattered and honored and I thought this woman was wonderful, but part of me was saying, "I'm not going to let anybody shove me into a cubby hole. I don't want to do that." There's a, sort of, funny resistance at the same time that I was…and I really loved physics in high school. I liked chemistry, but physics was just to me much more dazzling because the thing about chemistry is you can't see it. I mean all that…all those molecules are going on which you really can't…your understanding is a level that you can't see. With physics, particularly mechanics and waves and so on, you really…

DOMUSH: You can see it.

CHAPMAN: …there are the equations and there are the…you know you can see it in a way. I think I probably if you'd asked me and I wasn't being stubborn and saying…refusing to…I was maybe going to study physics. I took physics and chemistry. I forget if I took them both in my first year. Maybe I did. This is something that the people in the physics department at Smith were really strange. They were totally bizarre. The physics teacher…there were two Intro Physics courses you could take at Smith. One was Physics 10 and Physics 11. One was

calculus-based and one was not and this was a calculus-based physics and so it was supposed to be for majors. It seemed to me—and I'd love to go back and hear it because it may have been—but it seemed to me every time he put an equation on the board he apologized for it. As if he believed that nobody in the room wanted to deal with anything that was very mathematical. I was just put off by that instructor and I was put off by a couple other people.

I loved the chemistry. In fact, it was this marvelous, marvelous, elderly guy who taught freshman chemistry [Kenneth Sherk]. He was just so enchanting and engaging and so on. I think I had in fact been attracted to chemistry earlier on, but, sort of, resisting it. Then that became clearer when I was at Smith. Then I continued…I had a terrible time in organic chemistry. It's funny. It actually serves me well now as a faculty member that I did so badly in organic chemistry because when students come in to talk to me and they're having terrible times I can say absolutely truthfully that I got an F on the final in first semester organic chemistry. Their eyes get big…you. [laughter] I said, "Well, I stayed up all night and I didn't get any sleep. I walked into the exam and I couldn't write my name and I was a complete and utter wreck" and all this was true. I hated organic chemistry. This course was a very, very old-fashioned course. It was taught out of Fieser and Fieser[1], which is a book that had been around forever and ever. It was, you know I likened it to memorizing the Yellow Pages. It was, sort of, huge…here's a reaction, and here's another reaction, here's another reaction. It wasn't very mechanistic and it wasn't very logical. What I loved in the general…we did in general chemistry, in high school chemistry and so where you could do things with mathematical equations. So, I struggled through organic chemistry and indeed by the end of my sophomore year at college, I was doing…I had recovered from this total disaster. Fortunately, it was a year course and that failed exam didn't end up giving me…I didn't end up failing the course, but I didn't do very well. I don't remember what I ended up getting in it.

But I remember sitting down with an advisor at the end of my sophomore year when it's time to declare a major and basically, sort of, having Plan A and Plan B. Plan A was major in chemistry and all that would mean. I said, "But look, you know I've had such a terrible year in chemistry that maybe…I think that when we get to physical chemistry I'm going to back into stuff that I like, but maybe not." So, sort of, my backup was to major in math, but then I got to physical chemistry and physical chemistry is what I love. So, that was…I didn't have to go to Plan B.

DOMUSH: What about the calculus? You said, the first semester they put you in Calculus II which was incorrect. How did you, kind of, recover?

CHAPMAN: Well, I muddled through and, sort of, taught myself what I needed to know from Calc I and was okay by the end of the semester. Then my sophomore year, I had a terrible year in a lot of ways, again I draw on this when I'm advising students. I forget if it was fall or spring, whether it was Calculus III or Calculus…no, Calc III would have been my freshman year. So,

[1] Louis Frederick Fieser and Mary Fieser, *Organic Chemistry* (New York: Reinhold, 1960).

whether it was Calc IV or…it doesn't really matter. I had again, an absolutely, wonderful professor. Her name was Alice Dickinson. She subsequently went on to become Dean of the College. She was just this incredibly gentle, smart, perceptive…I mean, just wonderful. I remember being in this class at Smith…I have these, sort of, funny flashes that one gets. We had…back then of course, required physical education you had to take for two years. We all had these gym suits, sort of, made out of some gabardine fabric that you would wear to your gym classes, but here is a typical thing at a women's college in the middle of nowhere. It was fairly common in the day you had gym to simply put on your gym suit in the morning with your sweatpants or whatever underneath and you wander around in your gym suit. Then you go to gym and then come home at the end of the day and put on your skirt and go to dinner. As a result and each class had a different color gym suit, so my class was blue. The class ahead of us is green. So, in an interesting way, you walked into a classroom and you had this image of what the distribution of classes was in the classroom.

I remember in this calculus class…I can, sort of, visualize these green gym suits, so where most of the people in the class were the year ahead of me because I had done this foolish thing and skipped Calc I. But I really loved it. It was neat stuff and I forget what we were doing, multivariable calculus and I forget. I took an exam and I did absolutely terrible. Again, I look back on it I think, well, I sort of went "oh, all right. That's too bad." I didn't go see Mrs. Dickinson because I thought, well, I guess I thought I understood this stuff, but I guess I didn't understand it as well as I thought. Then there was another hour exam and I did terribly in that one. Again, instead of going and doing that, I thought well, maybe I'm not so good in math after all. Maybe I finally reached the limit of my math ability. I thought I understood this stuff, but I can't do it. Well, I then got a note from Mrs. Dickinson saying, "Please come to my office." So, in some trepidation I was…I mean, it's funny. I'm always encouraging students to go see professors, but I did very little of it, except when I got in advanced courses. I went to see Mrs. Dickinson and as I say, she was a lovely, lovely person.

She said, "Look, I don't understand what's going on." She said, "In class when we're doing problems you know this stuff and you know it as well as anybody else in the room. You're just making a complete hash of these exams. What's going on?" I don't know. She gave me some advice and it turned out…I give her advice to my own students rather frequently. It's pretty obvious, but on the other hand, you have to be totally obvious of it. She said, "You're obviously…you're coming in. You're panicking." She said, "Okay. Here's what you're going to do. You're going to come in to the next exam and there will be five questions or whatever, so this standard number of questions. You're going to say to yourself is 'everybody else has to do five. You only have to do four.' What you're going to do is you're going to carefully choose which of the four problems you feel most confident doing. You're going to do them more slowly." She said, "If you finish those four and there's a little bit of time, you're allowed to go and do the fifth, but you're not allowed to do the fifth until"…and it worked. It worked like a charm. You know, I was able to do all five questions so long as I wasn't…

DOMUSH: You calmed down a little bit.

CHAPMAN: Calm down a little bit, slow down a little bit, think a little bit, and, you know, who knows what. I mean, it was the same semester I was failing organic. It was not a good semester. Anyway again, sometimes as a teacher it's not a bad thing to have struggled. [laughter]

DOMUSH: Yeah. Well, I'm remembering now when I took organic. I took organic my freshman year in college. I loved it. When I went on to graduate school that was what I focused on. All of my other chemistry major friends were taking it at their junior year or sophomore year. Many of them knew that they would dislike it because they were, kind of, more math oriented…

CHAPMAN: Well, and it has this reputation. Still does today. I mean you say, "organic chemistry" and people cringe even though they don't know what it means.

DOMUSH: Right, and I just…I mean, I remember one friend I had in college. He was a double major in chemistry and physics and he was brilliant. He was so, so smart. He failed organic chemistry. Finally, second semester of senior year he was supposed to take the second semester again and he just said, "I'm already into graduate school in physics. I'm going to have a physics' major. I do not need this." The one semester. I could understand it because I couldn't do physical chemistry to save my life, so I could understand why.

CHAPMAN: It is interesting that within the field of chemistry are these two different areas which really call on such different cognitive skills. The cognitive skills that allow people to excel in organic chemistry are really, I think, very different from the cognitive skills that allow people to excel in physical chemistry. I mean, you put something in the form of an equation or an equation-like thing and I'm happy as a clam. I can manipulate and so on. In organic chemistry, you've got to take all this information. You've got to assimilate. You've got to visualize. The visualization I don't think was a problem for me. I know that it is for some people in organic chemistry. Then you've got to rework. I don't know, but it's fascinating and something…when I'm talking to students and especially now we've just finished first semester chemistry. At Barnard we do one semester general and they start organic spring of the first year.

DOMUSH: Oh.

CHAPMAN: We've done that for a very long time. So, especially to the students who are feeling quite battered and have got C's and so on in general chemistry. I'm sure I will be seeing quite a few of them in the next couple of weeks. Now what do I do? I said, "You go onto

organic chemistry. I'll tell you a secret. Many people who struggled in general chemistry do superbly well in organic chemistry. You know, your C in general chemistry is not the end of the world. You can go on, blah, blah, blah." But organic, its…they've heard about it, so I say don't believe the hype. [laughter]

DOMUSH: Well, for some people…I mean, like you just said yourself, it's about learning how to take the test and learning how to pace yourself and calm down a little bit. People used to make fun of me in undergrad because I would get to an exam early and I would read my book. Then I would I start the exam when the exam was given to me. They said, "How can you not be studying right beforehand?" I said, "I can't. I can't do that."

CHAPMAN: Then it amazes me sometimes that students will wander in. The exam starts at 9:00 a.m.. They'll wander in at five after nine perfectly calm. If I had arrived in an exam room at five after nine, I would have been in total wreck. [laughter] It's very interesting.

DOMUSH: So, after you got through organic chemistry, after you got through, kind of, learning how to take your math exams and you realize that you had not peaked…

CHAPMAN: I went on taking more math. I didn't take…I wish I had taken more math, because I think that…I mean, I'll get to this going on and doing computational chemistry and so on. I think well, there are lots of things I say, "What if?" I mean, maybe I shouldn't have gone into whatever. The more math the better, I did take…did I take differential equations? I don't remember. I took an abstract algebra course my junior year which I absolutely loved. It was such fun, but it was precisely that. It seemed like a wonderful game those groups and rings and so on.

A thing that I found very amusing—and I'll say this to my math colleagues—is not once in this—I think it was a year course. It may have been semester. Not once did the professor say that any of this was useful for anything. Only later did I realize that chemists use group theory all the time, whereas in the math it was just this incredibly clever game. I think that it depends on the math department, but I think there's some mathematicians who—and this perhaps was more true a generation ago than it is today—who really felt that applications were beneath them. That the beauty of the math itself was…and so to say, "Well, but this can really be used" was…well, who cares?

I see some of that even in…you look at textbooks today and you see [it]—chemistry textbooks. You see some of them that are very, sort of, written as if you have to motivate the student's interest by talking about the applications. I mean I think that some of the applications are certainly valuable, but I think that there are some students for whom the material is intrinsically interesting in and of itself. I certainly remember at that age finding the little personal vignettes and the little things. I didn't care about them. I cared about the material, but

of course, I think you know there's so many, many kinds of learners and what motivates people varies all over the map. I think that I personally fall on the end that I didn't want all that fluff. I just wanted the content, but I think there are others for whom just the bare bones content…you know who cares?

DOMUSH: It's not going to attract them to the subject. After you decided that you were going to major in chemistry and you're still taking math and you're still taking other things, did you get to work in a laboratory at all, or anything like that?

CHAPMAN: Yes. I did. I mean I did two different things. The summer after my sophomore year, I decided I wanted to get a real job. By which I meant, I had had summer jobs in this resort in the Poconos, you know, doing nursery schools three times a week or something else…you know, glorified camp counseling kinds of jobs. Now, I wanted to have a real job. So, I went to the college…back then they called it the "Vocational Office." Our terminology has been changed now. I think they call it "Career Services" or something more highfalutin. I remember digging out information. I wanted to work…I mean, not so much I wanted…I felt that my parents would allow me if I got a job working for some chemical company in the Philadelphia area that they would allow that. I don't remember discussing it with them, but I got a job working for a little chemical company in Conshohocken, Pennsylvania for Quaker Chemical [Corporation]. It was so different from anything I'd ever experienced before. I mean, it was…it's a dumb job in the sense of using chemistry or something like that. It was the Textile Research Lab. Quaker Chemical did…I'm sure it does now, sells industrial chemicals for various purposes. One of the things they sell are chemicals for treating fabrics. This little lab where I was one of three summer interns and there were lots of technicians. We mostly were the gophers for the technicians. You know they'd yell, "Summer help come do this. Summer help come do that."

DOMUSH: I'm going to interrupt you for one second.

CHAPMAN: Sure.

DOMUSH: All right, back on. Sorry about the interruption.

CHAPMAN: That's all right.

DOMUSH: Quaker Chemical.

CHAPMAN: At Quaker Chemical a typical day might…what would happen would be, one of their customers would have a concern that something wasn't working quite right. It would be referred to this lab and my boss…I don't remember his name. It had to do with a formulation and all things had to do with permanent press polymer things. My boss would say, "Okay," to me and to the technician, but I'd be helping the technician, "go mix so much of Q29 with so much of Q43 and then treat these fabrics." You take this goo. It, sort of, looks like Elmer's Glue and put it on small swatches of the fabric. Then my job is often to put these swatches of fabric into this thing that looked like a pizza oven for ninety seconds, or two minutes, or something like that. These fumes would come pouring out. I am to this day incredibly sensitive to formaldehyde fumes. If I walk into a fabric store or even a cheap clothing store where there is formaldehyde and there's a lot of formaldehyde because they still [use] the treatment. I mean I will…my eyes tear up. Because I stood in front of these ovens with this formaldehyde pouring off of it. Then I'd take these pieces of things that…white muslin really that was a square about two foot square that had been treated. Then I'd have to run them through the washing machine five times. Then we'd go and pin them up to the wall and talk about which one was more wrinkled. [laughter] Then it's just, sort of, day-after-day doing…and sometimes I'd go into my boss. I'd say, "Well, what's the chemistry?" He'd always look very perturbed that I wanted to know something about what these molecules were or something like that. I think once he bothered to pull something down and you know where he'd say, "I'm not sure I should tell you that" or something like that. It was an interesting experience simply because to see at a very basic level what goes on in that kind of world. I can't say that it was a summer job that made me decide this was the future I wanted, but I was very glad to…

DOMUSH: But you didn't run away. You didn't switch to a different major.

CHAPMAN: I didn't run. I really liked the notion…I had a 9:00 a.m. to 5:00 p.m. job. My brother who was just out of college at that point and he was living at…no, he's out of the [United States] Army. He'd gone in the Army for two years. He was living at home and he had a job working downtown for Scott Paper [Company]. He was commuting by train. He had a little green…it was a little Volkswagen. He incredibly generously allowed me to drive his car to Conshohocken every day because there really was no good transportation to get from Chestnut Hill to Conshohocken. So, I'd [get up] in the morning and get in his car and drive down to work. It was a real job. I had a paycheck. So, I enjoyed that. That was the summer after my sophomore year.

Then my senior year, I did a senior thesis. It was…well, it's hard to characterize my senior thesis. The professor with whom I probably would have liked to have done my senior thesis was this man I spoke of a few minutes ago who had been my freshman advisor, Mr. Fleck. He was an inorganic chemist. He was on sabbatical my senior year, so that…and I think I would have wanted to work with him more because personality wise than because of the science. I mean, I liked it but it was…in some ways it made more sense for me to do my thesis with Mr. [George] Durham who was more elderly, a somewhat more reserved physical chemist. Mr. Durham, may he rest in peace, I think I was the first student to do research with him in

some years. So, he was, sort of…went in here and was dusting off his ancient calorimeter. [laughter] I will tell you if there's one thing that that year's experience did, it convinced me the calorimetry has to be the most boring science possible.

It was…I look back on that…he was interested in an experiment that he had published many years before, some papers. It had to do with the enthalpy of mixing in solid solutions, so sodium chloride, potassium chloride for example. If you make a fifty/fifty mixture of them, what is the ΔH associated with going from you know various mixtures? So, it's the enthalpy of mixing associated with making these mixed crystals. It's a tiny effect. The numbers aren't that large, I mean because really you're just substituting one cation for another in the crystal. But there are small energetic differences.

At the beginning of the year the apparatus…this big, big, black home-built, waterbath that, sort of, was the size of a washing machine had this metal tank inside, and it took about a week to get this whole thing up. Then there's this can inside the tank. So, finally the action vessel was basically a piece of glass tubing, maybe a centimeter in diameter and maybe two centimeters long. Then into this you put the…gosh, I don't even remember how this was done. We weren't actually making these solid solutions because those…you wouldn't make a homogeneous solution in the timeframe. I think we were measuring the heat of solution of these. So, what we were measuring is you had one of these solid…it was basically mixtures of two salts that had been made and had been mixed and annealed and so on. What we were doing was simply measuring the ΔH associated with dissolving it in water. Inside this tube was this carefully weighed sample of this mixed salt and then we epoxied aluminum foil to the two ends of this. This, sort of, aluminum button attached to some fishing line and the whole thing. Then the idea is then you wait a week until the whole thing had been equilibrated and initiated the experiment by, sort of, pulling on the fishing line. The idea is you tear the aluminum foil and therefore the salt would be released and the stirrer would go. Then you would measure what happened to the temperature.

Well, I think in the course of two semesters I might have done thirty runs. I think twenty-nine of them failed for one reason or another. Either the epoxy leaked or the something and then we, sort of, redesigned, anyway. Then we had a different design, and another design, and another design. When we got a sufficiently robust seal that it didn't leak, when it came time to break it you couldn't break it.

DOMUSH: Oh, no.

CHAPMAN: It was…you know, the experimental part was a total disaster. However, the entire project was not a total disaster and I sometimes blame it on where I am today, on the other half of it. You could also calculate these enthalpies and you calculated these things. If you knew the lattice parameters…I could explain this to a freshman. You say, "Okay. What do you have?" You have ionic interactions. So, you simply have cations and anions in the lattice and you just simply add up the coulombic interactions.

DOMUSH: Right.

CHAPMAN: But there's something called a Madelung Sum. If you sit say at a sodium-ion and you say, "Okay. Let's add." We've got six nearest neighbors and they are at a certain distance and so you add up that. Then you take the next shell of these say ions of opposite charge […]. As you can imagine you set that up and you can set it up to do it systematically and sum those terms. The sum is highly oscillatory because of course, first you're adding all these attractive terms from the sum. Then you're adding all these repulsive terms. Then you're adding these attractive terms. Then you're adding…and ultimately this is going to converge, but it converges incredibly slowly, so that basically before electronic computers you couldn't…doing it simply the way I'm describing which is the…basically it would not converge.

So, people had developed very elaborate ways of sort of putting shells of various sizes and then averaging up the charges in the shells and then adding that. In a sense, you're combining the cations and the anions in a way that you're damping this oscillation and so on. So, they're these very elaborate things that involved Bessel functions and so on. But even they, they worked for simple salts, but you had these mixed salts. Some of the work that he had done had to do with modifying these theories and so on. Well, computers were very new when I was at Smith…I think it was my sophomore or junior year, Smith College. No, it must have been my sophomore year. Smith got with great fanfare a teletype hookup to the Dartmouth College computer.

DOMUSH: Oh, wow.

CHAPMAN: This literally consisted of this teletype machine where you "wham, wham, wham," but this was a computer. The Dartmouth College computer was very forward thinking. I think the language BASIC was invented at Dartmouth College…I believe. I'm not sure, but I think it was sort of these first high level languages that could be used for it. I think it was non-credit, but it might have been a one point credit or something, course that you could go and you could learn how to do this. You could sign up for it.

My junior year I took a course with Mr. Fleck in quantitative analysis. It was titrations, as the standard thing that one taught back then and indeed a lot of it one still teaches. The funny thing is I've taught the similar course here and…to have watched the evolution of doing the same task, but with such different tools is very interesting. But, Mr. Fleck had written a book on some of the using equations and quantitative analysis and so on.[2] He wanted the class to use the Dartmouth computer to do some of these calculations which one could otherwise do with

[2] George M. Fleck, *Equilibria in Solution*, (New York: Holt, Rinehart, and Winston), 1966.

these big, noisy…I'm trying to picture the name on these calculators. Big calculators with lots of buttons on it, with a carriage that goes "tsch, tsch, chu-chu" you know and so you do these big calculations on those but they take forever. I spent huge amounts of time my junior year. I got captivated by this business of doing this with BASIC on this teletype to the Dartmouth computer. Really not so much was part of the course, but it was, sort of, beyond the course and with Mr. Fleck. We programmed up a lot of these things.

So, but then the summer between my junior and senior year at Smith College got its own computer. Now, Smith College's own computer probably was less powerful than…certainly less powerful than my Christmas present over there—Apple iPod Touch. [laughter] But it was a computer. It was an IBM, I think, 1130. I'm not sure that's the number. People who were interested were invited to be computer aides. I remember I came back…it's so vague. I think I came back to college a week early. I'm not sure. I think I did. I had spent that summer in Mississippi doing civil rights work, which is a different story.

I came back and there were maybe six students and Mr. [Bruce] Hawkins, who was a professor of physics. We basically learned how to flip the switches to boot the computer and how to—I think there was a card. So, we were the computer center staff. There wasn't any permanent staff. It was Mr. Hawkins.

DOMUSH: How exciting.

CHAPMAN: Well, these thermodynamics calorimetry experiments are failing one after the next, after the next. It takes a week before you figure out whether the new design is going to fail and it fails again. I was just enjoying myself playing with this computer doing these sums, and trying this thing, and trying that thing, and trying the other thing. I look back on it with absolutely no direction. I mean, I'm sure it was just a lot of what I was doing was total nonsense, but I was enjoying it tremendously. I remember at the end of that year Mr. Hawkins told me he'd done an analysis of the computer usage of that computer at the end of that year. He said, "It's very simple. You can divide it into three people using it. There's you, there's me, and there's everybody else." I would always set this thing to doing these summations and go home. This poor little computer would be doing these lattice sums all night long. I come back and it would have gone you know…what today you could do in no time at all. […] I was doing these direct summations and trying to figure out the algorithm that was going.

DOMUSH: It must have been so exciting then though.

CHAPMAN: But it was. I think, that really, I think is what made me when I went to graduate school think that […] I thought about going to graduate school and doing something in computers. My father really thought that was what I should have done. He was not big on my

going into chemistry. He said, "Chemistry's a terrible field [for women] and computers is new and exciting and you should go into computers." I don't really know, but anyway.

DOMUSH: I would imagine at the time it would be and I have no idea, this is total speculation on my part. I would imagine that chemistry is such a…everywhere there's a chemistry department. There weren't computers everywhere. Where do you even go…?

CHAPMAN: Well, there was computer science. There wasn't computer science at Smith. I mean there was computer science at UMass [University of Massachusetts] and so on, but I didn't even know what it was. Besides which to say it seemed to me that I liked playing with computers, which didn't necessarily mean I wanted to study computer science. Actually, sort of, the idea when I got to graduate school which was not right away, that one could merge computers and chemistry, that this seemed like a perfect thing to do. That's what, sort of, attracted me into getting into computational chemistry because it's…yes, you can use these fun tools, the computers. But at the same time you're working on…I mean I like doing things on computers. When I watch my students take computer science course and computer science courses vary all over the place and some of them are glorified typing courses. […] This is probably my own bias you know, when you have a task you want to do is when you learn how to do things with a computer. Learning how to do things simply in the abstract and making up tasks where you can use those things, well okay, that's one way of doing it. For me it's much more interesting in a, sort of, need to know basis. So, in some ways the reverse, what I was saying a little while ago.

DOMUSH: Right, about needing the application.

CHAPMAN: It was doing those…using that computer at Smith and really being allowed just to play, because basically…I forget how it worked. But those of us who signed up to be computer aides each agreed to be there one evening a week or something. At the end of the day if we wanted to leave something running, we could leave something running. We were there to help people. I really don't remember that much about it. Basically, I felt as if this was my private toy that I got to play with my senior year at Smith. So, that was pretty cool. The fact that my experimental work was a complete and utter bust wasn't a problem.

DOMUSH: So, before we move on and start talking about how you moved from chemistry at Smith to graduate school, I want to know a little bit more about obviously Smith, an all women's college. But all the professors you've mentioned have been men.

CHAPMAN: Except Alice Dickinson. In chemistry, it was true, the professors were men. There were some women off-ladder. Professor [Thomas] Lowry was brand new. His wife

[Nancy] was also on the faculty but she wasn't a professor. No. It was…but that was the way chemistry was back then. Of course, that's the world was very different back then. I remember, God help me, sitting in my college classes and I was very excited to be college and so on. Being in college and being grownup meant having men teachers.

DOMUSH: Do you remember how many chemistry majors there were your year? I don't even know how big Smith is to be able to compare [to my own college experience.]

CHAPMAN: Smith had about twenty-four hundred students at the time. I think it's about the same size. My entering class had six hundred and thirty-six students there. That number might not be correct, but it stuck in my head. We probably had eight or ten chemistry majors in my class and maybe as many biochemistry majors. And that's similar to the kinds of numbers that we have at Barnard. It meant that it was a very cohesive group. That these upper level classes like physical chemistry and analytical chemistry and so on was, you know we were all together taking. So, it meant […] we were a close group and you got a lot of attention. The faculty, I mean I think there's…and of course, it's the reverse snobbism. Well, I shouldn't call it reverse snobbism. The interesting thing about Smith College, no one was Doctor. Everybody was Miss or Mister.

When I got to Yale as a graduate student, the undergrads called the professors Mister. The graduate students called them Doctor, which I thought was a very funny. At Barnard, we're very into titles, and so, it's "Professor" and "Doctor" and so on, even though students misuse them terribly. I mean they will call somebody "professor" who was not a professor. They'll call somebody "Doctor" who is not a doctor. I don't ever correct them, even though I carefully use the correct one because this is what more or less I was told when I arrived, but anyway that's a digression.

The chemistry department at Smith when I was there…you had Mr. [George] Durham who was the physical chemist, Mr. [Milton] Soffer and Mr. [Thomas] Lowry who were the two organic chemists, Mr. [Kenneth] Sherk who taught general chemistry and some inorganic chemistry and Mr. Fleck. I think that was…and then there were some laboratory instructors who were not of professorial rank. That was pretty much it. Oh, there's Mr. [Kenneth] Hellman…excuse me. Mr. Hellman was a biochemist. So, it was a faculty of six and it was all men.

DOMUSH: The group of students who were also chemistry majors. Was it a good group? I mean, I feel like that would make a huge difference […] because the classes are so small.

CHAPMAN: Yes, I mean it was…as with any group, it was a funny group. So, I remain very close to some of them. There was one woman who was…she was a brilliant young thing who had come in. She was three or four years younger than we were. She drove my friend,

Stephanie, absolutely nuts because she was so competitive. My friend Stephanie was just…and the funny thing is that I did very well, except for organic chemistry courses. But, Stephanie would come up and say, "Did she do better than you? Did she do better than you?" I said, "Stephanie, I don't know." She always had to know what grade I got and this competitor. She was very young and very smart. So, you know there were conflicts, but we basically got together. My friend Stephanie spent the summer after junior year there and she loved organic chemistry and organic synthesis. I think that NMR [nuclear magnetic resonance] was quite new at that point at Smith and she was just totally enraptured by using NMR and so on. She actually went off to Yale a year ahead of me. Unfortunately, she didn't finish Yale. So, we had a pretty good group, yeah. I continued to take lots of them. I took lots of political science courses and lots of other things, as well. I had my friends in chemistry as one circle, but then I had other circles of friends that I probably spent more time with.

DOMUSH: How did you go from chemistry at Smith, and this interest in using the computers, and not necessarily getting your laboratory experiments to work that great…how did you go from that to graduate school at Yale?

CHAPMAN: Oh, I look back on it, you know when I advise students I'm always trying to point out to them that these…we act as if life was a series of rational choices. When in fact, so often…at least I look at my life and say…and my career's been pretty linear. Even so, I can't say that I made studied, rational choices, and stuff along the way. I didn't go directly to graduate school. The reasons were several.

I wasn't at all sure what I wanted to do and I will have to…again, this has to do with being of an age and era and so on. If you had probably asked me when I was at Smith College to guess what my life would be like ten or fifteen years hence, I think I probably would have said to you that I will be married and raising a family and that I wouldn't have a job. Neither I…I mean, there were some of my classmates at Smith, particularly a couple who were interested in medical school…we didn't have lots, but we had some who were very goal and career oriented and so on. Most of them…and I have some incredibly successful classmates. There's a woman [Shelly Lazarus, Smith College, 1968] who is now the C.E.O. of Ogilvy & Mather and she says the same thing. She said when she was at Smith she had no idea that she was going to end up being a captain of industry.

We didn't sit around thinking about…talking about careers. We were—for better, for worse in some ways it was better and some ways it was worse—that wasn't why we were doing what we were doing. I mean it was better in the sense that we were just following our interests. It was worse in the sense that it's…well, somewhat self indulgent, and not very focused, and so on. I studied chemistry in college because I enjoyed studying chemistry, not because I pictured myself being a professor. I certainly didn't. Or, I certainly didn't picture myself being a bench chemist and…I'm not sure if you said, "Why are you studying chemistry? What are you going to do with it?" I wouldn't have an answer to that.

DOMUSH: That goes along with what you were saying about in the chemistry books you didn't need an application.

CHAPMAN: Right, exactly.

DOMUSH: You liked the subject matter.

CHAPMAN: I liked the subject and so on. When I was a senior and it was, sort of, okay now, time to decide what you're going to do next year. Stephanie was going to graduate school and a couple…you know, Pam was going to medical school, Margaret was going to medical school. It seemed to me just to do more school for the sake of doing more school seemed like not…it was time to get a little bit more focused.

There were also other factors. I in some ways had a difficult relationship with my father. He had…and I have to phrase this very carefully, but on the other hand you know…in a sense there was always this well, you know we pay your college tuition, in return for which you are going to be cooperative and come home for vacations and so on. I always, sort of, felt held hostage…that my education was being held hostage and that I couldn't really say the hell with you. Because I wanted to go to college. But, I wanted to say to hell with you. I needed to become […] I needed to be on my own financially. So, I felt if I went to graduate school even though I knew that there were fellowships…still it would not break that tie in the sense. I would still be a student. I would still have that…whereas, if I went off and I got a job and was living on my own and so on, then I could decide that I no longer would feel as if I had this peculiar thing. So, that was probably one of the big [issues].

Another one was that I had gone to Mississippi that summer with a project that had actually been initiated at Smith. It was a…it's a long story. I don't know if you want to go into it, but it was an education project. This was the summer of 1967. Summer of 1967 was a pretty wild summer in race relations in this country. Newark [New Jersey] burned. Detroit [Michigan] burned. Lots of scary things happened. It was an extraordinary experience. Part of me was saying I didn't want to just put that behind me…how. And so, what could I do if I graduated from college? I couldn't go back to Mississippi because that was no [longer an option]. Part of it was, sort of, figuring out was there a way in which this experience that I'd had that summer…again, going to graduate school would have in a sense just, sort of, completely…

DOMUSH: Closed that off.

CHAPMAN: …closed that off. Now in reality I think I made that connection, but I didn't. So, I really was not ready to go to graduate school. Several friends from my dorm, good friends were going to get jobs in New York [New York]. So, I thought okay. I will go. I will get a job in New York. I actually interviewed for a job at IBM and I think I was even offered it. I think I was offered a job in White Plains [New York] and I didn't want to work in White Plains. I certainly didn't want to live in White Plains. I hadn't lived in New York before, but I wanted a job in New York. I wanted to ride the subway to work and so on. I spent the summer after I graduated from college in Europe traveling with a friend, which was wonderful fun, but meant that I was officially on the job market in September. I tried when I was in college. I looked into this thing at IBM. I decided I didn't want to work in White Plains and they didn't have any jobs in the city. So, I came back from Europe and I had arranged with these three friends that we would…the four of us would be roommates. We had an apartment on East 88th Street. One of them was a schoolteacher. One was a first year graduate student in art history at Columbia [University]. One had a job…two of us were looking for work. So, I came back at that point and started looking for jobs and I ended up getting the world's dumbest job.

DOMUSH: Oh, no.

CHAPMAN: I worked as a computer programmer for Metropolitan Life Insurance Company. As I say sometimes to students, you know when…one uses one life as…I don't regret it. I did exactly what I wanted. I had that break. I earned money. I was on my own. I very quickly convinced myself that I wanted to be back in school. But the reason it was such a dumb job is Metlife, when they computerized their records they had made the decision to go with Honeywell, rather than IBM. Honeywell was very far behind and so they didn't have enough computers to keep up with things. It was such a big corporation that…again, all of this could be completely wrong, but it was my perception, that the people in the programming division didn't want to admit that nobody there could do any work because there weren't any computers, because that way their little world wouldn't have the same power. The Human Resources people kept on hiring kids like me to come and be computer programmers, and then they'd each us how.

In addition to having Honeywell machines, they had decided not to use COBOL which was the business programming language back then, but to have their own language which was called "Met English." They had written it. It was all fine and good. They had written it. It was incredibly cumbersome so that if you wanted to make a change in some program, it took literally hours to compile that. So, they put us through all this training and they basically told now there's nothing for you to do. We sat at desks. It was like a tombstone in Arlington Cemetery. It was desk, desk, desk, desk, as far as the eye could see, a city block full of desks. We weren't allowed to look as if we had nothing to do because that…now and then, they'd send us off and have us take another dumb course on insurance industry or something. [laughter] If we were lucky, they needed people over to mount tapes on the tape drive which was a union job with the union guys. If they were short of union guys they could send us over there when nobody was looking. And once in a blue moon, you could make some small change to a policy.

You'd sign various things….I mean, because the company would have come out with some new policy, so it was your job to go and change.

This was the time when computer memory was incredibly precious. Computers had very little memory. If you had a word of memory which was 36 bits or something like that, you used every single bit for something. You would use bit 33 to say, "yes or no that somebody had opted for something." But, in order to do this you had to take the word out of memory and then swap it around so that bit was in the addresser. Then change that bit and take it back, swap it back. I mean, it was incredibly clunky, elaborate program you had to do so that you could use every bit of memory because memory was such a precious commodity. Anyway, I learned some computer programming. I certainly learned that this was not my life. I earned a little bit of money, not much.

I decided at that point, I wanted to go back to graduate school. The one thing that was probably unfortunate is if I'd made the decision sooner I might have gotten more advice about where to go to graduate school. Not necessarily better advice…and again, my friends who like to tease me say that, "You wouldn't have gotten advice because you wouldn't have asked anybody." I don't know. I didn't sit down with anybody…the only person I sat down and asked a question about, okay, what would be a good graduate program in physical chemistry was my brother-in-law. My older sister Diana had married a biochemist [Christopher T. Walsh] who..let me think. At that point, Chris…yeah, but here I was in New York, he was in the Ph.D. program at Rockefeller [University]. He's incredibly knowledgeable. He's wonderful. Now, he's been at Harvard Medical School for a number of years. He's a very, very successful biochemist and a wonderful, wonderful human being. He had lots of friends, so he talked to his friends. I applied to Harvard [University]. I applied to Columbia. I applied to Yale [University]. I don't think I applied any place else. I didn't really…I'm not sure I visited places. I mean again, I look back on it, I think this is the most uninformed process. I applied to the Chemical Physics program at Harvard. I applied to Yale. I applied to Columbia. I was accepted by all three.

Why did I go to Yale? I went to Yale because when I read the Harvard letter…and this again, ignorance. If I'd shown it to somebody who knew something about it…basically the letter from Harvard said that, "I was accepted and that they would support me for the first year. After that I would have to be supported on the research grant of a faculty member."

DOMUSH: Right.

CHAPMAN: Well, that didn't sound very good. That sounded like they were only offering me support for a year and after that it was catch as catch can, which of course, is totally untrue, but that's the way I read it. Whereas the letter I got from Yale said you're accepted and we will support you through your graduate program.

DOMUSH: Which sounds a whole lot better.

CHAPMAN: Which sounds a whole lot better wording wise. It doesn't mean anything. What Yale was offering and what Columbia was offering was pretty much the same. I was living in New York and knew how expensive it was to live in New York. I thought I could live…I wasn't sure I could live in New York on two hundred eighty-three dollars and thirty-three cents a month, which was the going rate back then. The stipend was thirty-four hundred dollars a year. That was the standard NSF [National Science Foundation]. I mean, I didn't have an NSF my first year. I did my second year. So, I went to Yale. I mean, Chris had talked to his friends and they said Yale was pretty good in physical and Chris would always joke about [this with] me of course. As a Harvard man, he loved to dump on Yale and he still dumps on Yale. I think he said it was a good place. You know I have a lot of gripes with Yale, but I don't think it…I don't think it was a terrible decision.

DOMUSH: Was your friend from Smith that had started at Yale…

CHAPMAN: My friend, Stephanie was there. She was happy. So, that's how I went to Yale. Again, did I even…I don't think I even visited Columbia and I was in New York City. It was not…decision-making has never been one of my strong points.

DOMUSH: Well, that's very easy to look back and think why… you know, I should have done these things to help me make this decision. That's very easy looking back.

CHAPMAN: Right. In particular I think now…you know, why I didn't find the offer from Harvard more attractive. But that letter just didn't sound like they wanted me very much. [laughter]

DOMUSH: After you decided on Yale and you moved from New York up to New Haven [Connecticut], did you join a lab right away or did you have rotations or classes?

CHAPMAN: We didn't have rotations. We had to join a lab fairly soon. It was problematic in that that year Yale had many more incoming graduate students than they had expected or wanted. This of course happens and being on the receiving end of this is not good because a certain number of people had come in, and had already made connections, and knew they wanted to be in so-and-so. I mean, I was completely ignorant. I didn't even know […] the cast of characters. What we were told was how our first year we were to…we didn't teach our first year. We took courses and we were supposed to start pretty much right away running around and talking to faculty members about their research areas. I believe that we were supposed to

make a decision in November of that fall. I remember going around with a list of physical chemists. Again, I was not terribly self-confident at the time, so I would steel myself to go and talk to so-and-so. Several times the answer you would get was, "Well, no. I'm sorry there's no room in my group."

I wasn't…was I 100 percent sure I wanted to do computational chemistry? No, I wasn't because I'm not sure I even knew that computational chemistry existed. I talked with various physical chemists and basically…I mean, this is a terrible thing to say, but it was true, the guy I ended up working for was the least intimidating. I remember going in and talking to Marshall Fixman, brilliant man in statistical mechanics, National Academy member, all that kind of stuff. A very, very, nice fellow I now know. At that point, I was taking statistical mechanics and finding it very hard to make sense of and he got up there and he started writing things on the board. Well, I was lost after one equation. Then at the end of this he said he probably didn't need any students. So, then, I went to the next guy.

And so, basically I ended up working for this guy, Ray [Raymond J.] Suplinskas who was an assistant professor because he was, sort of, the least intimidating person. That was probably one of the poorest decisions I made along the way. Ray was a nice guy. It turned out he didn't get tenure and he left at the end of my third year. He was not particularly…I sometimes joke that my post-graduate education and my graduate school, sort of, backwards because Ray was not very engaged with his students. Even by the time my third year he'd already been told this was his, sort of, final year and he one foot out the door and so on. Probably it would have been…in fact, at the end of my second year when he was denied tenure and he told me. At that point, I'd gotten an NSF fellowship…I hadn't applied before in my first year, but Yale insisted we all apply if we hadn't before. So, I applied and I got an NSF fellowship starting my second year, which was good. […]

[…] I'd started on some dinky little projects. I mean, the stuff I did at Yale isn't particularly impressive. [laughter] I started on these projects and I remember the first summer I spent the entire summer trying to figure out what it was that he told me in this conversation that I should be doing, but it made less and less sense. The more time I spent, the less sense it made. Did I go ask? No. Until finally after literally spinning my wheels for three months, I finally went into him and said, "Wait a minute, this doesn't [make sense]." He said, "That's not what I meant."

DOMUSH: Oh, no.

CHAPMAN: You know, but one has to learn these lessons of asking. […] He was interested in an area called Hot Atom Chemistry. There was a lot of experimental research going on at Yale in this area where they were doing…using chemical accelerators and smashing things into them, seeing what happened. He was interested in modeling those. He had developed a pretty simple kinematic billiard ball model where you could understand some of these things. He wanted to extend that to charge species to put in through a small attractive force. Basically, it,

sort of, morphed from there into doing classical trajectory, which I've done every since, and writing from scratch a classical trajectory program using the classic paper by [Martin] Karplus, [Richard N.] Porter and [Ramesh Dutt] Sharma that had been published in 1964.[3] Basically I—from scratch pretty much by myself—figured out how to generate that, and that was interesting. Like I said, I like programming.

Anyway, when Suplinskas said to me at the end of my second year, "You know, they've turned me down for tenure, and I'll be leaving at the end of this year." He said, "You have two choices. You could continue. You're making good progress and probably at the end of another year you might have enough that you could graduate early. Or, you could change research groups." Well unfortunately, in my first two years at Yale, physical chemistry imploded. Dick [Richard L.] Wolfgang killed himself. [John O.] Rasmussen moved to [University of California] Berkeley. [Another Professor] was having a nervous breakdown. I mean, it was just, sort of, left and right. The number of people left…I mean, Phil [Phillip A.] Lyons was about to retire. The number of people who could serve… changing research groups…

DOMUSH: There weren't many options.

CHAPMAN: There weren't many—to me—viable choices, because these other people there […]. I decided I would finish up and so, I worked hard that third year. We got a couple of papers.[4] Now, was it one or two? They're pretty rinky-dink papers. I was more or less planning with Ray's approval to, you know, leave when he left with a Ph.D. which would have been […] he seemed to think it was okay. It was, sort of…I mean, almost a booby prize Ph.D. frankly, in my opinion. […] I had a very good friend who was in the research group of Dick Wolfgang. Wolfgang was a very distinguished physical chemist, experimental physical chemist. He had a fairly large research group, including a post-doc by the name of John [C.] Tully, whom I will mention again. He [Wolfgang] is the one that killed himself, but that's not part of this story.

As I said Tully was a post-doc with Wolfgang. There was a graduate student by the name of Richard [K.] Preston. Tully and Preston developed together a very beautiful theoretical tool which is to this day a very important contribution: trajectory surface hopping. It has to do with how you can take classical trajectory calculations and extend them into systems which have nonadiabatic effects and so on. It was really incredibly elegant and beautiful. They applied it to the reaction system that the Wolfgang group had studied quite thoroughly which was, protons colliding with H_2, so $H^+ + H_2$ where you have lots of interesting surface effects. They did, again very elaborate and very beautiful calculations. As I say it was a major, major piece of work.[5]

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[3] M. Karplus, R. N. Porter, and R. D. Sharma, "Dynamics of Reactive Collisions: The H +H2 Exchange Reaction," *Journal of Chemical Physics* **40** (1964): 2033.

[4] S. Chapman and R. J. Suplinskas, "Classical trajectory study of bond energy effects," *Journal of Chemical Physics* **60** (1974): 248.

[5] J. C. Tully and R. K. Preston, "Trajectory surface hopping approach to nonadiabatic molecular collisions: the

Now, one of the things that I had worked on with my dinky little single surface classical trajectories was the argon ion on H_2. Now, argon ion on H_2 is intrinsically a nonadiabatic system, but in my models completely ignored that and we basically had put together a potential surface that treated it as if it was a single surface problem…taking what was then the standard simple-minded A + BC surface and modified it a little bit so you could have long range attractive forces and deep wells. I'd done trajectories on these things. [...] I'd given a paper on this at a conference…it must have been at the end of my third [actually, second] year at a Hot Atom Conference at Brookhaven [National Laboratory]. That was one of these fifteen-minute papers. This was before poster sessions had been invented and so that brief contributions were these short papers which in some ways were insufferable to sit through. But I'm not a great fan of poster sessions either, but whatever. I gave this paper and I remember the big, big auditorium at Brookhaven. I don't know—several hundred people. This woman stood up. I didn't know who she was, never heard from her—never had heard of her. Of course, her name was Joyce Kaufman. Joyce Kaufman was a fascinating woman that I learned a lot about. She was a real battle-ax. She stood up—a short woman, sort of, shaped like a fireplug. In this booming voice said, "I have a question," slightly nasal voice. "I have a question for Miss Chapman." So, I stand up. She said, "You know, you ignored the fact that this is a nonadiabatic thing, and you ignored this, and you ignored, and you know…." I didn't understand the first word that she said. [laughter] I remember thinking what is this just…I just hated it.

Then the funny thing is…Dick Porter who was at Stony Brook and who was same generation as Joyce and very…actually *the* big classical trajectory paper that I'd worked from this Karplus, Porter and Sharma…and Dick was a real gem. Well, he stood up before I had a chance even…I was, sort of, taking a breath to say I don't know what. At which point he stood up and interceded. He said, "Now Joyce. You know that this is something." So, you know, there's this whole discussion. I'm just sort of standing there thinking, you know "get me out of here." Then I remember going to the ladies room later on that morning and having two or three people come up and say, "Ohh, to have Joyce Kaufman yell at you your first paper." [laughter] Of course, as I say later I realized she was absolutely right. It was just that I was…you know, anyway. That summer when I was getting ready to leave and I had actually a post-doc lined up, which meant the Brookhaven meeting had to have been the summer before because the post-doc was offered to me after Brookhaven. Anyway, that summer of my third year in graduate school when I was really, sort of, getting ready to leave. I had this hot atom paper and this, I had this bond effect paper and this [pending] Ar^+ on H_2 paper which they were going to say, "Okay. This can count as a thesis." A paper came out in *Chemical Physics Letters* which was a beautiful calculation of the family of potential energy surface for Ar^+ on H_2.[6] So, what this was, was exactly what was needed to take the Tully-Preston model and apply it to this system that I had worked on to do the right thing.

Actually, my friend Dick Preston was on his way off to a post-doc at Berkeley at the time. We were very, very close friends, and he came into my office and he said, "Look at this.

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reaction of H + with D2," *Journal of Chemical Physics* **55** (1971): 562.

[6] P. J. Kuntz and A. C. Roach, "Ion-molecule reactions of the rare gases with hydrogen. Part 1.—Diatomics-in-molecules potential energy surface for ArH+2," *Faraday Transactions. 2*, **68** (1972): 259.

Look at this. This is so exciting." He said, "I bet we can do this in two weeks." Well, of course, we could not do this in two weeks. So, we decided that we were going to do this. Well, you know, it turned out there were some minor errors in the paper took a while to sort out and so on. But I was really excited about it. I ended up deciding to stay at Yale another semester so I could finish this project. The guy I was going to post-doc for was perfectly happy about that.

In the meantime, Tully had left and gone for a permanent job at [...] [AT&T] Bell Labs. Preston had left to go post-doc at Berkeley. I was working on this. Suplinskas had left. So, I was, sort of, there on my own working on this. I consulted…because it was using the Tully-Preston model and because…and John [was] very bright. He was really the one when I would get in trouble and have something I really didn't understand or something, I would pick up the phone and call New Jersey and say, "John," you know. I sometimes joke…John spent several decades at Bell Labs. He's now on faculty at Yale. So, I sometimes joke that I was his first graduate student at Yale, because he really ended up being, sort of, my de facto thesis advisor during those last few months when I was finishing up this work. He's the only one I think who read my thesis with any care and so on. And I certainly felt a bit better about my Ph.D. with that piece of work on top of it, than I would have with the other. The other, too, I felt like it was almost fraudulent to me.

DOMUSH: When we first started talking about Yale you said that in some ways your Ph.D. and your post-doc education…they were kind of reversed. So, I assume that means that the post-doc…I don't want to put words in your mouth…but I assume that it sounds like they were more fulfilling for what you were looking for.

CHAPMAN: Well, it's not so much more fulfilling. I mean it's…I felt this way most extremely when I was a post-doc at Berkeley which was my second post-doc. At Berkeley, I was working for Bill [William H.] Miller, who is a brilliant, brilliant scientist. Bill is just …the ideas just pour out of his head. He had a fairly large research group for a theoretical research group at the time. When I arrived he said, "Here's some things you can do in your post-doc. You can do what you want, but here's some things I'm interested in and maybe you'll be interested in working on transition state theory with Bruce [C.] Garrett." I said, "Sure, that sounds interesting."

Well, in the course of that post-doc with Bill Miller, the way it worked for pretty much the entire year is first thing in the morning Bruce and I would go to Bill's office. He would hand us a thick stack of yellow paper on which Bill overnight had written equations, and equations, and equations, and equations of his next idea of what to do next. Then Bruce and I would go back down to the office and we would spend the rest of the morning going over these equations to make sure we understand what was going on. Then we'd spend the afternoon programming them up and then put them in the computer and they'd run overnight. The next morning we'd bring in the results and show them to Bill and he had another page of equations.

So, whereas when I was at Yale and to some extent even my first post-doc, there'd be a conversation and I'd go off. […] I described earlier that working on this thing for a whole summer when I was just completely confused. I mean, the amount of direction, and supervision, and the amount of ideas that I was given as a graduate student was nothing. I actually…when I was at Berkeley at one point, I had a funny conversation with a fellow who was a post-doc. I had arrived one day before he did, so we joked that I was the senior post-doc. Pete [Hickman] was working on a subject called Penning ionization which is something that Bill has been interested in on and off. Bill was obsessed by transition state theory at the time, and he was interested in pen-ionization. This mode where Bruce and I were there all…this was not the way Bill ran his group. This was just [that] Bruce and I were in the spotlight. I mean we joked…we'd have group meetings […] and the topic would be something or else and within ten minutes we'd be talking about transition state theory. It was just the one. I do remember thinking after about six weeks that this is really crazy because I am making no intellectual contribution to this. All I'm doing is running as fast as I can to catch up and understand the ideas that this man had last night and so is this where I should be at this point in my career? Then I said to myself, "This is an amazing experience." You know Pete and I would joke about it. Pete was, sort of, getting the…okay, this is what I didn't get when I was a graduate student. So, I'm getting it now, so why not enjoy getting it now? Even though some of the papers that came out of that post-doc…there are a couple of the ones that are probably the most cited ones, where I can say, "I feel as if my intellectual contribution to those papers is the least fraction of intellectual contributions to anything else that I publish."[7] On the other hand, it was incredibly exciting. If I had that experience as a graduate student would things have been…I don't know. It's just… that's the sense in which things were backwards.

DOMUSH: Well, and there must have been…I mean, even though you had a sense that, "I'm not contributing intellectually to this project or as much as I would have liked," that there must have been a sense of "but, I'm still learning the way in which science is conducted."

CHAPMAN: Oh, I was learning a lot. Yes. There's no doubt I was learning a tremendous amount. That's what I finally decided. Okay, here you're going to be…I mean, I'd already been a post-doc for a year and a half and this is the second post-doc. I didn't want to post-doc forever, so I said, "Why not spend a year, learning at the feet of a master and having this opportunity of seeing how this brilliant man does science?"

DOMUSH: How was the first post-doc—the one at [University of California] Irvine?

[7] S. Chapman, B. C. Garrett, W. H. Miller, "Semiclassical transition state theory for nonseparable systems: Application to the collinear H + H2 reaction," *Journal of Chemical Phys*ics **63** (1975): 2710; S. Chapman, B. C. Garrett, W. H. Miller, "Semiclassical eigenvalues for nonseparable systems: Nonperturbative solution of the Hamilton-Jacobi equation in action-angle variables," *Journal of Chemical Phys*ics **64** (1976): 502-509.

CHAPMAN: I had a good time at Irvine. Don [Donald L.] Bunker was a fascinating character. He actually, when I went back…I'll back up and say when I went to this Hot Atom meeting, right, giving the talk and Joyce. He actually came up to me…and it was the end of my second year of graduate school. He came up to me in that meeting and he said, "I want you to post-doc for me whenever you're ready. I have a place in my lab."

DOMUSH: Wow.

CHAPMAN: I was very, you know…wow. [laughter] When I went to look for post-docs, I really wasn't sure I wanted to work for him because he was doing trajectories. I thought I should do something different. I actually applied a bunch of places and didn't get them and, sort of, ended up picking up the phone and saying, "Did you mean it?" He said, "Of course I meant it. You know, come." He's a very interesting character. I worked on some interesting things. I can't say it had the…it wasn't at the same level as Bill Miller, but his style was so different. Don loved being out there at the cutting edge in terms of what one could do computationally. So, working on larger problems and inevitably being…the very fact that you're out there working on problems that are a lot bigger means making many, many more approximations, being much more…painting with a much broader brush. So, it's, sort of, a different kind of style, whereas Miller really liked doing things right, at least understanding the *detail* of what the approximations were. Whereas with Bunker it was, sort of, slash and burn style, but at the same time working on interesting things. He had a neat group of people. It was fun. I enjoyed it.

DOMUSH: So, in both of these experiences when you first got to Irvine and then you moved to Berkeley—and certainly when you moved to Berkeley—you were in a setting where you were having daily contact with your advisor…

CHAPMAN: Right.

DOMUSH: …all of a sudden. At Irvine, was it a difficult transition to have an advisor that was actually there?

CHAPMAN: Don was very hands-off. I mean he, basically…and this I think was intention. He'd, sort of, say what he wanted, "You know here are some things I'm interested in, and what do you want to work on? He ran his group as an extended family to the point that we had dinner at his house on Balboa Island a couple of times a week.

DOMUSH: Oh, wow.

CHAPMAN: It was really you know, sometimes excessive. In terms of science, you know, he was…he'd be wandering around and be talking. You could ask questions, but he also, sort of, let you off. He had some quirks. He thought that…again, going back to computers and what computers are capable of. Sizable portions of the programs that we used in the Bunker group were written not in a high level language, but in machine language, so that they would execute more rapidly. This was a different, kind of, programming and some of it I used to argue with him that you'd be investing many, many months of human time in order to save a few hours of computer time. Is this really the best? It was a philosophy of his, so I learned some.

Anyway, I can't say it was intellectually the best experience in my life. It was…you know, I learned some things and I think I gained some confidence in Bunker's group that I hadn't had. I mean, some of it I've even said this to students. I mean, some of it was really…I remember they had a speaker come through. [...] I think it was Lionel Salem, a French quantum chemist, but it could have been somebody else. This person was talking about nonadiabatic effects. Now this project I talked about working with Tully and Preston was nonadiabatic effects, so I felt this was something I knew a lot about and the talk was quite wonderful. I wanted to ask a question. I was ready to ask a question and I realized, I was drenched in sweat I was so nervous about asking a question because I never had. So, I said to myself, "This is not a good thing. You've got to get over this."

I set myself the task for the next few months that I was going to ask a question in every physical chemistry seminar come hell or high water and I did. I got a lot better at it. So I […] to some extent I always, sort of, worked in a cocoon. I grew to manage to come out of that cocoon a little bit when I was at Irvine. I think that was partly with Don's encouragement. I was looking for jobs at the time and this was…I left New Haven in January of 1973. So, I didn't look for jobs that first semester, but then the next year I was looking for jobs. I was at Irvine for a year and a half, but the full year and then the following year at Berkeley I was on the job market. It was a very tough time for looking for jobs. It was also the early days in terms of people interested in interviewing women. So, I was flying all over the place on job interviews. In more than one instance would be told behind closed doors that there was absolutely no chance in hell…that this was simply because they had to interview a woman.

Don Bunker, bless his heart, was a great champion of women and minorities and so on. He'd always give me advice about what to do and what not to do, what to say and what not to say. That was also part of …I think one of the benefits of being in his group and advice about how to deal with various situations.

DOMUSH: When you would go on an interview and someone would tell you behind closed doors you're not really a candidate, we just had to bring a woman out there. Were these academic positions or industrial?

CHAPMAN: Oh, yeah. They were faculty positions.

DOMUSH: Okay. So, was it a chair that was telling you this?

CHAPMAN: No. It would be somebody in the department who would say…the gist of what they would say was always meant, I think, as don't get your hopes up and don't be discouraged if you don't get this job, because no matter how good you are, you aren't going to get this job. Because either we already decided who it was going to go to or there really is no interest in hiring a woman. Or something. So, the idea was to say…I don't know. I'd still […] give it my all, but usually it was meant genuinely as a kindness to say that. So, that don't be discouraged if you get turned down, because…

DOMUSH: But there was no understanding that the attitude behind saying that was not in kindness. That they just, kind of, assumed that that was…

CHAPMAN: Well, I think they were being realists. I think the person who was saying it to me, wasn't saying, "You're not going to get this job because over my dead body there isn't going to be a woman in this department." They say, "You're not going to get this job because it is my perception," you know these were people who at least implicitly in what they were saying is, "I wish it were otherwise." No, it wasn't that anybody said you know, over my dead body, we're never going to hire a woman. I think that kind of person had been by that point, toned down, and told they couldn't say that. It was said much more from the point of view of somebody that I had known or met at a meeting or something who said, "Look. I'm really glad you came and you gave a great talk. I don't want you to get discouraged by the fact that if you get turned for this job because you're going to get turned down for the job." Which in some ways, you know, meant you didn't set store…you went on. You did more interviews and so on. I saw a lot of country back then. [laughter]

DOMUSH: Then how did you end up here at Barnard?

CHAPMAN: Well, that year from Berkeley…I don't remember exactly how many places, again, I had had half a dozen or more interviews.

DOMUSH: All the interviews were academic positions?

CHAPMAN: Yes. Yes, mostly at universities. I hadn't gone out and specifically looked for small colleges. You know, I suppose by that point, I'd, sort of, convinced myself that if the brass ring was a university, that this is what you did and this was what you aspired to, and

maybe if that didn't work out you do something else. But, this was if you were good enough that's the job you got. I'd been offered one job the previous year, but I had been interviewing for a tenure track job. The job I was offered was not tenure track. Don Bunker was very adamant that you do not accept the "bait and switch" offer, even though they had made all sorts of comments about how we really, really want you and blah, blah. It will turn in…he said […] there are no guarantees and so I think he was probably right.

DOMUSH: May I ask where that was at?

CHAPMAN: University of Missouri. Then the next year I was interviewing and I had two offers. As I say it was really a tough time. I remember I applied the first year for a job at UC [University of California] Santa Cruz. [laughter] The letter I got back from them said they had seven hundred applicants for a faculty position in chemistry. Sort of, the irony of getting some of these job interviews which were not in good faith is that I had friends, very bright, very capable friends who weren't getting any job interviews at all. From their point of view and I certainly see their point of view, at least I was getting a foot in the door. Sometimes if the foot in the door was really not in the door, but in…turned out to be out the backdoor, at least I was getting a chance. It was complicated. It was a tough time. Anyway, the next year I went out and interviewed again. I had two offers. One was from UMass at Boston [Massachusetts]. The other was from Barnard.

DOMUSH: This time both were tenure track offers.

CHAPMAN: Both were tenure track offers. The guys at UMass Boston very much believed at the time that this was an up-and-coming campus. It was really where the University of Massachusetts was going to grow, and it made a lot of sense in the Boston area. They had computer facilities to die for. They had a nice setup package. While it certainly wasn't a first tier or maybe even a second tier, they made it…there were very smart, capable people there. They made it sound as if this could really be in time a pretty good university and that graduate students…while you wouldn't have great graduate students, you'd have graduate students and so on. It would be a university research job.

The day I interviewed there—one of the days I interviewed—when they talked about…just casually over lunch and so on…when they talked about their […] undergraduate students, it was with such disdain that I found it very unpleasant. Then I came to Barnard and clearly, I wouldn't have graduate students. This whole idea of running a graduate research group and so on. But, on the other hand and of course, I'd gone to Smith. I'm familiar with this kind of world. Everybody talked about how wonderfully bright and capable the students were.

Dick [Richard N.] Zare was then at Columbia. He left and went to Stanford [University] a few years later. Dick, whom I knew from scientific meetings, made a point of coming over

and saying that he was very, very eager for me to be here. He would enjoy doing any collaboration to whatever extent I was interested in any way. I mean, Barnard had no computers, but Dick said, "Look I can figure out a way to make sure that you have access to things at Columbia. It just sounded like a nicer all around thing. I decided to take the Barnard job.

DOMUSH: Well, I think that that sounds like a really good place to stop for today.

CHAPMAN: Okay.

DOMUSH: It's been about two hours. Tomorrow we'll be able to pick up with you at Barnard.

CHAPMAN: We're going slowing through the bio stuff, but that's because I go on and on.

DOMUSH: No, that's great. I think it's gone very well.

CHAPMAN: Good.

DOMUSH: So hopefully, you do too. So, we will stop for today.

[END OF AUDIO, FILE 1.1]

[END OF INTERVIEW]

INTERVIEWEE: **Sally Chapman**

INTERVIEWER: **Hilary Domush**

LOCATION: **Barnard College**
New York, New York

DATE: **6 January 2009**

DOMUSH: This is day two of our oral history interview. Yesterday we left off and you had just accepted a position here at Barnard. You said one of the things that you were so excited about was it felt very friendly. Dick Zare who was at Columbia at the time said there might not be computers for you to use at Barnard, but you could come, and we could figure something out. We'll make it all work. Before we start talking about how that worked, I wanted to know a little bit about how you got interested in teaching or if you were interested in teaching at the time or that was just the job that, kind of, came up?

CHAPMAN: I was interested in teaching. I was not…I, sort of, alluded before that I certainly know a number of people—people who I now count as good friends—who knew early on that they wanted to be a teacher at a liberal arts college. As I say, I applied at a lot of universities and so on. I enjoyed the teaching I had done as a graduate student, although it wasn't lots of it, but being a TA, and lab sections and so on. I had done some tutoring when I was…even in high school I had done some tutoring. As I mentioned last time, spent a summer in Mississippi and that program was a lot about teaching. In fact, in some ways the teaching part of being a professor was the part that I felt more confident that I would like and knew how to do. The research piece was something that I had enjoyed very much as a graduate student and it was exciting and so on. Yes, I mean, teaching was […] I mean, I wasn't someone who knew for a long time I wanted to be a teacher.

DOMUSH: But it was always something…when you had partaken in teaching activities, it was something you had enjoyed.

CHAPMAN: Absolutely. Yes. Yes.

DOMUSH: Maybe before we go, maybe this would be the best time to talk a little bit more in detail about what you did when you were in Mississippi […] you said that it was in teaching and it was from a Smith program.

CHAPMAN: Right. It was very interesting. I went to a lecture. Smith had visiting lecturers on all sorts of things. I enjoyed part of…what I enjoyed in college was going and looking on the calendar and if there was some interesting visitor, I would go even if it had nothing to do with anything that I had a particular connection to. Well, the speaker of this particular day, I think it was probably December or January, was a woman…her name then was Marian Wright. She's now Marian Wright Edelman. She's head of Children's Defense Fund. At the time she was quite young, incredibly energetic, still is very energetic. She's African-American. I can picture her now. She was thin and fiery and just utterly charismatic. She came and she was then counsel for the NAACP [National Association for the Advancement of Colored People] Legal Defense Fund, which at the time was working very hard to do something about segregation in schools in the south. In particular what her organization wanted to do was—she was a lawyer—they wanted to confront in the courts some of the very elaborate and unfair things that state legislatures had come up with as ways of—of course this was more than a decade after Brown v. Board of Education.[8] Still a lot of the schools were still completely segregated. There were bizarre arguments that were used and so on. In talking about this, [she] said that for example that the high schools in Mississippi were going to be desegregated for the first time the following fall. That the system they used... and I've got to go…you have to stop me if I go on too long about this. The system they had proposed to use was that if a Black kid wanted to go into the White school they had to sign up months and months ahead of time. It was public knowledge. They couldn't reverse the decision and their family was immediately subject to all sorts of harassment. So, the numbers were very, very small. It was just at the…clearly a system that was setup to keep the Black kids out of the White schools.

What she was saying…and I had never asked her whether she…you know, was it her plan when she came and gave this talk that she would get people so excited that they would get something started? What she was saying is, "I need to have these kids brought together in the summer so they can get to know each other, so they can get to know what their rights are. So, that they can…so, our organization can get to know them, so when they run into trouble they know who to talk to and so we can build cases and so on."

DOMUSH: That they have a network. It's not just one person.

CHAPMAN: Right, exactly. I wasn't at all involved in what followed immediately after, but a bunch of faculty from Smith, and Amherst [College], and so on got very excited about this. This was of course during the [Lyndon B.] Johnson Administration. There was the War on Poverty. They had things called demonstration projects. So, they got together and got organized and wrote a grant proposal for a demonstration project that was funded by the government to have in Mississippi a summer program for…pretty much as I described. It was to bring to a…and it ended up being on the campus of a very small, old junior college in northeastern Mississippi, Mary Holmes Junior [Community] College. There were about two hundred kids, all of whom were going into the White schools. A few had already been in the

[8] Brown v. Board of Education, 347 U.S. 483 (1954).

White schools for a year because in one or two localities there had been a program the year before. They're going into various grades. And basically, they got the money and they set this thing up. It was a joint venture involving Smith, and Amherst, and Tougaloo College in Mississippi, and Spellman [College] and so on.

They put out announcements asking whether people wanted to come down and be tutors and be part of this project. It sounded to me…and then I heard this talk and it just sounded fascinating. So, I signed up and I went. My parents, particularly my father, wasn't very happy about it, but I'd been raised a member of the Society of Friends and, you know, Quakers care about such things. I mean there was, sort of, a funny way in which…put your money where your mouth is. [laughter]

As I say it was just an extraordinary experience. The way the program was setup there were…we had kids going into ninth, tenth, eleventh, and twelfth grades. Each tutor was given a group of eight students who were going into a particular grade. Then we had high school teachers—Black high school teachers—who taught in the Mississippi system. I mean, it was nominally a tutorial program. I mean nominally, it was working on academic skills so that these students would be better equipped to deal with the challenge in school. That was of course, the way it was sold as this program. Of course, there was this whole…and it wasn't hidden, but there was this secondary, but in some ways primary objective which was the networking and getting there.

I had a group of eight tenth graders. The way the program was run is they had a social studies class or a science class. I think we did two one-day and then two the next day. They'd have a regular class with a teacher. Then they would have a tutorial session and that was, sort of, how we did mornings. Afternoons there would be various activities and things and so on. This very sad little Mary Holmes Junior College did not have much in the way of resources. It was right outside…I mean West Point, Mississippi, the nearest big city was Starkville [Mississippi] where Mississippi State [University] was, which it was…anyway, I shouldn't go on and on about it.

But, it was an extraordinary experience. As I say, the summer of 1967 was the summer that there were the riots in Newark. [...] It had been the Six Day War in Israel. There was, sort of, incredibly complicated and incredibly difficult politics both within the group and with the outside. It was dangerous. It was you know…it was an extraordinary experience.

It was I think in a funny way…that was maybe one of the last years…when people think about, Mississippi and Freedom Summer that was 1964, where all these White kids came down and worked with the African-Americans with voting rights and so on. I think that Black Power and the way the whole Civil Rights Movement was changing, I think that this was really in some ways the waning of the role of White people in things like this. Because there comes a point when…

DOMUSH: The movement had changed.

CHAPMAN: The movement had changed with Black Power and so on. There was a great deal of that tension when we were there. So, it was a very, very profoundly moving experience at many levels. Even at the simple level of these wonderful, wonderful eight students that were in my tutorial group who…I mean, the Mississippi educational system—I think it's still fiftieth in the nation. The Black Mississippi educational system was just abysmal. Some of these kids literally could not read or write. Others were, I mean I remember what one young man, Keith Moses, I don't know why, but I picture him there. He was smart and he could write. He could…you know, he was full of ideas. But I had another young man [Ed Duffin] who really just barely could read and write. I grieve for what would happen to him when he ended up in the White school. What we were told…probably true, is that most of these kids came from families that were activist families because you would not…

DOMUSH: You wouldn't volunteer…

CHAPMAN: You wouldn't have volunteered to put yourself at that. They knew that they were doing this for a reason and it wasn't going to be easy. It was very inspiring in some ways. They didn't make a big deal of it, but it was clear this, was who they were. It was very admirable.

DOMUSH: Did you after that summer and you went back and you finished your time in Smith and you spent some time in New York before going on to graduate school and all the rest of those things we discussed yesterday, did you find ways to…or time even, to do anything else…not on the same scale?

CHAPMAN: No, I didn't. I didn't. It was…it's a very good question. I'm not sure I know what the answer to "why." Partly it was because this had been, sort of, this extraordinary moment. Partly that you know I was doing other things and so on. It was interesting. I was in graduate school when, sort of, the women's movement was getting to be a bit more. But certainly when I was in college there wasn't much of that.

I was part of a women's [group]…it was graduate women mostly. We met at the law school. We met once a week and we talked about women's issues and so on. It was interesting to me and in some ways it was…I mean, it was interesting to me to, sort of, make comparisons. It some ways it was liberating to be able to talk about something where…how to phrase this so it makes sense? In Mississippi as passionate as one could be about what was being done, it was…I mean, I felt at least in my mind, I don't know if everybody else did, but that it was very, very important never to step up and take a leadership position. We were there to help and that the Blacks had to be the people who were…so, there was this constant sort of self-censorship because this was not…

DOMUSH: To stay in the support role.

CHAPMAN: This, sort of, evolving notion that you can't have Whitey come down and think that he's so great and can do. Sort of in some ways, sort of, getting involved in the early part of the women's movement…again it wasn't a big deal. I wasn't out there doing massive things, but it was, sort of, nice not to have to constantly feel that you had to self-censor. Because it was somebody else had the right to be standing up and being in charge.

DOMUSH: Now the group at Yale you said you met in the law school. Was it mostly…I'm trying to think how to phrase this. Were many of the participants graduate students in the law school or the medical school?

CHAPMAN: It was mostly…it was a small group. It's funny. I remember, I think I was really involved mostly one year. I think it was during my second year. I don't even remember how I got involved. I do remember I'd go down and it was probably half-and-half graduate students and law students. I must have gotten involved because some friend, who was a graduate student and said come along some time. A lot of it for me was tremendously eye opening because the sort of things that it…things that I always thought were just "that's the way the world worked." Suddenly they're much more—people who are sort of much further along in this than I, were saying, "Wait a minute, you know this is wrong." I mean, one of the things we got involved in and you know it was…there is an eating establishment at Yale called Mory's.

DOMUSH: Yes.

CHAPMAN: "From the tables down at Mory's" and so on. Women were not allowed in Mory's. There were certain places, but they basic…most of Mory's was men only. When recruiters would come to the campus, they always had lunch at Mory's and they'd invite people and you know the women couldn't come. People said, "Well, we're sorry, but that's the rules of Mory's that women…" Now you look back on it and say of course, this is totally unreasonable. When challenged the people would sort of "what do you mean it's unreasonable. I mean, this is the way we've always done things." We actually picketed Mory's at one point and got a lot of flack. [laughter]

You know Mory's still […] back then and even now, I can get in discussions with people and I say there you are teaching a single sex college. [laughter] You know, but you're not being consistent. What is your beef? What's wrong with men-only organizations? I have no beef with men's-only organizations. When men's-only organizations are places where decisions are made and women are excluded from being able to be part of that decision-making because

that's…that's my objection. You know, if you guys want to go and sit in a back room and get drunk together, more power to you. I don't want to be part of that place.

So, it was interesting. As I say, we'd sit around and talk about…I mean, I think as I say women…and you know what, the funny thing is I don't remember names. I sometimes joke to myself…when Hillary Clinton was in law school at Yale at the time, she certainly wasn't political. Catharine MacKinnon, who had been in my class at Smith…she wasn't part of the group, but she's also a very prominent feminist lawyer. It was just, sort of, a casual group of women. I remember being teased by my graduate school friends because you wore this button with a fist and something. I was one of those women's libbers and so on. I mean, dumb things like at one point, people started slamming the door in my face because, well you know, you're a women's libber and so you don't want people to hold the door for you.

I don't think Yale was a particularly awful place, but in many ways…it was such a male bastion. And dumb but very real ways and this…yes, it was my second year of graduate school when I went skiing in December and broke my leg. I was in a cast for about six weeks. When I got the cast off my…I mean, I'd messed up my knee and broken my leg, when I got the cast off after a couple of weeks my knee wasn't behaving properly. The doctor at the health service said, "Well, you need physical therapy." He said, "Now, here's where you go." He gave me an address in the next town over. I, sort of, frowned. […] He said, "Oh, no, no. The facilities here are for men." I said, "In the dead of winter on crutches, I have to go to the next town over because," I said, "What is it?" Oh, well we're planning to build a better facility. We build a better facility, we'll be able to handle both men and women, but it's just not [possible yet]." I said, "Look. You know whose modesty are you concerned with?" If you're concerned with my modesty, I can dress myself in such a way that you know if it's work." Oh, no, no, we can't possibly, you know." My great triumph was to get them to spring for cab fare and they really thought that was pretty outrageous that they should pay cab fare for me to go to the next town over to have physical therapy. [laughter]

DOMUSH: Wow, that's an aspect of that movement and that era of being restricted from things that…I had never thought about being restricted from physical therapy.

CHAPMAN: Well, their health services had been built when Yale was all male. But of course, there had been graduate student women for years and years. But they, sort of, never thought about that. It was for the athletes. You know the athletes this and the athletes need their space. You can't have a woman in there. And of course, I mean, I didn't win, but that's the sum total of my victory was cab fare. I mean, I certainly would not…and let me go back to your original question, I can't say that my involvement with the women's movement was in any way equivalent to being involved in the Civil Rights Movement. There was, sort of, a continuity there.

DOMUSH: As you said, it was an eye opening experience for you. It was important to you and you were doing other things at the time. You certainly couldn't…

CHAPMAN: There was also the Bobby Seale trial while I was in New Haven, which was…I don't know if you remember. You're too young. There was a…I don't remember, what was Bobby Seale on trial for? He was on trial in New Haven and this was right during that, sort of…it ended up being the week before Kent State [4 May 1970]. There were lots of demonstrations and he was on trial. He had been one of the Chicago Eight. And there was this huge demonstration in New Haven. There were in fact people who really thought that New Haven was going to burn down that weekend because people were coming in from all over the country and so on. I signed on to be a marshal and was very much involved in trying to be…to do what could be done to for maintaining peace and so on. I know a lot of my friends thought I was crazy. So, yeah, I still had some political involvement, but I can't say I was, you know I was real…

DOMUSH: Busy?

CHAPMAN: Yeah.

DOMUSH: In thinking a little bit about the kind of women's group that you were involved in at Yale, how did it change? I mean, I know the times were changing very quickly, so it may be that this is not a location issue, but, kind of, time had passed. When you got to California for your post-docs…

CHAPMAN: Oh, that's a very interesting question. Being a post-doc and being a graduate student are such different things. I mean, being a graduate student, at least for me, being a graduate student you really are part of this community and so on. Being a post-doc, you come in, you're part of the research group, but you don't have…at least I didn't have the same sense of depth of a network of connections and so on. I had mentioned in a comment yesterday that the fellow from when I worked in my first post-doc, Don Bunker was a man who cared deeply about gender equity and race and so on. He's a fascinating, but complicated character. He had…I think he was either then or had been recently before then on some University of California wide committee having to do with…

DOMUSH: Affirmative action?

CHAPMAN: Gender affirmative action and so on. We'd have conversations about this. I was no longer, sort of, involved in a group of women, because I really didn't have that kind of

network. I think that in a sense and whether it's…you know, as you say the times were changing. Whether this is just my own experience or whether it partly had to do with time changing, I think a lot of things had become more…discussions were in the common media. Issues of women and getting jobs and you know, I should go back some time. It'd be interesting to go back and see. I do remember that in graduate school *Chemical & Engineering News* every year had an article about the women in the chemistry departments. Back then, it was, you know, there's a woman at Place X. There's a woman at Place Y. Otherwise, none of the top twenty-five Ph.D. granting institutions have any women. It was, sort of, you know where are we? I really laud *C&E News* for every year that they collect the numbers and they put the numbers out there and so on. Because you know, scientists are data driven and seeing the numbers and after a while, you realize that this is something real. It's an interesting question. I mean, I was not…I have not been as involved [as] part of a group, as I was when I was…oh, the other thing we were involved in at Yale was this group, again because of the law school women were very interested in abortion rights. Of course, I should say back then this was pre Roe v. Wade.[9]

DOMUSH: Right.

CHAPMAN: They were working on a lawsuit, "Women v. Connecticut" and this was a class action suit to challenge the Connecticut law [on abortion]. We collected signatures on that and that kind of thing. Then along came "Roe v. Wade" and thank goodness that that was no longer something that had to be done. Certainly when I was a post-doc there was…you know, I think affirmative action was something that chemistry departments were beginning to worry about. Again, I, sort of, alluded to this when we talked last time about when I think departments were hiring they were felt some obligation to consider women applicants and so on. The numbers were still very small.

DOMUSH: When you came here to Barnard, what was the professorship makeup like in terms of women or men?

CHAPMAN: Okay. Barnard, when I came there were four faculty members. We were two and two. [phone ringing]

DOMUSH: Okay. Do you want me to pause this?

CHAPMAN: I think I'll just let it ring.

[9] Roe v. Wade, 410 U.S. 113, 116 (1973).

DOMUSH: Okay.

CHAPMAN: It'll pick up in a minute. Okay. We've more or less maintained fifty/fifty. I mean not exactly, but pretty much since, I've been here. When I came, there were four faculty members of professorial rank though. The person who hired me was an extraordinary woman whose name was Bernice [G.] Segal. She had been at Barnard for a number of years. She was an extraordinarily powerful woman and for me in many ways a very important role model. I sometimes joke that I was almost thirty before I got a Jewish mother, than I got one with…Bernie was a power to be reckoned with. She was such a supporter of mine. I mean, she just went out of her way in so many ways to support me. When I joke about the Jewish mother thing…it's that Barnard is not now and certainly was not then very well endowed financially. Particularly, I mean it depends on who you compare it with, but compared with those other Seven Sisters and so on, we really are…our previous President at Barnard used to joke about Barnard being a bag lady of the Seven Sisters. So, budgets were really, really tight back then. They're still pretty tight, but not the same way. The chemistry department had two outside telephones for the entire department.

Bernice and I had offices on the sixth floor and then the two other faculty members had offices on the seventh floor. There was one party line that we shared for an outside phone. Well, the phone would ring and I would pick it up and start talking to somebody and Bernice would be on the other end and she'd listen in. [laughter] I know it was done with absolute…this woman has, there was never…she's always incredibly generous and it was nothing sneaky or anything about it. She would listen in because she wanted to figure out whether maybe this person was calling her and so on. Sometimes I'd say, "Bernie, it's for me." Sometimes I still would hear her.

At the same time, she was…as I say she was incredibly supportive and she herself would tell stories of her academic career. She had gone to Harvard as an undergraduate and was very, very proud of that. I remember once when a visitor came and somebody who she was very impressed by and they're sitting at lunch. Bernie sort of perked up and said, "Well, three of the four of us have Harvard degrees." A friend, one of my friends who was not one of the…leaned over to me and whispered and "yes, and three of the four of us are New York Jews." I said, "God, then I'm out of it in every respect." I should know what year she graduated. I should know her age.

DOMUSH: We'll be able to add it in that later.

CHAPMAN: Anyway, she'd gone to Columbia graduate school. Then when she was looking for jobs…and at that point, people would just come right out and say, "No. No, there's no way in hell we were going to have a woman." She'd come to Barnard…at one point, Columbia wanted her to teach some graduate course and the Chair pulled her in and said, "You better not think that this means that we're ever going to want you to be a member of our department." It

was a very different kind, because it was very explicit and everybody, sort of, accepted this is the way things are. I think and I hope this doesn't…but I really do think that Bernice in her encouragement of me…I mean, she'd say things that sort of, you know she saw in some ways myself in her. So, she was going to see to it that I got the opportunities that she didn't. She was quite wonderful. She gave me lots and lots of excellent advice in terms of…I mean, Barnard and Columbia's relationship is very complicated.

We can go on for hours and I won't, but Barnard has been affiliated with Columbia its entire history. Since 1973, tenure cases at Barnard have had to go through the Columbia review as their final stage. There was a period in the 1970s and 1980s and maybe even beyond that, well particularly in the 1970s and 1980s, when this was very, very problematic. Because you know in the early 1970s, Yale and Princeton [University] and so on had gone coed. Columbia didn't. I mean because Columbia had Barnard and they had this affiliation agreement. Moreover, I would argue that Columbia after 1968…when I arrived in 1975, it was quite clear that the events of 1968 were still raw on both these campuses. I mean, this campus had practically gone up in flames. So, that gender was not on anybody's radar. There were plenty of other things that they were worried about. By the time that, when I first arrived at Barnard in many people's minds, Barnard's days were numbered. It was simply a matter of time. You know, they would say, "Well, look Harvard and Radcliffe [College] have merged, and Brown [University] and Pembroke [College] have merged, and surely, it's time for Barnard and Columbia to merge. Of course, there's one fallacy in that is that…I mean, Radcliffe never had its own faculty [so,] that to make those analogies really…

Some people will say, and I don't know whether it's true, because I wasn't privy to the discussions. But some people will argue that one of the reasons in 1973 that Columbia insisted on having final say in Barnard tenure decisions was the assumption that when and if Barnard disappeared, tenured Barnard faculty would be a liability that the university would probably have to swallow, not legally, but ethically. And indeed there was a memo that was not for public consumption, but I saw a copy of it in which the then provost wrote a department to basically say the Columbia department when it was supposed to vote on a Barnard candidate to say, "You should consider this as a tenure slot in your department." So, it was very difficult and it made life very difficult in this department for a long time. I got tenure, whenever…I got tenure the day [Ronald W.] Reagan was shot [30 March 1981]. You know I'll have to look it up and see. [laughter] I should also add to this and maybe it's relevant, maybe it's not…my wonderful colleague Bernice Segal was diagnosed with breast cancer just the summer before I arrived. She had surgery and she was somebody who was…nothing held her down, so she was back and going again….on chemo and so on, and then after, if you make it for five years, things are great. Well, she made it for four years and the cancer came back. I think not only was Bernice supporting me because she was that kind of mentor and advocate. Also, I think she was looking for the future of the department and at some level sort of realizing that she was seriously ill and so on. I sometimes say half jokingly that Bernie ran me through the tenure system because she was such a forceful person that they didn't dare say no to her.

DOMUSH: When you went through the tenure process, did you have to go through Columbia as well?

CHAPMAN: Yes. I got tenure and then my colleague, Les Lessinger who came two years after me. Brilliant man, and got tenure two years after I did. Then so, I would have gotten tenure in maybe 1980 and he in 1982. There was then a twenty-year gap when nobody in my department got tenure.

DOMUSH: Wow. That's partly because they were…

CHAPMAN: Well, it's because of the Columbia thing. I mean, the fact that there was the Columbia hurdle at the end, raises the bar higher than it might be at a stand-alone place. Plus, there's this complicated tension which exists in any research and education institution…what is the balance? People can say all sorts of brave things about teaching and research and how research informs teaching and blah, blah. I buy that completely that people who are good, active researchers are also good teachers and so on. The bottom line is there are twenty-four hours in a day. At some point, yes, you can be brilliant in the classroom and so on, but the kind of teaching that I think a place like Barnard…and here I can only speak for chemistry because things are different in different departments. The kinds of thing we can do for our students, that is what makes a Barnard education something especially valuable, is to be here for them hour after hour after hour. You can't do that and also have the kind of research productivity working strictly with undergraduates. I mean, no one expects that a faculty member at Barnard is going to, in any way be comparable to a faculty member at Columbia in research productivity. Fortunately, even though I say that and at Barnard, the last hurdle is the Columbia review, it's not that we are held to the same standard because none of us would be here if that's the case.

On the other hand, you read the language and they…and it's evolved over the years. It's a little better now in terms of the language in the letters that go out to the referees commenting that this person is from Barnard and they had a different working environment. There was a time when the letter that went out was a Columbia letter and it didn't say boo about Barnard. It required…how to say it….I get quite worked up about this because…

DOMUSH: I can imagine.

CHAPMAN: It was as colleague and department chair of a bunch of good people who didn't make it, and it's been hard over the years keeping this department strong and thriving, when people can't succeed. Now, what I can say is that we have turned a corner. I think several factors have contributed to this. One is Barnard has acknowledged to a much greater extent than it did back in the 1970s and 1980s, that there simply has to be better support for faculty and that faculty are not going to get tenured if they don't have more opportunity to do research. So,

things like a special assistant professor leave. After you have a successful third year review you're eligible for a semester off where you can push your research program at a very key point. Then some course reduction both in your first year, and in the fourth, and fifth year. Plus, startup funds which once upon a time, was almost negligible. Now, they're still not what they are at some places, because Barnard doesn't have lots of money. But, I think the college has really…and I think this is the administration. This is recent presidents and recent provosts and so on, have seen this has to be a high priority for the college. The last two people who come up for tenure in our department have gotten tenure, including one two weeks ago.

DOMUSH: That's great.

CHAPMAN: Wonderful and then we have two wonderful, young organic chemists who have tenure. We've got some…it's been very hard at some level hiring people because I've had to look them in the face and say, "Look. I believe this is a place where you can come and you can thrive and you can get tenure." There was a time when saying that to somebody and saying it to them honestly and in good faith, was hard. Because I did believe it, but I also at some level had to say, "But, I think it's going to be a crap shoot and it may not work." There was at least one case that ended up in lengthy litigation and another one now.

Anyway, it's complicated because we have a very…the Barnard chemistry department has in many ways a wonderful working relationship with the Columbia department. As far as teaching and so on are concerned, we're completely separate. We have our courses. They have their courses. We even have the courses sequenced differently so that there's not a whole lot of traffic.

DOMUSH: Right. You said that students take one semester of general chemistry and then start organic

CHAPMAN: In fact, the fact that we start organic in the spring and Columbia starts organic in the fall, there is some traffic back and forth in that course. Because that means if a student at one school or the other for one reason has a problem and falls behind or can't take the course, they don't have to wait a year. They can cross the street and take the course a semester. That in fact is a positive thing. The Columbia people are quite generous about access to the kind of major equipment that you can't have at a small place and in some ways have been supportive of our people. But, it hasn't always been rosy.

DOMUSH: Well, I know, just from my own experiences in graduate school in chemistry, it can be very difficult to walk down the hall and say, "Can I borrow this piece of equipment?" Because whoever owns that equipment…they always need it. It's not necessarily that they're trying to wish you ill will or sabotage your experiment.

CHAPMAN: Right.

DOMUSH: There's always going to be an excuse of this is ours and we really need it right now.

CHAPMAN: It also, sort of, depends on the area in which…when I first came to Barnard as a gas-phase physical chemist, computational type, it was absolutely fantastic. Because in terms of interactions with people at Columbia, because they had a whole bunch of people, both experimental and computational, who were interested in gas phase reaction dynamics: Dick Zare and George [W.] Flynn and Rich [Richard] Bersohn and Bruce [J.] Berne and Phil [Philip] Pechukas and so on.

They had evening physical chemistry colloquia. I felt that I could go to these things and I was on a lot of Ph.D. dissertation committees and so on. I really felt very, very strongly connected to the department. I would sometimes say when I go off to scientific conferences that in some ways, it could be the best of all possible worlds, because I love being at a small college where the time you take with students is valued and you feel that it is your job. It isn't your job to get them out the door so you can get that next paper written. It's your job to be spending time with students. Yet, I had friends who were at undergraduate colleges, who felt so isolated scientifically. This was of course, pre-email or early email. I mean I remember going to a conference […] at Berkeley and walked into the chemistry library. There was this fellow there that I'd known as a post-doc. He had tears in his eyes because he was in a real library and he was at some small branch of University of Texas, nowhere. He said just getting access to a journal was a major thing for him. Of course, here again it's a place where electronics have changed things tremendously. It was really very wonderful because I could, sort of, go across the street and talk to the Zare people and have all these nice interactions and so on.

Curiously, their department has, sort of, changed. Not curiously, it's the nature of the place…changed quite drastically. I don't have that kind of connection at Columbia anymore. Their gas phase reaction dynamics people are either dead or gone [or have moved to new areas]. The younger physical chemists are doing things that are very different. It's probably that people have moved on and I haven't, but whatever it is, I sometimes miss that kind of interaction.

My younger colleagues who I think function very successfully in this environment have that kind of connection today. Certainly, the two organic chemists have very nice…you know, there's a weekly organic evening seminar and problem session. Both Christian [Rojas] and Dina [Merrer] are very active in that. Our youngest faculty member, John Magyar, inorganic chemist and he's doing very nicely and clearly has good connections with the Columbia folks. I think when that works that can be…that can make this job really be a wonderful one. We've had less success with our biochemists. It's the problem of dealing with…thinking about something like this is it comes down to individual human beings. So, was it the situation? Was

it the person? We've had several…and in fact, we had…our most recent biochemist resigned a couple of weeks, no, a couple of months ago. He was on leave. He had a third year review and he was on his special assistant professor leave. He basically decided that this was not the environment for him. He's taken another job. So, we're going to have to go and see if we can find another biochemist. We had a couple of biochemists turned down the [by the] tenure system, despite having papers and grants and so on. I won't go into the details of those because they're individuals. In both cases, I was deeply disappointed because I felt as if…we had two very different women, but each of them had, I think, many, many, many very strong points.

Somehow it just…and I have not always been Chair, but my colleague, Les Lessinger and I have, sort of, kicked this back and forth for the last twenty years. In a sense both, and he and I see eye-to-eye on things and that's been one of the great pleasures in this place is that working with him. I think both of us have felt in each of these cases that this was a wrong and that they should have made it through, and anyway. But, the academic life is a tough one. I am hoping, hoping, hoping we can find some great biochemist. We'll be running a search next fall.

DOMUSH: Well, I hope so. I'm sure that there will be plenty of good ones out there. I'm curious to know…when you were applying for positions and I know from when my friends who finished their Ph.D.s had gone to apply for academic positions…I mean, you apply everywhere.

CHAPMAN: Right.

DOMUSH: In the end, you said you picked here because it just seemed like the better fit.

CHAPMAN: Well, they offered me a job. But of the…I think, at the time when I had the offer from Barnard, I had one other offer. Then there were some other things that were possible. I decided…I mean, at some level it was asking myself am I…I mean, the first job interview I ever had, academic job interview, then that was the year before when I was interviewing, from Irvine. I had interviewed at the University of Chicago and Northwestern [University] and one other place on that trip. Now, University of Chicago and Northwestern are very impressive places.

DOMUSH: Yes.

CHAPMAN: I guess, there was a period there when I was, sort of, saying to myself, "Wow, you know, maybe I could really get this brass ring. Maybe I really could be a professor at a top place and so on." There was, sort of, this recalibration, I think. I had a wonderful time interviewing in Chicago [Illinois]. It's funny. I often later commented that the difficulty and challenge of the process with job interview is, sort of, inversely proportional of the prestige of

the place. The very prestigious places treated me very well. The, sort of, the less prestigious places were much more confrontational and much more, you know…anyway. [laughter]

In a sense deciding to come to Barnard, I knew that I wouldn't have graduate students. So, it was saying, "Okay. This is going to be a different world." Yes. I could do research, but it wasn't going to be…you know, I wasn't going to become Bill Miller or whatever. To turn this around, from the point of view now as somebody who is interviewing people for faculty positions. It's very interesting to try to, sort of, figure out what…I mean, if somebody and they don't always tell you, but if somebody is also interviewing at research universities, would they really be happy at Barnard? Is this or would they feel frustrated by the fact that their research is not going to move forward at the same rate.

I mean, there is no doubt that I do remember, particularly in my first, oh, five or ten years at Barnard, going to conferences in the summer. I love going to Gordon [Research] Conferences and so on. It's a wonderful, wonderful experience. I would joke that it's, sort of, going to summer camp with my old buddies and listen to what people were doing and listen to all this neat stuff. I mean, it was really just so interesting and so exciting, but I would be very much aware of the fact that my immediate contemporaries were doing orders of magnitude more than I was doing. You know, I was working hard and I was getting things done, but getting done what I could do with myself and maybe an undergraduate. I would sometimes characterize it…I felt as if I was hanging on by my fingernails in terms of being a legitimate, card-carrying member of the scientific establishment. I mean, I always felt welcomed. I always felt included. As I said these were my friends, but I really wasn't playing in their league anymore. It was patently clear to me, and I think it was also clear to them. Sort of, the question is…and you know I am very happy now that this is the league I'm playing in. But, at that transition point, it was…there was some regret. I see this and I say…I see this in young…in fact, we had a wonderful young inorganic chemist in this department. Her name is Linda [H.] Doerrer. She came, I don't know six or seven years ago. She did spectacularly well. She got an NSF career grant. She's a wonderful teacher and so on. After being here maybe […] I have the timing wrong, but she maybe came ten years ago, because she was to the point…she was maybe in her fifth or sixth year. It was the point where we were to begin to put together materials for the tenure decision, when she came and told me and told Les Lessinger that she was going to apply for positions at research universities. I think…I understood completely, because she was, sort of, at this point, things were moving. Things were going very, very well and she was full of ideas. She was getting work done, but she knew that she just wasn't getting done enough to stay at…

DOMUSH: Right. She can't do the level of work at an undergraduate institution.

CHAPMAN: She couldn't do…you can't do the level of work. You can do very satisfying work and you can do…and I talked to her. She's now at BU [Boston University] and I think things are going very well for her. I wish her the very best and continue to wish her the very best. She says she misses Barnard. She misses this environment very much, but she doesn't

regret the decision. But there is a real…you know, it's a different world. When we're interviewing candidates for jobs, it's always very interesting to, sort of, read the folders to see, does this person have any idea what teaching at undergraduate college means?

Even teaching an undergraduate college, if you're serious about research, because as you say, you know, people apply everywhere. Of course, the letters that practically get immediate rejection are the ones that talk about how many graduate students they expect to have, that they could do fine, if they have setup funds of half a million dollars. As I said, "Okay, sorry. This is…we're not…

DOMUSH: You don't know what…

CHAPMAN: You know, but some of them will…they'll, sort of, pay lip service to wanting to be at a small college. We have to, sort of, read between the lines and figure out what this is. As I say, in some ways, Barnard can be almost between the two worlds, but the reality is that there are twenty-four hours in a day, as I said before.

So, that you cannot…and we don't have graduate students. Now curiously at Barnard in some other departments, faculty members are involved in the graduate program. Like some of my psychology colleagues and some of my physics colleagues and astronomy colleagues are involved in the graduate program and do teach graduate courses. Teaching graduate courses isn't so much, but they do have graduate students. I am told—and this is something that in principle, I wasn't supposed to ever be told—but I was told by someone that this actually was an issue when my tenure case came up. I was told this by the Columbia faculty member who was there because a Columbia faculty member comes to this tenure review committee as witness. This person is a fellow by the name of Phil Pechukas. Who is now retired from Columbia…brilliant, brilliant theoretical chemist and just a wonderful, wonderful human being. So, funny, I mean he's just…conversations with Phil are always a pleasure. He told me this, years later. He said, "You know it was really, it was touch and go there for a while." He said, because one of the members of the committee said, "Well, I don't understand what's going on here, because you say that your department supports this case and yet, you don't let her have graduate students." Phil said, "Well, no. It's a Barnard [case]. Barnard people don't have graduate students." This person who was in whatever [department] said, "Well in psychology, you know…Barnard people [have graduate students]." He had no idea of that. He's thinking, what's going to [happen]? And he answered this as only Phil can answer, he said, "Well, let me explain something to you. Graduate students are a scarce commodity. We're not going to share them with anybody, no matter how good they are." It's typical Phil to just, you know, go into [the crucial point with humor]. [laughter]

I think the reality is and at least as I see it and of course, you know…that even if within the Barnard/Columbia arrangement, the possibility of having graduate students associated with Barnard faculty exists…let us take that as a premise. I think it would make no sense in this department because there is absolutely no way that we are going to compete with the Columbia

chemists at what they do superbly well. It's a very, very distinguished research department. They do that job very well. We do our job very well.

We can remain and, you know, so we try to…I mean, actually another issue is having post-docs. Some faculty at small colleges, have had post-docs. I never have. There was a program at [Camille and Henry] Dreyfus [Foundation] that ran for a number of years. It was a very nice program. I think that it made a lot of sense. I was always a little concerned about it just in terms of my own possibilities, not for others, partly in terms of the opportunity for the person. If you come to a place like Barnard and are a post-doc, well, yes, there is the Columbia connection. But, would I be able to give a post-doc the kind of support that a post-doc…and time, that a post-doc needed? I was never sure. You know once the semester gets going I'm pretty tied up with my teaching.

Anyway, so Linda did have a post-doc with her NSF career grant, I think. One of the…well, I shouldn't. I don't think she had lots of great candidates. There are issues of space and so on. It's complicated. So, you have at a place like Barnard this dichotomy between wanting and needing to have a more active research program. In some ways, people say well, a technician or post-doc you could do that. Then you also think about what is your core value and activity and so on.

DOMUSH: Has there ever been any interest in teaching post-docs?

CHAPMAN: Well, that's what…that's where the Dreyfus program made a lot of sense. We actually talked about it. I mean, we have had some people who came in and taught a course…were doing sabbatical replacement and, sort of, had some research connection. I think the way the Dreyfus thing was set up, it was really…the idea was the person would get a post-doc with a faculty member at an undergraduate school. Somebody who had a well-established research program and a well-established teaching program and this person could come and basically, learn about this kind of institution. Get a little bit of teaching experience. Also, get a little bit of experience in research working with students.

I sometimes get phone calls from people whose names—I mean, my name has been given to them by their professor or sometimes they're Columbia students. Somebody who is a graduate student somewhere who says, "Look, I want to be a candidate to get a job at a place like Oberlin [College] or something. What do I do? How do I make myself a more viable candidate? Should I go and spend a year as an adjunct faculty member someplace? Should I go…what should I do?" Also, I've been on panels with…I haven't talked yet about COACh [Committee on the Advancement of Women Chemists], but this COACh group that I'm part of where that's been the same question. People are sometimes surprised by my answer, which is don't go off and just teach, because if you want to be at an Oberlin or a Barnard, you're going to have to hit the ground running in terms of research. You need to keep your research activity, your research profile high. You need to continue working on research programs.

But, something like the Dreyfus program, I think made a great deal of sense, especially for someone who had no history of any association with a small college. If you went to Berkeley and then to Harvard…you know, Harvard and then Berkeley or something like that and now you want to sell yourself as a potential faculty member at Oberlin. They want to look at you and say, "Well what, do you know about this? Why?" If you did a teaching post-doc and you did it at say Kalamazoo [College] or some…again, some place. You've spent time. You understand the institution. You're a little familiar with that world. I think then that really does give you more credibility as a candidate. To say, "Well, I want to go to a place where teaching is valued and therefore, what I should do is stop my research and teach, that's a killer because if you stop your research and teach, then we're going to be very worried about whether or not when you arrive, you really have the fire in the belly that's required to initiate and sustain an active research program.

DOMUSH: Why don't we take this opportunity to talk a little bit more about the COACh program and your involvement with that and how that came about.

CHAPMAN: Oh, sure. This was…I don't know how many years ago, I can look up the numbers. I don't think I'd ever met Geri [Geraldine L.] Richmond, but I knew Jeanne Pemberton. In the early 1990s I took on two major responsibilities that are associated with ACS [American Chemical Society]. I sometimes—it was funny because I was…I got a phone call asking me whether I wanted to join the Petroleum Research Fund Advisory Board. Then about two weeks later, I got a phone call asking me whether I wanted to join the ACS Committee on Professional Training. [...] I had had PRF funding, so I knew a little about PRF. The Committee on Professional Training, I had read their guidelines and so on. Each of these were things that I was interested in and they sort of represented the sort of two ends of my career, the teaching and the research. To take those on at the same time was a little crazy, but I thought about it.

As I started to say when I interrupted myself, I think if I had heard from CPT first and said yes, to CPT and then had heard from PRF, I probably would have said no to PRF. Because I think CPT was the one that was initially more interesting to me. Since I'd said yes to PRF and then, got the invitation to CPT, I said, "What the heck?" I spent…and each of these I thought was a short-term commitment. I was on Committee for Professional Training. I was on the Committee for nine years. I chaired it for three years and I stayed as an associate for two more, so that was it…

DOMUSH: Not quite as short as you thought.

CHAPMAN: No. PRF, same thing. PRF Advisory Board typically you do three-year terms [...] but I did a three-year term, then a two-year term and I went on sabbatical. So, I resigned from my last year. Then I got an email asking me…inviting me to come back and be Chair, so I

came back and chaired. I finished being Chair […] of CPT and I was Chair of PRF. These were very nice activities. I realize you asked about COACh and I will get to COACh. Both of these, I found were very nice activities. I enjoyed them very much as each of them involve travel a few times a year and working with a wide range of chemists. PRF it's chemists and geologists and so on. I mean, the world of Barnard, even with Columbia, is not that wide a world, so I enjoyed it very, very much the opportunity to sort of get involved in some larger things and work with some neat people.

Finally getting back to the…Jeanne Pemberton from University of Arizona had been on CPT with me. Jeanne was good friends with Geraldine Richmond, who is at University of Oregon. Geri is really the dynamic force and the prime mover behind COACh. Geri is an amazing person. Geri had been talking to Jeanne and a bunch of other people and was feeling, sort of, very…feeling this sense that the ACS Women's Chemists Committee had been around for a very long time and done a lot of very good things in promoting women and so on. Geri saw a very specific, in some ways…in fact, rather narrow, but still a very profound issue and that is academic women moving up the ladder. Not so much getting hired, but getting promoted, getting tenure, getting recognized and so on. She felt this is sort of a glass ceiling kind of issue. She felt that in our generation there were a lot more of us than there had been ten, fifteen years before. But an awful lot of people were facing—in some ways more challenging problems as we move up the ladder than we faced earlier on and sort of what could we do for each other and in general to support academic women.

She decided that we should talk about it, so she called me and asked me whether I wanted to be part of this group. I was very flattered because it was an incredible group of mostly university [faculty]. Meeting people like Angie [Angelica M.] Stacy at Berkeley and Cyndy [Cynthia M.] Friend and I don't know, Marye Anne Fox and so on. Peggy Merritt who was then at Wellesley, she's now retired, but Peggy and I had been friends, I guess…I don't even know if [from] CPT or PRF, one or the other. Peggy and I were sort of the two undergraduate people in the initial group, and Geri got funding from the Dreyfus Foundation just to get the ball rolling. Bob [Robert L.] Lichter [at Dreyfus] was very…who has been a great champion of women, was supportive of this and so on. So, we started meeting and we…I think Geri…she's so astute. For the first few years, we met at a hotel near [Chicago] O'Hare [International Airport]. Later on she said, "You know I planned that very carefully." Because she said, "You know, if we'd gone some place where we'd be near a city center and so on, everybody has all these connections, people would have wandered off." She said, "By meeting at this hotel [at the] airport, you know, nobody goes anywhere. If you're going to spend the day brainstorming about what you're going to do, once you've flown in, you're going to spend the day brainstorming. Later we could go and we could meet. In San Francisco [California] we could meet and Alexandria [Virginia]…we could meet in places where people drift in and out."

We met. The Board started meeting, and has ever since met…biannually. We meet in September or October and then in February. We started out really with…now, perhaps Geri had a more specific sense about where—I mean she had lots and lots of ideas, but whether—I haven't even asked her whether she—the direction in which we went was something that she had hoped for all along or something. I hope, certainly in your interviews you'll interview her.

DOMUSH: I would like to, very much so.

CHAPMAN: We tossed around lots of things. We tossed around doing some kind of site visit program. The American Physical Society had done a climate assessment site visit program where they'd send teams of three people into talk to women and to report back to them. We talked about you know, a bunch of other things that we might do, but we constantly came back to the point that we constituted a very small group of very, busy women. Realistically something that was going to involve a large time commitment from this core group wasn't going to fly. Because you know after all, if our objective is to help women who are in chemistry departments succeed, you pull them away from the bench and pull them away from their research and have them […] no, it's when I see a woman who's doing wonderful work in a chemistry department suddenly become a dean or something a part of me says, you know, "You go girl." Part of me says, "Too bad," because…you know [one less woman running a lab!]. Anyway, so I don't even know who suggested first this idea of these workshops. This is really, now the centerpiece of what we have done and do. They're just marvelous. The idea was to get financial support and that's where Geri is so good at writing grant proposals. We now have NIH [National Institutes of Health], NSF and Department of Energy support and I think are in the second round of funding for this to sponsor these workshops which we offer at ACS National meetings, as well as…and we can go through the whole evolution later. We started out just offering them at ACS meetings and a couple of other meetings. Now, there's a, sort of, road show that can go to the departments and so on.

The way it works is if we come up with an idea for a new workshop and Geri will use her contacts and often the workshop leaders we have already, they'll say, well, here are some people who do…because this kind of thing happens so much in the business world. One of the funny things about the world of academia is…I mean, it's one of the ironies about being a professor is…if you want to teach high school, you have to take many courses on how to teach. You want to teach college, you don't take a course on how to teach. You're expected just to, sort of, walk in the classroom the first day and be a great teacher. It's all sort of assumed if you're bright and you know after all you've been an apprentice, in a sense in this job all your life because you've been on the other side. So, of course, you can step in and know how to teach a course. You can step in and know how to run a research group. Of course, you can step in, but nobody tells you how to do any of these things.

I think there's—at some level—a tremendous arrogance in the professoriate that people assume that we're all so brilliant that we don't need to be taught how to do things. We will just know how to do them. Well, that's nonsense. There's lots of expertise out there. In the business world if somebody…you know, you have a young executive you're going to send them off and help them learn these skills and these skills. Anyway, so there is a whole world of people out there who do training for people in business about leadership and about negotiation and all these things.

The idea was well can we find some people who…and the idea was not that we would do this, because that's not who we were, but that we would bring in potential workshop leaders and have them run a trial workshop with us—the Board. Then if it looked promising, we work with them and tweak it and sort of try to do what is required to adapt it, you know the case studies were appropriate to the academic world and so on. Some of it had to do with how much did the workshop leaders really know about the world of academia. Sometimes it was a matter of taking a workshop leader who knew a lot about business and pairing them with somebody. We have—there are some workshop leaders who have been with us from the very beginning and who have continued to evolve new workshops.

We had some total busts. We love to joke about the woman that we made cry. [laughter] This was supposed to be a workshop on time management. Anyway, this woman came in and she started through this slideshow and it was just such fluff. It was such, you know, write down on a little piece of paper, I am me. I am happy and so on. You know, we were polite for a while, but anyway.

DOMUSH: As you said, it's a group of very busy women [who] don't have time for that.

CHAPMAN: Exactly. So, this was not where we needed to go. We still joke about making that poor woman cry. But, I think we have now…we've got various leadership workshops. We've got the negotiating skills workshop. We've got this sort of presentation skills workshop. Over the years we often …I mean, Geri is always very happy if a member of the COACh Board can attend, not necessarily the whole time, but can be present at some of the workshops. […] We started out and our, sort of, target audience, were associate professors, people who had tenure. Then there were assistant professors. Then we now have some more of a range. We have a set of workshops where our target audience are post-docs. So, when we do the post-doc workshop, we finish the afternoon where we have a panel of COACh Board members to do a Q&A about it. Of course, they're very eager to get advice about a job market and finding jobs. Also, setting up a research group and they do the negotiating skills workshop.

I sat through a negotiating workshop half a dozen times and I still learn from it. I mean, it was one of the first ones we did and I think it was really transformative, for some of the two women who run it are absolutely fantastic and know the academic world very well. They started the day by going around the room and asking each of us to identify something immediate in our professional lives that we really needed to negotiate. As we went around the room, I mean every time I sit with the COACh Board, I'm always just…here are these incredibly successful women at the top of their careers. Yet, this one—and here I'm not going to name names—just found out from the Chair that they're taking away one of her labs. This one was just turned down for something or other and this one I know. Often these have to do with departmental [politics]. This one, the new Chair expects them to, you know. So, we went around the room and everybody said, this is what I need to negotiate for. Then we did this whole thing. Then we met six months later and went around the room, everybody had succeeded in getting what they wanted.

DOMUSH: Wow.

CHAPMAN: Yes. [laughter] I mean, some of us joke that if we'd only had this thirty years ago, we'd be much better off because we would have had better salaries and anyway.

DOMUSH: Are there any COACh workshops as of yet given to graduate students or people, kind of, navigating that part of the path? Or, I guess much earlier in the…

CHAPMAN: No. I don't think so. I think we really have…except for some of the ones that we run say at the NOBCChE meeting, the National Organization of Black Chemists and Chemical Engineers. I think at that and there's also one, I forget the name. It's another. It's a group for Hispanic and Native Americans…

DOMUSH: SACNAS [Society for the Advancement of Chicanos and Native Americans]—

CHAPMAN: SACNAS, that's right. I think what we found at NOBCChE and SACNAS is the workshops really have to adapt to the style of those meetings. Those meetings are much more informal. That you know the ACS you sign up ahead of time. You do this. You do that. You come. You go. Everything is very cut and dried. NOBCChE and SACNAS is much more you come and you find what you want to do. I think the first time we ran a workshop at NOBCChE I think there was some frustration because we sort of couldn't nail down who was going to be there and so on. And again, Geri can tell you this much better than I. But it's my sense and I have not attended these. I've only heard discussions afterwards that it works much better if you just sort of say, this is here. People come and so I think they have a more diverse, not ethnically, but in terms of where they are in their career at those meetings. I think we haven't opened up to graduate students explicitly because I think the numbers would overwhelm us.

DOMUSH: Okay.

CHAPMAN: With the funding we have we pay travel charges and a couple nights' hotel for people to come and participate in these workshops and that's expensive. Now we view that as potentially useful to these people not just because of what they get in the workshop, which we think is very important. And from the networking which comes from the workshop, which we also think is very important. You know for this sort of cohort of women who are at this point or that point in their careers to share stories and share and to go back and have those kinds of

connections. Also, in some cases, not all, but in some cases being able to pay for these people to come an ACS meeting that they might not otherwise afford to come to is also a helpful thing.

DOMUSH: Right. Now originally, and I don't know if this is still the case, but you said that, kind of, out of the founding group, you and a woman from Wellesley representing the undergraduate…

CHAPMAN: We were the undergraduate. There were […] I forget how many. There might have been maybe ten in the original group.

DOMUSH: Was it just coincidence that both of the undergraduate, kind of, representatives were women's colleges?

CHAPMAN: I think it's […] yeah, I think it was coincidence. We knew each other. It really started out as a group of friends who knew each other through science connections and so on. I mean, the fact of the matter is that women of our generation in chemistry all, sort of, know each other anyway. I mean, I remember years ago, when Dick [Richard B.] Bernstein was at Columbia. He introduced me to a [woman] visitor. I don't even remember who it was. I was over there at lunch and he introduced me. I sort of said, "Oh, yes. We know one another." He, sort of, looked in this typical Dick Bernstein way—which is, Dick always thought everything through. He said, "I guess it's true. You all do know each other." [laughter]

So, it wasn't […] it was just I think Geri quite wisely wanted people that either she knew or somebody else knew were the kind of people who were going to be engaged and give this the time and the ideas and be willing to put in some effort. Now, the bottom line is that the effort has been 99 percent Geri and 1 percent the rest of us. You know, she now has a staff person who is paid from the grant and so on, but she still is the energy behind this.

DOMUSH: I'm a little bit curious just in thinking about COACh and the way you were talking about [it]. I guess, it sounded like […] women do go to these workshops or various parts that apply to where they are in their career. They get great advice about all sorts of things. They're able to, kind of, build a network that maybe they didn't have or maybe expand on the network that was smaller before. In my head, I'm trying to relate that to the idea of the undergraduates here at Barnard. Now, I did not go to a women's college, but I did go to a small college. I'm pretty sure that the reason I majored in chemistry was first of all because I liked the subject matter, but because I could spend so much time with the faculty, who were wonderful and because I spent so much time with the other seven chemistry majors.

CHAPMAN: Yes.

DOMUSH: It was amazing and I loved it. I loved every minute of it. I even probably really did love every minute of every horrible PChem class, which weren't horrible…they were horrible to me.

CHAPMAN: Right.

DOMUSH: But, when I talk to friends who went to women's colleges, whether they majored in chemistry or various other things, every single one of them says, "It was the most wonderful experience because no one ever told me that I couldn't do something. All you ever hear is that you can do something." I'm wondering…I mean, at a certain point unfortunately, people stop hearing that. I certainly stopped hearing it in graduate school mainly because my advisor didn't talk to me. I would imagine and you said when you first got to Barnard, Bernie Segal…she was really encouraging of everything. For a lot of these women who are young professors there maybe isn't a Bernie Segal. There maybe isn't someone who's telling them keep going. You can do this. I'm just, kind of, trying to put these ideas together. I don't know that I necessarily had a question out of that. I'm just trying to…

CHAPMAN: Well, you know it's interesting. And this really doesn't touch on the undergraduate thing, but more back to COACh. When we on the COACh Board and it has expanded and some people had moved on, but more people had come on so that maybe if I counted up the total, maybe twenty-four names total or something like that have been involved. We, in this one-day meeting twice a year, talk about all sorts of things. We talk about…we try out workshops. We talk about programs. We also, talk about…we start the day by going around to people saying, "What's going on? Tell us about some of your triumphs. Tell about some of your problems and so on."

Particularly early on when we were, sort of, trying to figure out who we were and what we were doing, I think many people agreed with the statement that even…yes, there had been some barriers and some challenges in graduate school and post-doc and some people more than others. Certainly, there are some awful things that happened. One of the things that we, as COACh members and even just as individuals, now and then you hear about women who are just facing terrible situations in graduate school. But most…I think we were the lucky ones and had […] what I was going to say I hear from other people as well. Even when you're a young assistant professor, you're still someone's protégée. Now, you know I had Bernice, so it was, but, even if your mentor, your advocate is not a woman, it still is somebody who is invested in your success. I mean, after all they hired you. They want you to do well. A number of these women said that it was really only once they got tenure that their departments became hostile, unpleasant places to work, which I thought was very interesting.

I mean, I sometimes come home from these COACh meetings and think, "I am so lucky." I mean, I'm at this little, tiny college, but I have colleagues I love. I don't have to gird my loins to come to work because I'm going to be dealing with nasty people who are trying to undercut me all day long. I of course, am not going to name names, but a number of my COACh colleagues are working in environments that are very hostile environments and the people who are making their lives miserable. You know, some of our discussions about workshops and so on is…I mean, helping people to deal. How do you navigate these shark-infested waters? At least for this group of women the sharks really only showed up when they were, sort of, beyond the protégée stage, and then suddenly they were seen as competition […] for lab space. You know, just when they thought that they arrived, in the sense they made it and things should get easier, things got harder. You know whether that…I mean that was a common theme among the women in these discussions at COACh. You know, whether that's more widespread, I don't know. It was sad for me to hear, because I kept thinking you know, boy, you guys should have it all. You know it's the…I think, that probably if we had a conversation among men faculty, they will say, "It's a competitive, dog-eat-dog, it's a tough world out there." That we're competing for limited resources and so on. It's tough for everybody. It makes me sad that to hear some of these very accomplished women really talk about these pretty hostile environments that—and dealing with individuals who make their lives miserable.

DOMUSH: How important do you think it is at various stages of someone's career, whether the undergrad or graduate school or young professors…how important do you think it is for someone to have a mentor? Someone who's, kind of, in the same… in close enough range that they can talk to you frequently.

CHAPMAN: I think you need many mentors, because I think mentoring…I think there are lots of kinds of mentors. I mean, this whole mentoring, I mean it's a big issue and there are lots of articles and so on. I think that there is sometimes in some people's mind, if there only was this one wonderful person who would be able to give me the answers and protect my flank and so on, then my career will be very successful. Of course, if there is such a person…and we're all different psychologically in, sort of, what we need and what we […] yes, I think that that kind of mentor, if you can find them […] certainly, if you are a young faculty member many, many things are written down or patently obvious. But, there are so many things that aren't written down, that you're expected to just pickup on. What are traditions, climates and so on? Whether you pickup on these things by being an astute observer or whether you pickup on these things by asking or whether you don't pickup on them and you just stumble on through, I think matters very much. I think that…and a lot of places…I mean, Barnard has a faculty mentoring thing where they assign a member, a senior faculty member who is a member of a department different from the person to, sort of, be their mentor.

The idea is if you want to ask a question like, "well, I've been asked to be on this committee, is this something I should do?" Because of course…the reason why I say you should have many mentors is there are some things you don't want to ask your department chair, because no matter how much that person is your supporter and so on, especially if you're feeling

that you have misgivings about something or you're not […] I think with women—and I think it's probably also true of men. I talk more to women about things like this—there are issues of self-confidence and issues, you know, do I really belong here? You don't want to go to your department chair.

I mean a couple of years—I think it was even last year—we were hiring. We had a short list, I think, of four candidates. They came through and everybody talked to everybody in the department, gave a research talk, and had a meeting with the provost. There was one candidate who I thought had done a very nice job and so on. But I as Department Chair picked up the phone and called the provost and had a conversation which usually goes nowhere. The conversation is basically you met these candidates is there anything you want to say? Almost always what the provost will say, "Oh, no, you know just tell me what your thinking is. They all seemed fine." She came back and she said, "Would you believe that so-and-so—and so she named a name—proceeded to tell me in the course of my interview with her that she really wasn't sure she wanted to be a chemist. She was thinking [about] going to law school." [laughter]

DOMUSH: Wow.

CHAPMAN: You go, whoa. She's out of the running. I sometimes…I'd love to ask her, you know, whether there was something about this place she really hated and she took…anyway. There are things…I don't know. That's an extreme case.

I think that, so I think you need a mentor in the department and in a sense of only there will people know that world very, very well, and a lot of that can be very casual, informal. Of course…I shouldn't say "of course," but I think one of the issues with diversity and efforts to increase diversity is the kind of informal mentoring that historically could have been very effective, can be much less effective when you have a diverse faculty. What do I mean by this? Well, you know, the things you picked up on the basketball court and you say now, this so-and-so was a jerk, what do I do or something? Well, not everybody's playing basketball. So, when it was, sort of, a guys' club and you all go out and have a beer. You walk over to play basketball or something and everybody's going to be part of the conversation and somebody's not going to be left out. Whereas, if you have someone who is different and you're not actively excluding them from being part of this casual group, but just, they may self-exclude or you know, they don't drink beer or they've got a family at home and they certainly don't…you know that they end up not being present at the casual conversation where incredibly important information is passed.

Do you know about the University of Michigan's CRLT [Center for Research on Learning and Teaching] players?

DOMUSH: No.

CHAPMAN: This is an absolutely wonderful…University of Michigan is one of the schools, that has an [NSF] Advance grant. I have admired their program tremendously. They've done beautiful things. One of the many nice pieces of theirs is they have this CRLT and I don't even know what the acronym stands for. It's people from the drama school who work with the Advance Program. They have these skits that they put on in various places that are, sort of, to make people aware of situations. They had one having to do with mentoring. I've seen this skit twice. […] There was a meeting that was convened a few years ago of chemistry department chairs.[10] It was convened by NSF, and NIH, and DOE about women and so on. They had them do this skit. I also saw it here at Columbia once. In this skit, there are these two assistant professors, one man, one woman and they're coming to this guy who is not the department chair. I think you would probably identify this character…still the fount of all knowledge in the department [as] the very senior, very well connected, very helpful guy and so on. They have these two characters coming in and talking to this guy, one woman, one man. Just the dynamic of what gets said and what doesn't get said. This woman ends up so isolated. The thing that they do so beautifully in the skit is that it's quite clear that none of it is intentional, but it just has to do with who she is and how she presents herself and what questions she asks. The mentor and the male protégée go out for a beer at the end of this and she goes off because she's got to pickup her kids. It's very clear at the end of the skit that she's going to fail and he's going to succeed.

I think that those places that are serious about mentoring…I mean, I think another interesting opportunity I had to observe mentoring. There was AWIS—Association for Women in Science—had a program maybe ten years ago involving site visits. They invited me to be a visitor on one of their trips. We went to two institutions. We went to…and I think it was chemistry departments. There may have been another team that went to other departments, but I went to chemistry departments. One was Oberlin and one was UVA [University of Virginia]. Both of these departments had…and Oberlin surprisingly at that point, I think had no women professors. They had a new one who was coming next year. UVA I think had, had one woman professor, assistant professor, who hadn't made it and then they had a new one. Both were eager to be part of this program to get advice and so on.

What I found utterly fascinating in these two day-long visits at both places listening to faculty and administrators and so on talk, is how incredibly different the approach to mentoring junior faculty was at these two institutions. I don't think in any way either way typifies their kind of institution, although some of it may have to do or did have to do with Oberlin being a small college. At Oberlin everything was explicit. Everything was spelled out. Everything was…there were mentoring programs. There was this. There was that. You know, we'd ask questions about what are their criteria for tenure? Well, here's this handbook. Here's this. You know, huge effort to have everything as transparent as possible. Whereas at UVA when we'd

[10] Workshop on Building Strong Academic Chemistry Departments Through Gender Equity, Arlington, Virginia, January 29-31, 2006.

ask these questions…oh, you know, everybody understands that. Everybody picks it up. It was quite clear that they had this oral tradition that […] they'd look at you and say, "Well, no, there's no need to write any of this down," because it's all understood. It's all…of course, young faculty understand it, because we embrace them and we were good friends and we talk to them and they know what's going on. Now, you know I was there one day and it may—I'm just giving you my impression, but I certainly at the end of that day was saying, boy, this is great. This means that a certain fraction of people come in. They are keyed in and they get all the information. Another cohort of people never…

DOMUSH: Never even know that they missed it.

CHAPMAN: Anything. They never know they even missed it because you know – and yet, there was no sense from the point of view of the faculty that this was – that there was anything wrong with it because it worked. They had a fine faculty and this had worked for everybody they had had. Therefore, it was a perfectly fine system.

Again, going back to mentoring, I think that we need mentors. I mean, I think of—if I think of all the people who have been my mentor and I'm using the word loosely, I think there is one person and he would laugh if he heard me say this. This is a fellow by the name of [G.] Barney Ellison. He was a graduate student at Yale when I was a graduate student there. He's a very, very smart, entertaining fellow. He was a graduate student at Yale forever because he basically stayed until he learned everything. He loved being a graduate student. He started out in pharmacology. He ended up…he did physical chemistry. He did organic chemistry. He's now a physical organic chemist at the University of Colorado and very successful and very brilliant.

He was one of the senior graduate students when I arrived and I left and he was there several…and of course, you know I wasn't there very long because of my advisor. Barney has this network of his friends who were graduate students with him at Yale. He just keeps it connected. Over however many years, thirty-five years since I've been at Yale, if I am feeling discouraged or feeling as if I'm frustrated or something, all I need to do is talk to Barney. He is just so enthusiastic and so supportive. You know he's at no…he was just a fellow graduate student and a friend, but also, I mean but that's a kind of mentor I think, because it's a kind of connection, a kind of support. And I think that especially when people get to be faculty members in departments, small departments, large departments, especially small departments it can be very isolating. You know, you've got to have your best foot forward all the time. You can't possibly sort of sit around saying, "I think my research is pretty boring." And of course, some people get this kind of support. They have family. They have…so, there's that kind of mentoring.

Then there's the kind of mentoring where certainly in your college, in your university people who can tell you important things about how many committees should you agree to serve on and is this one that's worth taking your time? You know the first time you deal with a

student, if you've got a student who cheated on a test, what do you do? That kind of thing is everyday mentoring. Then there's people certainly, when you're a young faculty member, people that you can hand research proposals to and ask them to critique them, people who can give you advice about where you ought to submit a paper or where you ought to submit your research. Or, how should you…somebody suggested that you should take this job as you know, is this something you ought to do? I think that some…I know, when I talk to graduate students and post-docs and so on, there is sometimes the notion that the research advisor is the mentor and should be all these things, which is pretty silly. Because in fact, well, there are research advisors who are very connected and very interested in promoting their students, who really pull strings and you know the puppeteers. I won't name names. There are others who are fine scientists, but that's just not their thing. I do remember talking sometimes to graduate students who really felt frustrated that their advisor wasn't mentoring them well enough, wasn't pushing. I say, "Well, all right. Go find somebody else." I mean, your advisor…what you want from your advisor is to be doing great science. If we could figure out ways where people could get the different kinds of support they needed from different people and felt comfortable that way, I think it works better.

DOMUSH: Do you consider yourself a mentor to undergraduates?

CHAPMAN: Oh, absolutely, formally and informally, yeah. I mean, I advise. At Barnard, first year—we don't say freshmen…politically correct. First year and sophomore advising is optional for faculty. You may sign up to be a first year and soph year advisor and they'll give you a very small stipend for it. We all advise majors. I typically advise first years and sophomores not because the pay is so great. When some time ago those of us in science were a little frustrated at the advice that students were getting about their programs in the first two years: that some of the people and the Dean of Studies Office seemed to be rather science phobic and tell students, "Oh, no, you can't possibly take calculus and chemistry together. That's too hard." So, they would arrive as majors the end of their sophomore year and […] you know, they'd have to pile stuff on in order to complete the major and we say, "If we only could have talked to them sooner." We in my department volunteered left and right to advise students so that we – more of them can be advised. It's not that our objective is to create majors, but at least to make sure the ones who are interested in maybe going on in science do get better advice in that way. I also enjoy it. I love seeing the students that are just arriving. I mean, as a major advisor with some students it's really, "what's your program going to be this spring?" With some, it gets much more personal and much more complicated and so on.

Then we advise when students choose their major, at least in our department we simply say, "Pick a faculty member as your advisor." So, they'll typically pick somebody whose course they've taken. I have I don't know how many that I have maybe a dozen junior and senior chem majors. As you were saying before, in a small department everybody knows everybody else. So students will come into ask questions about graduate school or about summer research or about any number of things like that.

Then I love the fact that we make these close connections with our students that we continue to connect with and often when they're in graduate school. I mean, sometimes the phone will ring and it'll be an alum who is in graduate school and is thinking about what group she's going to join or maybe isn't completely happy about the graduate school. I mean as you were saying that, I think one of the…when students come out of these kinds of undergraduate worlds—women's colleges, but small colleges in general where they are so supported—for some of them that transition into graduate school where it's sink or swim can be pretty fraught with all sorts of problems. Of course, email is a nice way that somebody can just give a little support and so on.

We have a senior thesis program. About half our students write senior theses and we meet. The way we have it set up is the thesis program is mostly just doing research in somebody's research group. But, all of the students doing senior theses meet in a Friday afternoon colloquium from 2:00 p.m. to 4:00 p.m.. The major piece of that is, students giving oral research updates and the purpose of that really is to give them lots of experience in talking about their work. It really works very [well] and we actually start out in the fall talking about how to give a good talk and how to make theses slides and what not to do. Then as they give these research updates, we ask questions of course about content. Then we take time where everybody, faculty and students, will critique and say, "You know, your voice is going up at the end of every sentence like you're asking a question, can you work on that? Or, you're not looking at people." We really, really do work on oral presentation skills which I think is something that can be incredibly important.

DOMUSH: It's something that often gets forgotten. I find that very interesting.

CHAPMAN: Yeah. At the end of the year these students…I mean, I sometimes worry that our thesis students are getting this, but the non-thesis students don't, but that's you know. We also have some sessions—well as the person in charge that schedules the meeting might spend one afternoon talking about ethics in science and reading some case studies. We might do something about women in science and read some articles. Or, we might talk about what graduate school is like. We try to give them…not everybody's going to graduate school, but some are, you know some advice.

I'm smiling because I'm often torn, particularly if a student is going to go off to some pretty cutthroat competitive place and I won't name names. There are some places we try to talk out students out of going to, but sometimes they go for the prestige. I'm torn. I don't want to say, this is going to be an awful, nasty place. You have to have your armor on. Because I don't think that's a good thing to sort of suggest to them ahead of time that it's not. On the other hand, to send them off into battle without their armor is also not. It's how to, sort of, impart…this is going all the way back to my telling you the story several hours ago about my high school principal telling us that college was going to be hard. In part, saying that, "it's going to be a different world and that it may be different in challenging ways. But for them to them to think about that." You know, I think telling horror stories and saying that it's going to

be bad is a terrible thing. On the other hand, having them be aware of the fact that they're not going to have the same kind of support. It's not even—it's sort of somebody knowing that somebody thinks you're going to—somebody assumes you're going to succeed. I think you get into graduate school and you don't assume. I mean some people do, they just have that kind of you know.

But I certainly remember being very unsure of myself in graduate school. There wasn't much of anybody saying, you know there was nobody. If you're not saying to yourself, "I can do this," nobody else is saying to you, "I can do this." Yet, when you're at a place like Barnard, people all the time say, "Of course, you can do this. Of course, you can do this." You have to have that little tape to play in the back of your head or at least know that you can send off an email or something like that and have that "You can do this."

DOMUSH: Right. Well, we've been talking for about two hours today. So, I think our time is just about up.

CHAPMAN: Okay.

DOMUSH: Of course, I mean there's plenty of things we could continue talking about for a long time, but I can't keep you all day. So, I just wanted to ask if there was anything that you wanted to mention before we finished.

CHAPMAN: I don't think so. We've covered lots of things, some of them quickly and others in great depth. I'm sure there's some things, I mean that we haven't touched on, but I can't think of huge gaps. It's been a pleasure.

DOMUSH: Thank you very much for your time.

CHAPMAN: Good.

[END OF AUDIO, FILE 2.1]

[END OF INTERVIEW]

INDEX