SHEILA WIDNALL

November, 1977

Part I

Women in Science and Engineering

MC 86

Oral History Collection

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SCHOOL OF HUMANITIES AND SOCIAL SCIENCE

ORAL HISTORY PROGRAM
MIT 20D-224
CAMBRIDGE, MASSACHUSETTS 02139
(617) 253-4067

TRANSCRIPT OF A TAPE RECORDED INTERVIEW WITH
SHEILA WIDNALL

THIS IS A TRANSCRIPT OF A TAPE RECORDED INTERVIEW CONDUCTED WITH SHEILA WIDNALL BY Shirlee Sherkow OF THE MIT ORAL HISTORY PROGRAM, ON November 2, 1976, November 4, 1976, November 16, 1976, November 23, 1976 and November 24, 1976 at Cambridge, Massachusetts.

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Interview with Sheila Widnall,
on Nov. 1976.

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Subject Table of Contents for Tape-Recorded Interview with Sheila Widnall

Pages	Topics	2,4,16,23, and 24 November, 1976
	Family and Early Life	
1-4,11-12	family; parents' education, occupation	
4-8,24-25	childhood; friends, pastimes, encouragement from parents	
8-13	grade school: classes, social life	
13,16-22,30	math/science interest in high school; science fair winner; parental support	
14-16	high school social life	
18-19,24,30-32	decision to go to MIT	
22-24	impressions of high school math, science courses	
24-25	professional aims; expectations as to marriage	
26-27	relations with father; importance of parents in inspiring young women	
27-30	increase of women in science; role of women's movement; professionalism	
31-32	experience as woman applying for college scholarship, 1950s	
	MIT, 1956-1964 (BS through PhD)	
32-35	to MIT, September 1956; social difficulties for women undergrads	
35-41	first two years; academic struggle; experience as woman in class	
41-43,74-75	summer work at Boeing; practical experience	
42-43	decision to enter engineering	
44-49	parents' reaction to decision to continue for PhD; M. Landahl support	
49-52,80-83	marriage; husband's work; first child	
52-53	mentors	
53-55	women at MIT, 1950s and present; effects of quota	
55-57	friendships at, satisfaction with, MIT	
57-60	singled out by press as woman at MIT; distortions	
60-61	fellowships, assistantships	
61-65	engineering as job field for women; need for more recruitment efforts	
66-69	first woman elected to National Engineering Honor Society; impressions of societies; no experience of discrimination	
69-71	on NAS space & aeronautics board as "young" scientist	
71-74	thesis topic on unsteady aerodynamics; relation to career; current fluid mechanics work	
75-78	involvement with John Hancock Building (Boston) wind problems	
79-80	summer work, Sweden, 1960	
83-85	MIT research staff engineer (1961-62);PhD, 1964	
	Work at MIT after PhD (1964-)	
85-88	Ford postdoctoral fellowship (1964-66);teaching, theoretical research interests	
88-93	assistant professor (1964-70); engineering community at MIT	
92,138-142	involvement with MIT commission on education	
94-98	feelings on teaching at MIT; professor (1970-); effect of sex in MIT advancement system	
98-99	research on aerodynamic noise, other areas (1964-70)	
99-105	role of buddy system, sex, in obtaining research work	
105-119,124-125	marriage and children, domestic arrangements; effect on career; effect of husband's career on mobility	
119-123	popular image of engineering and paucity of women in field	
125-129	Director of University Research, US Dept. of Transportation, 1974-75	

Pages	Topics
	(Work at MIT, etc., cont.)
129-133	contract work with Bolt Beranek & Newman (1966-); other consulting jobs; MIT attitude towards faculty participation
133-138	NASA and ONR-sponsored research; importance to graduate student research work
142	sense of overcommitment
	Involvement with Women's Issues
142-146	MIT Women's Forum (1971-); role in increasing involvement of women in MIT community
146-150	Women's Faculty Group; work on admissions, Equal Opportunity
150-153	attitudes towards women's issues
153-163	evaluation of women's position at MIT; trends
164	personal salary history
164-166	women and self-responsibility; need to sensitize men to issue
167-169	female role models
169-171	role of NOW, women's organizations, at present
171-173	Widnall career not hindered by organizational activities
173-177	feelings on women's movement in general
177-179	self-confidence problems of women students
(NB page 178 omitted)	
179-180	reactions to Widnall speeches to various groups
	Committees, Professional Activities
180-181	government committees, generally
181-184	associate technical editor, Journal of Aircraft; advisory committees and scientific panels
184-185	awards
185-188	conferences; importance of participation
188-192	personal achievements assessed; goals and aims
192-195	activities, recreations

MIT ORAL HISTORY PROGRAM

Project on Women as Scientists and Engineers

Interview with Sheila Widnall by Shirlee Sherkow

Cambridge, Massachusetts November 2, 1976

Session 1 Transcribed by Janet Billane

Sherkow: This is Shirlee Sherkow with Professor Sheila Widnall at her MIT office. I thought we would begin as a child. Did you have any brothers or sisters?

Widnall: Yes. I have one sister.

Sherkow: Is she older or younger?

Widnall: She's younger. She's three years younger than I am.

Sherkow: And that's it, just one sister?

Widnall: Just one sister.

Sherkow: What is the level of education of your parents?

Widnall: My father has a master's degree, but it's a very interesting sort of master's degree. He, as a young man, was in Colorado, and he was a rancher. He did not go to college after high school. He got his bachelor's degree during World War II going to night school while he was working at the shipyards. So although he has a bachelor's degree, he didn't get his bachelor's degree till he was about thirty-five. Then he got his master's degree when he was about fifty I would say, a master's in business. Maybe even fifty-five. He was really quite old when he

finally completed his master's degree. Then he began teaching at a junior college, and he taught at the junior college for about ten years before he retired. So he has a master's degree, but it was not a master's degree that was earned in the traditional way where you get your master's by the time you're twenty-two.

My mother, although she held a job that would now require a master's degree, had only two years of college. She was a juvenile probation officer. She was the second in command of the juvenile court, juvenile probation system in Tacoma, Washington, where we lived. Of course she did not have a degree, but obviously the people they've hired since have degrees.

Sherkow: Is she still working?

Widnall: No. She's retired. They both retired early. They retired about sixty-two years old, so they could have fun or whatever. (Laughter)

Sherkow: Do they still live in Washington?

Widnall: Yes, they still live in Washington State.

Sherkow: As you were growing up, what were your mother and father's occupations then?

Widnall: My mother was a juvenile probation officer from the time I was in the first grade until very recently. So she had that job for many years. My father did a lot of different things. When I was in grade school, he was selling insurance. He was also teaching mathematics in the vocational school in the evenings when he was doing that. Then he went to work for Boeing as a planner, which is sort of an industrial engineering job, and he worked for Boeing for the

years while I was going through high school. Somewhere in that time, he left Boeing and went back to get his master's degree and started teaching at the junior college.

Sherkow: Did he teach business courses?

Widnall: He taught business. But he's always been a very quantitative person. He taught business, and one of the things he used to teach was business mathematics, or he'd teach economics or something on the quantitative side of business. He's also very interested in vocational programs. I think when he finished at the junior college, he was the director of vocational programs for the junior college, and they were doing two year preparation for various fields, real estate, electronics technician and lots of other things.

Sherkow: Sounds like he's done a lot of different things.

Widnall: He's done a lot of different things. When he was a young man, he was a rodeo cowboy, and he traveled with the rodeo circuit. The reason that he ended up in Washington State was that he was appearing at the local rodeo there, and he had an uncle in the neighborhood. So he's done quite a variety of things. He's a very bright person.

Sherkow: Are your parents from the United States?

Widnall: Yes.

Sherkow: You grew up in Tacoma, Washington?

Widnall: I grew up in Tacoma. They still live there.

Sherkow: You went to high school there--

Widnall: I went to high school there. My mother was from Tacoma. She grew up in Tacoma. So her side of the family has always lived there. My father's family is from Colorado.

Sherkow: I see. While you were very young--I'm thinking of pre-high school--what kinds of encouragement did you receive from your parents in terms of academic subjects?

Widnall: Oh, well more than encouragement. You could call it pressure. (Laughter) I was the oldest child, and my mother--well, I guess I either was very bright as a child or I was tutored extensively because when I was extremely young, I knew all the states and capitals before I was three. I don't know any of them now. But they taught me things. They taught me to read before I went to school.

Sherkow: Your parents?

Widnall: My parents--my mother mostly. I could play the piano before I took lessons. So I guess I was precocious in the sense of having parents that went out of their way to teach me things.

Sherkow: How did you feel about that when you were little?

Widnall: I don't remember. I guess I thought it was okay, but no, I really don't remember.

Sherkow: You were so young then.

Widnall: Yes. I was very young. All I remember was always being able to do things well in school and having encouragement for doing that.

Sherkow: For doing well in school?

Widnall: My parents didn't really monitor how I was actually doing in school after I got to be about in the third grade. In other words, it wasn't one of these things where they would look at my report card and give me a hard time about it because I guess--I don't even remember that period of my life, between fourth grade and eighth grade. I was not particularly grade-conscious at that point, and I really don't have the foggiest idea what sort of grades I was getting. But they never said anything about it. They never said, "You're not working hard enough," or, "Your grades should be higher."

Sherkow: It sounds like they changed from when you were very small.

Widnall: When I was very small, they got me started, and then they figured I was on my own or something like that. They didn't bug me about it, which was very much appreciated.

Sherkow: It's kind of unusual too. At least most people that I know--their parents pushed them one way or another, or checked up on their grades.

Widnall: Yes. Right. My parents gave me a big breathing space between about the third grade and--of course in high school I was on my own. By the time I got to high school, I was entirely self-motivated, and there was no particular reason for my parents to even interfere or concern themselves about what I was doing.

Sherkow: When you were in school, what were the interests of your friends?

Widnall: Well, at what age? (Laughs) We had lots of different interests.

Sherkow: I'm thinking of junior high and grade school.

Widnall: I didn't go to junior high. I was in one of those eight-four systems, so we didn't have anything that was like junior high.

Sherkow: Okay, pre-high school then.

Widnall: Pre-high school. Let's see. Before eighth grade, I was sort of a tomboy. I lived in a neighborhood full of boys, and I guess we played football, and we used to build camps, with trees and things like that. I did a lot of reading as a child. I was a voracious reader. But I had some friends, some guys in the neighborhood, the guy next door and two doors down or something, and we just did things together.

Sherkow: What about girls?

Widnall: There were no girls in the neighborhood.

Sherkow: What about from school?

Widnall: When you're in the first eight grades, you don't tend to import your friends from other neighborhoods. At least we didn't. I know people do now, but we were happy to take our friends as they were given in the neighborhood. Of course when you're in school, you play with your friends from school. I guess in school, we used to play baseball in school.

Sherkow: But you did have girl friends in this school.

Widnall: Yes. We played baseball.

Sherkow: You were a tomboy. So many girls were tomboys. (Laughs) I was a tomboy.

Widnall: Of course. It's a more attractive life style.

Sherkow: I guess, than being into dolls and cooking and whatever.

Widnall: Oh, well my one great love as a child was a doll house. It was

miniatures really, and it didn't have too much to do with the fact it was a doll house. It was the idea of something being scaled down to a very small size. One of the things I've done in the recent years, is I've built my daughter a doll house, a nine room doll house, four feet tall and--She thinks it's for the birds, but I'm always buying things for it. I really like it.

Sherkow: That's like Mary Hartman. (Laughs) Did you see that episode?

Widnall: No. I never stay up that late.

Sherkow: She almost bought a doll house for her daughter.

Widnall: I made a doll house. It's a lot of fun. I think my first freedom came when my parents would let me go places on my bicycle. Now that I think of it, I guess I did used to ride my bicycle down about a mile or two where some of my girl friends lived. That was really the only time when I started playing with girls at other than school--is when I could ride my bicycle down.

Sherkow: You've mentioned in terms of extracurricular activities that you read a lot, and you were a tomboy. Could you talk a little a bit about any other childhood activities that you were involved in?

Widnall: Well, I liked to horseback ride. I took piano lessons for about four or five years, and I still play the harpsichord. I was very artistic. I took all sorts of special painting classes and things like that. I don't think I'm terribly good at it, but I was considered at that point to be somebody who could do it better than most of the kids in the class.

Sherkow: Did you belong to any things like girl scouts?

Widnall: Yes. Girls scouts, brownie scouts. How did that work out? I was a girl scout and a brownie. My mother wasn't the leader, but she was very active in helping out in the troop.

Sherkow: What sports were you interested in?

Widnall: Baseball. That's all we ever played--was baseball. Baseball and football.

Sherkow: Are you a Red Sox fan? (Laughter)

Widnall: No. I don't like baseball. That's just what we seemed to do when we were outdoors.

Sherkow: As you were growing up, did you feel or notice a lot of peer pressure towards anything in particular?

Widnall: It's hard to sort that out. I was in a grade school class that had about twenty-one girls and seven boys. So it was an off-balance class. So the kind of peer pressure you get in a situation like that I think is quite different from the kind of peer pressure you get in a more evenly mixed class. I think the other thing that's different is that I went to a Catholic girl's high school. Again, the peer pressure that you get in that sort of situation is different than you would get in a public high school.

Sherkow: So you went to a public grade school?

Widnall: No, it was a Catholic grade school. It was a parochial grade school.

Sherkow: That's why there were so few boys?

Widnall: On the grade school level, they're coed. I think most of them are coed on the grade school level. Certainly in the West they are. I don't know what they're like in the East. The high schools were not coed, although the high school that I went to has since merged with the boy's high school. So now it's a coed high. But when we went, it was two separate boy/girl things.

As I recall, in both high school and grade school, there was no peer pressure that was in any way related to academics, one way or the other. That was just really not an issue. In other words, nobody made fun of you because you studied or because you didn't study, or because you were doing well or because you were doing poorly. That was not an issue. The only peer pressure I felt was wanting very much to belong to a certain group of girls that I was running around with.

Sherkow: Were you successful?

Widnall: Yes. But that was very important to me at the time. In any of these things there was always a group of ten or twelve girls--in any group like that that are clearly acknowledged to be the leaders.

Sherkow: Oh were you in the popular group?

Widnall: Yes. I was in that group.

Sherkow: You were in that group. Oh well, that means a lot.

Widnall: Well, it means a lot, and it's more achievable in the parochial school than it would have been at a public school, where the peer pressure conflicts with your academic desires. But we were very nice girls, in the sense that since we were in a Catholic school, the kinds of pressures on us were probably a lot different than the pressures on

the girls in the public schools. So all we had to worry about was clothes and--(Laughs) I don't remember--clothes and--

Sherkow: You mean looking 'cool.'

Widnall: Well not 'cool.' We didn't worry about that. It was dressing well and being able to talk well on any subject and dating boys, dating certain boys.

Sherkow: Certain boys.

Widnall: But of course the certain boys that we were dating were very nice boys as a matter of fact. Half of them became priests, so (laughs) it was a very different kind of pressure than you get in the public schools.

Sherkow: In the grade school, how did you feel about being in a situation where it was three to one in terms of girls to boys?

Widnall: That didn't bother us because we were under thirteen. The way we handled that was that there was a neighborhood school about four miles away that had a ratio that was the other way, where they had a lot more boys than girls. So what we really did was we took over those boys, and the boys that were in our class were really dating younger girls. So that's the way that worked itself out.

Sherkow: How would you characterize your home life during this grade school period?

Widnall: Well, I don't know. I mean I don't know what to say about it.

Sherkow: In a way, I'm asking how did you feel about your parents?

Widnall: Oh, I have a great relationship with my parents.

Sherkow: What was it like then?

Widnall: It was good then. My parents just gave me a lot of freedom. They never really bugged me about a lot of things.

Sherkow: Were you close to them?

Widnall: Yes. I'm very close to them.

Sherkow: Did you do a lot of things together?

Widnall: Did a lot of things together. We still do a lot of things together. At that point we were doing a lot of camping. Every summer we would go on one of these tenting trips with a car. My father is the sort of person who works around the house. He's always making things or building things or something like that. So a typical weekend would just basically find everybody at home doing their own thing. My parents did not go out a lot. They were not terribly social. In all of the time I was growing up we probably had no more than three or four babysitters in the house, the entire time. We did generally have live-in help before I got to be in the eighth grade because mother worked. But they did not go out in the evenings. They were basically always home.

Sherkow: Did you do things with your sister?

Widnall: No. She's much younger than I am. Three years. I think she had a difficult time getting her feelings of independence, having an older sister.

Sherkow: You mean when she was younger.

Widnall: Well, she still does.

Sherkow: Really. Is she an academic person?

Widnall: She's teaching high school, but she's not academic actually. Although she's still going back to school. She's working on a master's degree and picking up additional courses, but they're vocationally related.

Sherkow: So she was too young for you when you were a child?

Widnall: Yes. She was too young for me, and of course there was a lot of sibling rivalry, and I was always getting the best of things. I was the oldest, and I was academically moving along very fast. I'm also unscrupulous (laughs) when it comes to fighting with my younger sister.

Sherkow: Were you more academically successful than your sister?

Widnall: Yes. Quite a bit. I don't think she really got the hang of school until the last three years of college, when she finally began picking up.

Sherkow: Were the two of you competing, or did she just drop out?

Widnall: We weren't really after the same thing, so I'm not sure we were. We weren't really competing for the same thing.

Sherkow: In this Catholic school, the grade school, did you have to take what I term 'female-oriented' courses, like sewing and cooking?

Widnall: Yes.

Sherkow: As opposed to shop?

Widnall: No, we had shop too. In the seventh and eighth grade, we had wood shop. I remember that because the nun who taught the course had lost her little finger on the band saw. We made things; we used

the big saws; we built things with wood. Then I remember in high school doing some sewing and doing some cooking.

Sherkow: But was there a clear differentiation between this is what girls are supposed to do, and this is what boys are supposed to do?

Widnall: Not really. Of course when you have a class that's got twenty-one girls and seven boys, and you put them in a woodshop, it's very hard to convince them that's not what girls are supposed to do because clearly there were more girls doing it than boys. I think the nuns were pretty good about that sort of thing.

Sherkow: How did you like going to Catholic school?

Widnall: I liked it fine.

Sherkow: Did you like the nuns?

Widnall: Yes. I liked the nuns.

Sherkow: A lot of people don't.

Widnall: I think the ones that we had let you get close enough to them so that you really saw them as people. You saw their personalities. They were all very different from one another. When I was in high school, I won the science fair and got to go to Cleveland. I got to take my chemistry teacher along. My chemistry teacher had a reputation for being an absolute bear and the snappiest person in the world. But it turns out when you take her on a trip to Chicago that she's really quite a nice person.

Sherkow: Was it Chicago or Cleveland?

Widnall: I guess it was Cleveland, but we had to go by way of Chicago, and we spent some time in Chicago. I had the same nun all the way through grade school and high school. It was the same order. The grade school and high school were about two blocks away from each other. So it was basically the same group of people. Although it wasn't identically the same people, it was the same order, and they all knew each other.

Sherkow: So you don't feel that your grade school, in particular the nuns, tried to channel girls in any way?

Widnall: No. No. Because for instance, the principal in high school was a really good mathematician, for a high school teacher. She had gone through a Master's Degree in mathematics and was a good mathematician. There was no way you could convince her that girls shouldn't study mathematics. She was very good with that.

Most of the other teachers really just didn't get into those issues about what people should do. This may have been before the end of the war. I think the time when people went back into the home was the middle fifties or something like that, and I was going to grade school--I finished the eighth grade in '52. So that was the whole aftermath of 'the women had gone into factories during the war, and they were doing this, and they were doing that, and they were doing everything.' So I don't know what the girls got after that, but certainly we didn't get any of that at all.

Sherkow: Then you went to the high school, and that was all girls. How did you feel about that, the fact that now there was just girls; there were no boys?

Widnall: I realy didn't think about it at the time.

Sherkow: Really? In high school you didn't think about it?

Widnall: No. It was all my friends. And we only had had seven boys in the class to begin with, and when they suddenly disappeared, it was no real big deal. It was understood that the boys' high school and the girls' high school were part of the same thing, that the boys were expected to come to our parties, and we were expected to go to their parties.

Sherkow: Were they close?

Widnall: No. They weren't geographically close. They were a couple of miles away. But it was understood that we were part of the same social system. But it was kind of nice to have your own space, where you could take your classes and do the things you wanted to do, and there weren't boys around. That was kind of nice. It gave us more freedom.

Sherkow: What was your social life like in high school?

Widnall: We had this group of twelve girls that we ran around with, and there was a corresponding group of some number of boys, twelve to twenty. We all knew who was in the group, and we used to run around together. We'd go to dances. On Friday nights, there was a dance. It was sponsored by the Knights of Columbus. Everybody would go to that. It was a weekly thing. We all went to that, and sometimes there would be a party on Saturdays, or sometimes you might go to a movie or something like that. Sometimes you stayed home.

Sherkow: Did you have boyfriends?

Widnall: Oh, yes.

Sherkow: Was it serious?

Widnall: No, not serious. It was really more a question of how you were going to get this group of twelve girls and twelve or twenty boys organized for the coming weekend.

Sherkow: You did things together.

Widnall: We did things together. You always made sure that everybody could go to the party, so you had to rearrange people sometimes.

Sherkow: Did you have private parties?

Widnall: Yes. Private parties.

Sherkow: You've mentioned before that by the time you got into high school, you were self-motivated. I was wondering when and how did you develop an interest in science?

Widnall: When I was in grade school, I thought I was going to teach mathematics, so I was always interested in math. When I was in high school, my best subjects were math and science, and I was more clearly interested in those than any of the other subjects. So I always thought I was going to do something in science or math. I didn't choose engineering until I came to MIT.

Sherkow: Were other girls in high school interested in science and math?

Widnall: I'm not sure what my friends were interested in. I think I was the only person, at least of my friends, who was interested in a particular thing. In other words, when we got ready to go to college, I was the only one who said, "I'm going to MIT because I'm going to be a scientist." Everybody else said, "I'm going to the University

of Washington," or "I'm going here," but nobody else had a 'because.' They just said, "I'm going."

Sherkow: They didn't have the direction.

Widnall: They didn't have any particular thing that they were going to study. In other words, they had not chosen a school for a particular reason.

Sherkow: Did that make you feel unusual at all in your group?

Widnall: No. I just felt that I knew what I wanted to do and that maybe they didn't have to know. Many of them thought they might teach grade school or something like that.

Sherkow: What about marriage?

Widnall: There was one girl that got married right after high school. It was always very clear that's all she ever wanted to do--was to get married. But everybody else went to college at least for one or two years, and many finished.

Sherkow: While you were in high school, did you have approving or encouraging teachers or guidance counselors?

Widnall: Yes. We didn't have guidance couselors. We just had teachers. I think basically they were teaching us, and I was doing well, and they were happy, and I was happy. I didn't really worry too much about-- In other words, I never looked to the high school to give me any advice about what I should do. It's never occurred to me that I should ask anybody what I should do.

Sherkow: You came up with it all on your own.

Widnall: Yes. Right.

Sherkow: Your parents weren't pressuring you or pushing you into anything?

Widnall: No. No.

Sherkow: Did you have any significant female role models that affected you?

Widnall: My mother. Since she has always worked, it just seemed natural that I was going to work. It just seemed pretty obvious to me.

Sherkow: That's a pretty good role model, your mother.

Widnall: Yes. I think that's true. Also, my father was very supportive and encouraged without being specific. In other words, he says, "I don't care what you do, but do it well," or "We'll support you," or something like that.

Sherkow: Were your parents pleased that you were interested in a special subject in high school?

Widnall: I don't think my parents knew in high school what I was interested in until the very end. Once I had made up my mind to go to MIT, then I said, "If I'm going to go to MIT, I'm going to have to take physics, so that means I'm going to have to go to the public school every afternoon to take physics." I did that; I used to go on the bus for about a five-mile bus ride from where I was going to high school to the public school. I used to go to every single afternoon on the bus, and then I'd take physics in high school, and then I'd go downtown where

I had a job.

Sherkow: You mean you didn't have physics in your high school?

Widnall: No, we didn't have physics in my high school. So then I had an after-school job in a drug store. So my afternoon was to go take the physics course and then go off to work.

Sherkow: Was this when you were a senior?

Widnall: Yes. This when I was a senior.

Sherkow: When did you decide you were going to go to MIT?

Widnall: It had to do with the science fair. I was entering the science fair when I was a junior.

Sherkow: And you won it?

Widnall: Yes, I won it in Tacoma. It was really nothing very special.

Sherkow: What was it?

Widnall: Just a little project on radioactive decay of uranium. I think it was more artistic than scientific, but it was a well-put-together project even if it wasn't very profound.

Sherkow: But you were competing with a number of other people.

Widnall: Well, yes. High school kids. So after I won that, then it's interesting. He just called this afternoon. There was a man who was the MIT educational counselor, so he picked me up at that point and said, "Well, I think you should go to MIT." He wouldn't hear anything--

Sherkow: So you did have a counselor.

Widnall: Well, this was not somebody in the high school. This was an MIT alumnus.

Sherkow: Somebody that just knew you because you won the science fair?

Widnall: Yes, because I won the science fair. His job is to recruit high school kids for MIT. In other words, that's something he does as a volunteer activity. So I met him that spring when I was junior, and he said, "I think you should go to MIT," and he started sending me catalogues and stuff like that.

Sherkow: What was your reaction to that?

Widnall: It's always nice to have somebody take an interest in you. I didn't know very much about MIT or what I wanted to do, but by then it was fairly clear that it was either going to be MIT or the University of Chicago or Reed or Stanford or something like that. So it became very clear that I needed some physics, no matter how it turned out. I could get all the math I needed at my school. I had to do trigonometry on my own, but I could do all the math at school. I just needed physics, so I had to go down to the high school and take physics.

Sherkow: How did you like taking that course?

Widnall: That was sort of interesting. It was being in a class with boys. I was about the second in the class, I guess. There was one guy in the class who was extremely bright at least in terms of numbers. He could literally multiply things faster than the instructor could do it on a slide rule. It was very impressive. I was not envious of him at all, but it was interesting being in a class with someone like that.

But that was just a different experience. But I did well in the course.

Sherkow: Did you feel it was more competitive than the classes that you'd been in at the high school?

Widnall: No. It was less competitive. It was very clear that the students were not as interested in the material as the students were in a typical class in the private school. That was very clear. That just really came across; it wasn't clear why half the kids were in the class.

Sherkow: Like why they were taking that course?

Widnall: Why they were taking the course. Right. A lot of them were just not interested in the material. The kids who had the ability, most of them, except for maybe one or two, did not seem to get that real satisfaction out of mastering the material that you ought to get in a situation like that. They didn't get that kind of joy out of it that you should get when you take a subject like that, and you do well in it. That ought to make you happy, and these kids didn't seem to have that.

Sherkow: Why do you think?

Widnall: I don't know. I really don't know.

Sherkow: Do you think they were more interested in something else?

Widnall: Well, yes. They may have had a lot on their minds. But that was a big difference in atmosphere.

Sherkow: In what ways did your teachers try to influence you? Sounds like they didn't.

Widnall: They didn't. They just gave me encouragement.

Sherkow: Did they give you lots of encouragement? Or was it just sort of average for somebody who did well?

Widnall: I suspect it was just average for somebody who did well. I think every teacher is glad to have somebody in a class who is interested in the material. That's what teachers are there for. My physics teacher in the high school, who obviously recognized I was special case since I was coming from another school to take his course--he used to give me a certain amount of encouragement. I thought it was fine.

Sherkow: How do you feel your high school prepared students in science and math?

Widnall: That was many years ago. I graduated from high school in 1956 and also from the West Coast, which is a little different than being in the East Coast. For instance, our high school did not offer calculus, nor did any of the high schools in our town. Now during the Sputnik revolution, high schools started pumping that stuff into the students. I don't know what they gave up when they did that. In any case, it's a very different situation. What my high school gave me is--and society in general at that point--was the freedom to grow and do it on my own without somebody pumping it into me. Now, the kids today I think are getting a lot more work. I don't know if they're getting it now, but certainly a few years ago. They're getting a lot more pumping up in certain areas. People are saying, "You must do this, and you must do this, and you should take, and you better study hard, and you've got to get into a good college, and you've got--"

Sherkow: I think they definitely do that. There's a lot of pressure.

Widnall: I didn't have anything like that. I didn't have any pressure like that. I don't know what I gained and what I lost. I didn't get calculus. I had to learn it when I came to MIT.

Sherkow: You also mentioned you didn't have trigonometry.

Widnall: I had to do that on my own. I did that.

Sherkow: And then physics.

Widnall: And physics I had to get somewhere else.

Sherkow: So what did you have? You had chemistry and biology--

Widnall: Chemistry. I didn't take biology. I wasn't interested in biology. I had chemistry and two years of algebra, three years of Latin, and all the other things.

Sherkow: Geometry? Did they have geometry?

Widnall: Oh yes. Geometry.

Wherkow: So it sounds like they didn't have the senior level type courses?

Widnall: Yes. They probably didn't have the senior level type courses except for English and Latin and history. Obviously, we got all of those things, but they were missing physics, and they did not have calculus. The public high school didn't have calculus. If I had wanted to come down to the public school to take calculus I wouldn't have been able to do it. They didn't have any calculus.

Sherkow: So did you study calculus on your own?

Widnall: No. I just did it when I came to MIT. Now, that put me at a disadvantage relative to the class. I think at least twenty percent of the class had had calculus. But that's something that you can overcome.

Sherkow: By the time you were a junior in high school you were thinking seriously about MIT.

Widnall: Yes. At the end of my junior year.

Sherkow: After you'd gotten this award. Did you have any expectations at this point in your life that you might be pursuing a professional career in science?

Widnall: Oh sure. I always had an intention of pursuing a professional career. Always. But the question is 'in what.'

Sherkow: From pre-high school?

Widnall: From pre-high school. I was going to be a mathematician or teach mathematics. I was going to be a teacher. So I was always going to work. There was never any question about that. It was really only the question of work at what? When I got into high school, that gradually shifted from mathematics to science. That was really the only change.

Sherkow: What were your parents' expectations about your pursuing a professional career?

Widnall: I was expected to pursue a professional career. They'd never said I had to pursue a professional career, but they were both doing it.

Sherkow: And they were encouraging of your doing whatever you wanted to do?

Widnall: It just seemed to me that's what people did. Both my parents were doing it, and I just assumed that's what I would do also.

Sherkow: When you were in high school, what were your feelings about possibly getting married someday and having a family?

Widnall: Well, I assumed I would do that too.

Sherkow: You would do both.

Widnall: I would do both, the way my mother had arranged it. I had to send my mother back to work when I was in the first grade because she had so much energy she was just driving me crazy. (Laughter) I would come home from school, and she'd be there, and she'd have all this energy. Finally I said, "Mother, I just think you ought to go back to work. I don't need you around home, and you'd be much better off if you'd go back to work." (Laughter) So I was never convinced that raising children had anything to do with staying home. In fact, I was convinced that raising children was better done if you didn't stay home.

Sherkow: But you had somebody that came in to help out?

Widnall: Yes. We had a housekeeper or a babysitter or something.

BEGIN TAPE ONE, SIDE TWO

Sherkow: What in your early home environment and early educational experiences lead to the development of your own self-esteem and feelings of competence?

Widnall: I think it's my parents. I suppose the other thing that I

haven't mentioned is my relationship with my father. We used to build things together. We would always be doing something. We would be building something or painting something or refiguring this and that. There are just lots of things that I can do. When I was twelve, I used to cook the dinner for the family while mother worked.--[Interview interrupted]--Being able to do things. I've just always been able to do things, with my hands, or to get things done. That's probably what leads to the feeling of self-esteem. It's just the ability to do so many things.

Sherkow: So working with your father had--

Widnall: Working with my father, being responsible for the cooking in the family, being able to do trigonometry on your own, being able to organize your life. I think success breeds self-esteem, and self-esteem breeds success. I guess I realized that pretty early, that there was a relationship between the two, and that it worked both ways.

Sherkow: When you say "success," aren't you referring to the accomplishment of getting things done?

Widnall: Yes, of getting things done. Being successful, getting things done.

Sherkow: But from your own experience, how do you feel that we can reach women in their younger ages in terms of encouraging them into careers of math and science? One of the big things ever since I've gotten involved in this project that I keep hearing over and over is that women see these fields as masculine, especially engineering.

Widnall: You have to get at that. That person that just called--that's

from Channel Five, and they wanted me to appear on Channel Five this Sunday. They wanted me to talk about science. What I tried to sell them the idea of doing--and they're not buying it for this Sunday, but they may buy it later--we made a film at MIT called "Women in Engineering," and I was trying to talk them into letting me come to Channel Five on Sunday and show excerpts of the film and then talk about the issue.

I think the way you know it's happening. I've been doing a lot of traveling around the country. It's not maybe happening so dramatically at MIT, but there are other schools of engineering where the enrollment of women in engineering is doubling every year, and so you've gone from one percent enrollment to a twenty percent enrollment at many universities. In particular, Cornell I think is up to a very large percentage. Oklahoma State is way up. The University of Washington is way up. Stanford is way up; I think they have two hundred women in their freshman class who want to go into engineering.

Sherkow: That's a lot more than here at MIT.

Widnall: Yes. It is a lot more than here at MIT. I think the issue for MIT is that we are competing with the Ivy League Schools, who've recently gone coed. We're still drawing only fifteen percent of our freshman class, fifteen to twenty percent women in our freshman class, and we have yet to get that kind of enrollment in engineering. But that's happening now, and the only reason I can think it's happening is that it really has to do with the woman's movement. Everybody, mothers in particular, and fathers too I guess, to a limited extent, are much more aware of the importance of encouraging their daughters to take life seriously. When they start doing that, then they start asking the same questions for their daughters that they would ask for their sons.

Sherkow: Rather than being smacked in the face with it when you're so much older.

Widnall: Yes. Right. Right. I think people are starting to realize that. I think that's what it takes. I think as long as it was just a few women running around encouraging women to go in engineering, I don't think that it had very much impact at all. But what it really takes is a whole change in society, and that's sort of happening.

Sherkow: I think the outcome of this ERA thing in Massachusetts if it passes, that's a sign that people are just saying, "Look, we really needed it."

Widnall: Yes. We need it. We need to take it seriously. Women need to take their life planning as seriously as men do. But I think it takes a revolution of that sort to encourage women to go into science because it comes from the parents.

Sherkow: I've just read this on and on. In fact a couple of years ago, a man at California University, wrote an article called "Women and Math." The women all did better in pre-high school than the guys in math. Proportionally it was really kind of tremendous, but then they just dropped out. Then they got to the high school, and they had somehow lost their confidence, or they didn't think math was interesting.

Widnall: I think it's an issue of professionalism. In other words, if you feel professional when you're in the eighth grade or when you're in the twelveth grade or whatever, then--It's one thing to master a subject. It's another thing to feel professional, and those are two separate things. I think the problem is that women can master the subject,

but they don't feel professional. When you feel professional, it's a feeling that goes right down to the core. It makes certain questions no longer an issue, such as, "Will I work?" That simply becomes no longer an issue.

Sherkow: It's an assumption.

Widnall: It's just an assumption. It's a given. Unless women begin to feel that way, then they're not going to pursue some of these fields.

Sherkow: But you think it's an attitude change on the part of the whole society?

Widnall: I think that's what it takes. And I think it's happening.

Sherkow: That's encouraging.

Widnall: Yes. It is. I have this freshman seminar that has about sixty students in it. Every year we've given this freshman seminar, which is an introduction to engineering, and we have always specifically asked for women students to come in it. We are running about one-third women.

Sherkow: Yes. The 'What is Engineering' course?

Widnall: Yes. The 'What is Engineering' course. We run about one-third women. One-quarter to one-third. Something like that.

Sherkow: This is the course that Mildred Dresselhaus teaches?

Widnall: Yes. Right. The reason we began it was specifically to encourage women to go in engineering by basically showing them what it was all about and letting them make up their own minds as to whether that's what they wanted to do.

Sherkow: On the whole, how do you feel about high school?

Widnall: I had a very good high school experience. It was at a very different time and a different place. I can't say whether a high school experience like that would qualify anybody to go to MIT in this day and age. I really don't know whether it would. But for me it was a good combination of getting some academic material, and at the same time not being so pressured that I lost myself, lost a sense of what it was all about. In other words, I did it myself, and I had always had that feeling. I thought that was very important.

Sherkow: You chose MIT at the end of junior year. Did you consider other places?

Widnall: Yes. Stanford, University of Chicago--

Sherkow: You applied to other places?

Widnall: I was a little fuzzy. MIT was the only place that I was really considering. I guess I did apply to Reed, and I did apply to the University of Chicago.

Sherkow: Did your parents give you any advice at this point?

Widnall: My parents said, "If you don't get a scholarship to MIT, we can't afford to send you." That's what my parents told me. But that's all they ever said.

Sherkow: So did you get accepted at more than just MIT?

Widnall: Yes. Right. I was accepted at all the places that I applied.

Sherkow: Obviously you got a scholarship to go to MIT?

Widnall: I got a scholarship. The people from the University of Chicago were pretty bad.

Sherkow: In what way?

Widnall: The people from the University of Chicago--there was a scholarship that I was applying for at the University of Chicago, and you had to go through an interview with the local alumni board. I remember very specifically all these questions about, "How do we know you're not going to just get married and drop out?"

Sherkow: In order to get the scholarship?

Widnall: In order to get the scholarship. They were overtly insulting of (I think probably) both the women who were applying for the scholarship. Not only did it make me furious, but it was very clear from their questions that there was no chance in the world that they were ever going to give that scholarship to a woman.

Sherkow: Did they?

Widnall: No. I think they gave it to to one of the boys. But it was very clear that they had all these questions about women...(interview interrupted)...It was very clear that they had too many hangups to ever give that scholarship to a woman.

Sherkow: I guess that's why they were hassling you.

Widnall: Yes. That's right. It's clearly the reflection of what they were concerned about.

Sherkow: I went to B.C. (Boston College) Graduate School, and I served on an admissions' committee for scholarships. And I was really shocked.

This was about five years ago. One of the teachers in the sociology department said of this very qualified woman, who was married and had kids, "Well, she really doesn't need this scholarship." Apparently she felt she needed it. I don't really remember what her relationship was, if she was separated or divorced or what. But apparently she was a young married woman and needed the money to go to graduate school.

Widnall: I think that's just disgusting. The dealings with MIT, on the other hand, were (on) a completely different plane. Of course, this guy was so encouraging, it never occurred to me that I wouldn't get a scholarship. But more than that, in the spring after having been accepted by MIT and waiting to get the financial aid thing all straightened out, there was a regional scholarship that the Seattle alumni could give; there were twenty students who applied for the scholarship; I was the only woman; we went over to the guy's office on a Friday night, and they interviewed the students one by one, and they didn't ask me any questions like that. And they gave me the scholarship. So my dealings with MIT from the very beginning have been of a completely different order in dealing with the issues of women as professionals. MIT's not perfect, but I think it has in my mind still held that ratio relative to other universities, and it started out with the University of Chicago.--[Interview interrupted]--MIT has continued to keep that same ratio of quality in dealing with women's issues.

Sherkow: How did you feel as a woman student at MIT? I know you were in the minority.

Widnall: Yes, we were a very small class, although we were very large relative to anything that MIT had ever taken in before. We were twenty-one. The class the year before us had been twelve.

Sherkow: So you started in '57.

Widnall: '56. The fall of '56. Because I had been in the high school class of '56. So the fall of '56. The class before us had had twelve women students in it, and six had flunked out their freshman year. So needless to say, all of us were absolutely terrified. (Laughing) I think half of us did flunk out the first year.

Sherkow: Really? Out of the twenty-one?

Widnall: I think so.

Sherkow: Why do you think that was?

Widnall: MIT did a very poor job of providing housing for that particular freshman class. They took in too many freshman women. They didn't have the housing for them. They put half of us in the women's dormitory, which was a building that held about seventeen women. So half of us managed to crowd into that. The other half were put in a brownstone that they rented from a woman who lived in the basement of the building. So they had all these college girls in this building. She threw them out because they weren't keeping their rooms clean. She threw them out in about November, just really literally out on the street. So they put the women students in the Boston University dorm, and the study conditions were absolutely impossible. None of the women could study because it was just so noisy, people running up and down the halls. They just couldn't study. They couldn't study as much as MIT students have to study in order to stay in the class. So all of the women students that were involved in that housing problem flunked out.

Sherkow: You were one of the lucky ones.

Widnall: I was one of the lucky ones.

Sherkow: You were in the dorm.

Widnall: Actually I'm so tenacious that even if I had been in other group, (laughs) I would have survived. But I thought it was an insurmountable problem for many of the students. The thing is at MIT, if you're a woman, once there is a problem, there are so many easy avenues to take. There are so many interesting things to do like go out all the time and stuff like that, that if you're having problems with your studies there's no limit to the number of things you can find to do with your time besides studying. So I think what tends to happen is once you begin having problems, then it just compounds. You put your time and energy elsewhere, and you just flunk out.

Sherkow: Since that time, they've built a lot more dorms for women.

Widnall: Now, they've got the women's dorm, and now they have a much better situation, and they have a much larger number of women. So the whole thing is much better.

Sherkow: How did you feel as maybe one of the few girls in science and math classes?

Widnall: Of course, when you first arrive on campus, you find that--at least it appears when you first arrive that coeds are the big joke. At least they were then. The upperclassmen are just waiting for the freshmen coeds to arrive so they can begin to ask them why they're here. You feel very pounced on when you come to MIT because the first thing you get are all these upperclassmen who are waiting to see what the new freshmen coeds are like so they can ask them why they've come. You get a

little tired of that. You find your own classmates are equally bewildered by MIT, as you are. Moreover, they have just come from high school. They're not too unused to having women in their classes. In high school when you're taking a physics class, there aren't too many women in there anyway. I don't really think from my own classmates I got as much hassled as I did by the upperclassmen, because my classmates didn't expect to find it any different. But the upperclassmen always seemed to think it was very strange that there were women at MIT. That's on one level.

Of course, the other level is that if you're a woman student, you have access to an incredible number of good looking, eligible undergraduate men. That's a different issue. I always had a good social life. I had plenty to do. I had lots of friends. I didn't date people of my own class very much. I dated sophomores. But literally in my class, I bet I knew five hundred people by name and some smaller number of upperclassmen by name. I was very active as an undergraduate, on the student council and all of that sort of thing.

Sherkow: Weren't you a class president or vice-president?

Widnall: No. (laughs) That was too much work. I think I was a class secretary during the year when the secretary didn't have anything to do. I was chairman of a committee called the public relations committee, which was a committee of the institute. It was just kind of an activity. It wasn't really anything special.

Sherkow: I vaguely recall in one of these biographical sketches something about how terrific you were at MIT, and you were in all these activities.

Widnall: I may have always been very careful to choose activities that

didn't require a lot of work but always seemed to give a big return for the amount of effort that you put into it.

Sherkow: You got elected into the all-male Beaver Key Society.

Widnall: Yes. That's true. There were two women in my class. I was one of them. The other woman was Linda Sprague, who was then Linda Greiner, and we were fairly active as undergraduates. The junior honorary, which was not an academic honorary, but was sort of an activities honorary. I don't think they would have been able to save face if they hadn't let us in because in terms of meeting the qualifications, we met the qualifications of that organization better than about fifty percent of the men who were in it. I think they felt--and they should have felt that way--that we really should be members of it.

Sherkow: Oh here it is. "At Tech, she distinguished herself in student activities: Chairman of Public Relations Committee; Secretary of the Class; Freshman counselor in Bexley Hall for three years; junior year election to Tau Beta Pi; membership in Sigma Gamma Tau. So that in her senior year she and another coed classmate became the first women elected to Beaver Key."

Widnall: That was I think our junior year actually, when we were in Beaver Key.

Sherkow: This is from the Historical Collection.

Widnall: Yes, well, it's wrong. (Laughter)

Sherkow: But it sounds impressive when you read it altogether. It sounds like you were very active.

Widnall: I was active in the sense that my academic work left me plenty of time to do the things that an ordinarily active college student would want to be involved in. When I decided to run for class secretary, everybody else dropped out of the race. I simply said, "Okay, you guys, I'm going to run for secretary this year." Just nobody would have run against me because I was just so well-known, and I had so many friends in the class. I had been involved in so many different things then.

Sherkow: Why were you so well-known?

Widnall: Because I was a woman.

Sherkow: You stood out, being in the minority?

Widnall: Yes. I stood out. That's really an advantage. Everybody knows you.

Sherkow: Was there ever a disadvantage to being in the minority?

Widnall: If you don't come to class, people notice. (Laughter) You have to go to class. I just had a woman student in here who's in my class, and I said toher, "When you don't come to class, I notice it." She blushed and said "yes," that she figured that that was true.

Sherkow: Mildred Dresselhaus went to Radcliffe, and there was one teacher at Harvard that she had who always asked her--he was some brilliant teacher, and he never prepared his lectures--so he's always call on Mildred Dresselhaus because she was the only woman, and she stood out.

Widnall: Because she always knew the answers too, I'll bet.

Sherkow: She summarized what he had talked about last time. So she felt put on the spot.

Widnall: But I'm sure she did a good job of it. She always does a good job of it.

Sherkow: I'm sure she did well, but she always had to come prepared.

Widnall: Well, that's true. But that's okay. You should come prepared to class.

Sherkow: Did you have any experiences like that with teachers?

Widnall: I had this economics professor who used to tell dirty jokes in class just to see if I would blush. I had humanities professors that would call on me for very strange requests. In other words, it certainly amounted to being treated differently.

Sherkow: How did you feel about that?

Widnall: Most of the time I was annoyed. But often the rest of the class would rise to my defense. But in the 'aero' department when I was undergraduate, the professors were very very good. They were very supportive. Actually, it's a very good atmosphere for students in general. It was fine for me.

Sherkow: Did that encouragement have anything to do with your picking that field?

Widnall: No, because you don't get that until after you've chosen a department. In other words, it wasn't until I had chosen the department, that I began taking courses in the department and learned that it was that kind of a department. That was just an accident. Of course, if it had been the other way, it might have helped me change my mind. But those people were very supportive.

Sherkow: When you came to MIT, and you were a little bit behind in math, how did you do? How did you do in these science and math courses?

Widnall: Not well enough to believe that I should go into physics. It was very clear that I was not at that point in the top of my class.

Sherkow: You're talking about when you were a freshman?

Widnall: Right. I had to work pretty hard as a freshman just to-- I ended up as a freshman--I never--I only got one C at MIT, and that was a fluke. So I did get A's and B;s all the time. But my lowest grades I think were in my freshman year. In fact the lowest grades I ever got were first term freshman year, when I got all B's. From then on, I started getting B's and A;s, and when I was junior I got all A's. So the first two years at MIT was a bit of a struggle academically to put it all together.

Sherkow: So you became convinced that physics was not your field?

Widnall: That I was likely not bright enough to go into physics, and that what I should probably do was choose something more useful like engineering.

Sherkow: Is that considered one of the more difficult science fields to get into?

Widnall: I'm not sure. Certainly I saw it that way when I was a freshman.

Sherkow: People seem to be a little bit leading that way from my experience.

Widnall: I think the physics department has the attitude that there are too many physicists in the world and that they basically make the undergraduate offerings extremely difficult because they really don't want students who are not going to be in the top of the class. I think they

might be right. The market for physicists is primarily in the universities, whereas the market for engineers is primarily in industry. There's simply a lot more demand for engineers than there is for physicists. So that seemed reasonable to me, and that's the decision that I made. Also everybody comes to MIT to study physics. Two-thirds of the freshman class came to MIT to be physicists. So it is not a very unusual thing to find somebody switching from physics into something else. That's the standard MIT mode. I don't know if it still is, but it certainly was then.

Sherkow: What kind of required courses did you have to take?

Widnall: You mean before coming to MIT.

Sherkow: No, at MIT.

Widnall: Oh, at MIT. I was at MIT during the years when the first two years were almost completely specified. It's very much different now. The first year was entirely specified except for some slight elective freedom of very minor things, and the second year was virtually specified. At least, the physics and the math and the humanities were completely specified each semester, which left you one professional course each semester that you could choose and perhaps one additional elective or something like that. So there really was not very much freedom. There were two different options of physics that you could take, but it was basically required.

Sherkow: Did you have to take two years of a foreign language?

Widnall: No, I didn't take any foreign language at MIT. MIT doesn't require a foreign language.

Sherkow: Their requirements are either in the sciences or in the math.

Widnall: Yes. Requirements for science and math. They require foreign language for entrance. At least they did then. I don't know if they do now, but they don't require you to take it once you get here. The only foreign language requirement at MIT is for graduate students. Ph.D. students have to pass some sort of foreign language exam at the discretion of their department.

Sherkow: While you were going to MIT, what did you do in the summertime? Did you go back home?

Widnall: In the summertime I worked for Boeing, which is a very nice arrangement. I had a summer job in engineering every single summer following my freshman year. That was very good. I really learned a lot.

Sherkow: How did that get established?

Widnall: It got established because the people from Boeing came to MIT to recruit students, and I signed up to talk to them. I guess I talked them into hiring me, so they hired me, and I worked for them every single summer. That was a good experience. I made a lot of money, a lot more money than I could have made working at the drugstore or doing almost anything else that somebody could do with one year of college. I learned a lot of things. I learned things the summer after my freshman year that I have never learned at MIT, things that I need to help the students out with when they're doing this certain kind of laboratory. That's how to work with strain gauges. Nobody at MIT ever tells you how to do that until you get around to doing a lab. Then because you're a graduate student, all of a sudden you're supposed to pick it up on your own.

Sherkow: What did you exactly do there?

Widnall: I did a lot of things. We were in structural test, and we were responsible for testing the structural integrity of the aircraft. There were two things that we were involved in. One was reduction of flight-test data on vibration of the wings during flight. That was one thing.

The other thing was: there was a structural problem with respect to the clamps that held the fuel lines together. These were breaking. They gave me a project of my very own, to basically design a test that would measure what was happening to those clamps. So I got a very nice opportunity to really do some small thing myself and really learn a lot about what was going on.

That whole thing involved directing a lot of technicians. I bet I had ten people that I could order around. "Do this!" "Solder that." "Bring that!" "Bring this!" "Plug in this," and all that sort of thing which for a freshman woman student was really pretty nice. It gave me a very good introduction to engineering and working with people. I must say that most people in that situation are a lot of fun to work with. I've always had good relationships with the technicians and the draftsmen, the other people, and the other engineers, the people that you work with. They usually are very good help.

Sherkow: Had you decided at this point that you were going to be going into engineering?

Widnall: Yes. I had made that decision in the spring of my freshman year.

Sherkow: How did you make that decision?

Widnall: When you come from Tacoma, it seems that aeronautical engineering is an obvious thing to do.

Sherkow: Because of Boeing?

Widnall: Yes. Because of Boeing. I had made up my mind at that point that I would probably stop after the bachelor's degree and go out and work for Boeing.

Sherkow: While you were working at Boeing during the summer, did you live at home?

Widnall: Yes. I lived at home, and I was in a car pool. I can't remember too much about the car pool. Oh, I do remember something about the car pool. No, that was the second car pool. I was in a car pool one year with a guy from Cal Tech and a guy from some medical school, and they were both working at Boeing, doing something. So we had this car pool, and we drove back and forth in Tacoma.

Sherkow: So you really felt good about working there. You worked there three summers or four summers?

Widnall: I worked there three summers. The summer after my senior year I worked in Sweden. Then I went back to Boeing the summer after my first graduate year.

Sherkow: Did you have a four-year scholarship?

Widnall: Yes. MIT's financial aid policy is once you get started then you don't lose your scholarship unless you do something pretty silly. So I had certainly an adequate scholarship from MIT.

Sherkow: So you were earning extra money.

Widnall: Yes. As a matter of fact, I banked all of the money that I made as an undergraduate. I never spent a penny of it until I got married, and

then I bought a car, something like that. I basically never spent that money except for the car.

Sherkow: At what point did you expect to go on and get a Ph.D.?

Widnall: That's another one of these situations where somebody comes and says you know you really ought to do this, which is why I put a lot of stress on men helping women out. First term junior year when I was in the 'aero' department after having only two random courses in my sophomore year when I got to be a junior--the first term junior year I got all A's. It was unexpected. I was doing pretty well. It's like playing roulette. You expect some A's and some B's, and if they all come up A's, it's just a big surprise. Needless to say, word of that spread through my class like wildfire.

Sherkow: When you were a junior?

Widnall: Yes, when I was junior. But then there was a professor, who now since has gone to Stanford, who basically said, "Well, okay, you should start thinking now about getting your Ph.D. degree." So he convinced me that I should not set my sights so low, but that I should plan right then and there to continue on for the Ph.D. So I did.

Sherkow: What was your reaction to that?

Widnall: I said, "Well, gee, I really don't know if I want to do that." He said, "Well, you're obviously good enough so you really ought to." That made sense to me. If somebody convinces you (you) can do it, then you think seriously about doing it. He was at that time, when we had that conversation, working for Boeing. He worked for Boeing the summer after my junior year. That's when we had this conversation because he used to come

over to the house, or he'd go water-skiiing with us or something like that. So he convinced me at that point that I should think seriously about doing that. Also in my junior year, we had a particularly good professor join the faculty, somebody that I could really identify with in a scholarly way. So you put those two things together, and I not only knew I wanted to go for my Ph.D., but I knew who I wanted to work for.

Sherkow: That person.

Widnall: That person, right, who is now two doors down.

Sherkow: Oh, he's working here right now?

Widnall: Yes. He's still here. He went to Sweden for a while, and then he's come back. Anyway, we're close colleagues, and he is really an excellent scholar. I began to realize what it would mean to work on a Ph.D. for somebody like that.

Sherkow: What's his name?

Widnall: His name is Professor Landahl, Marten Landahl. He's not widely known around the institute except in fluid dynamical circles. But everybody in fluid dynamics knows him.

Sherkow: What was your parents' reaction to the possibility that you might go on and get your Ph.D.?

Widnall: I don't think they had any strong reaction to it. I think it was very well understood that I would have to be financially self-supporting when I did that. In other words, they were supporting me through my bachelor's degree, but I guess it was fairly well understood that I would take it from there. It was fairly well understood on the

part of the other faculty member that he would support me and give me a research assistantship, or that I would have a fellowship or something like that. I anticipated that MIT would support me through my graduate work, and they did. But my parents would have said the same thing if I had told them I was going to go to work for Boeing. Graduate school is more like a job than it is like a major educational decision.

Sherkow: You think so?

Widnall: I thought so at the time.

Sherkow: It depends on which field you're in.

Widnall: It's not something you'd ask your parents' advice about really because they really would not be in a position to give that kind of advice.

Sherkow: My parents give that kind of advice freely.

Widnall: Neither one of my parents at that point had really gone to graduate school, so they didn't feel that they could advise me on it one way or the other.

Sherkow: That's nice. Not all parents do that.

Widnall: As I say, I have a very good relationship with my parents. They have provided some kind of a very successful walking of the narrow line between over-advising your child but making sure that the child is making full use of the available resources. I think they've done a very good job of it. I don't know how they've done it. I'm not sure that I'm as good a parent as my parents are.

Sherkow: It's not good to compare. (Laughter)

Widnall: No. They're really quite remarkable people, and I have a very good relationship with them.

Sherkow: I think that's great.

Widnall: It's unusual. Most people I know have got some kind of hangup about their parents, or they have some unresolved issue that has not been settled. There's something that's blocking the relationship of most children to most parents.

Sherkow: I was just thinking in terms of what you were saying, that simply that more parents than not over-advise their children.

Widnall: Yes. They over-advise, and then the children resent it.

Sherkow: Then they don't know what to do at all.

Widnall: So it's really a problem.

Sherkow: They do things for the wrong reason.

Widnall: My parents and I have a very quick relationship, if they overstep the bounds, I let them have it right away. The same is true--if I over-advise them which I try not to do, then they'd give it to me. So we have always had a reasonably adult relationship. It's really remarkable.

Sherkow: I just think that's really a little bit unusual.

Widnall: Yes. It is. Now I've been in several groups, and I've heard people talk about their parents and their relationship to their parents. I have never heard anybody talk about the kind of relationship that I feel I have with my parents. So I feel very lucky.

Sherkow: I think it just helps. All along what I've been stressing is this encouragement and not blocking girls from thinking that they can't do this or that. If you have parents that over-advise, sometimes they tend to touch on these issues. "Oh, well don't go into science. You should be a nurse," or, "You would be a good teacher." This is one of the big problems, and this is one of the things that they're always talking about women in science and engineering; they end up having parents like that or guidance counselors, or their friends think that they're unusual. It's one thing or another. So having parents that aren't like that is just a plus right from the start.

Widnall: Parents, I guess are under a lot more pressure nowadays. The whole school system is under a lot more pressure than it was then. We had time to grow up. We really did. We just didn't get the kind of pressure the kids are getting now. We had time to grow up, and we had time to really pursue whatever it is we wanted even if it was just creative goofing off. We basically could pursue that. Whatever level we wanted to. I don't think kids have that nowadays.

Sherkow: No. I don't think they do. I graduated from high school in '65, more than ten years later than when you went to high school. But still it's been going on for a while.

END OF SESSION

MIT ORAL HISTORY PROGRAM

Project on Women as Scientists and Engineers

Interview with Sheila Widnall by Shirlee Sherkow

Cambridge, Massachusetts November 4, 1976

Session 2 transcribed by Janet Billane

Sherkow: Today is November 4th, and we are interviewing Sheila Widnall in her office. This is Session 2. The last time we ended with the time that you were at MIT. I believe we were talking about the undergraduate years at that point. One of the things that I did ask you about was why you got a Ph.D. You told me the reasons for doing that. What were your parents' expectations and feelings about your getting a Ph.D.

Widnall: I think we did talk about that the last time. It's basically that they really had very little to say about it one way or the other. They thought it was a fine idea if that's what I wanted to do, but they didn't have any conception of what it was all about so they didn't really say either do it or don't do it.

Sherkow: Why did you decide to go to graduate school at MIT?

Widnall: Our department had a very complicated structure which combined undergraduate years and working toward a master's degree. I was involved in that as an undergraduate. In the middle of my junior year the department admitted me into a special program which was a five-year program leading to a master's degree. So you basically were admitted to graduate school as a junior. I think when I had already spent then five years at MIT--by then I was married and it was much easier for two people who want to be in a graduate school, to stay in the same place that they're at, rather than to move off to go to another school.

Sherkow: Was your husband at MIT?

Widnall: He was at MIT at the time. So I think the reason I stayed at MIT was a combination of inertia and being married, and it was too much trouble to apply to graduate school for two different people to go to another school.

Sherkow: When exactly did you get married to your husband?

Widnall: At the end of my senior year.

Sherkow: How did you meet him?

Widnall: He was a MIT student. His fraternity was across the street from the girls' dormitory. I didn't start going out with him until I was a senior, but I had known him since I was a freshman.

Sherkow: You got married in your fifth year?

Widnall: In the summer after my senior year. He was a graduate student at that point. He was one year older so that he had already had one year of graduate school by the time we got married. He was in electrical.

Sherkow: Electrical engineering?

Widnall: Yes. So that was another reason for not switching graduate schools at that point--because he was already enrolled at MIT.

Sherkow: Has he received his Ph.D. also?

Widnall: Yes. He actually ended up gettin his Ph.D. in the aeronautics department because he got involved in the Apollo project and started working on space craft guidance, and so he ended up doing the Ph.D. in our department.

Sherkow: Didn't he get his Ph.D. after you already had yours?

Widnall: Yes. Right. He took some time off from graduate school and actually worked on the Apollo project at the Draper Lab. Now I think that he took about three years off, as I remember. Then he came back to work on his Ph.D., still staying at the Draper Lab, still working on the Apollo project.

Sherkow: Does he work at MIT also?

Widnall: No, he doesn't now. He and a small group of people from Draper started their own company.

Sherkow: Didn't you have children before you finished your degree?

Widnall: Yes. I had my first child in January before I got my degree. I was just in the final stages of writing my thesis when I had my first child.

Sherkow: Was that planned?

Widnall: Yes.

Sherkow: I saw some cute pictures at the Historical Collections.

Widnall: Yes. Right. There's some pictures of [myself, my husband, and our son.]

Sherkow: You have your cap and gown on, and you're holding the baby.

Widnall: Right. Holding Billy. Billy is now, of course, twelve. That's right; we were basically finished with the degree, so it was not particularly difficult at that point to have a child.

Sherkow: Getting back to MIT, one topic that's talked about quite a bit

in terms of women and advancement in science and engineering is the topic of mentors, and if you have mentors in terms of faculty members who are keenly interested in you, that that's really going to help your career. I believed that happened to you?

Widnall: Yes. It's happened to me. In fact, my whole career has been marked by mentors. I spoke earlier of Dr. Anderson, who was the person who helped me when I was a high school student, encouraged me to apply to MIT. I think without his strong encouragement, I probably would not have even considered it in my wildest imagination. I'd never even heard of it.

Sherkow: Really?

Widnall: Yes. So I think that that was a very strong person in my life. Probably the next strong person was Professor Holt Ashley who was the person who talked me into going to graduate school. He has basically always been in a position to encourage me and promote me in my career. In fact he's still doing it. He's off at another school now, but I mean I'd suspect that he's behind the woodwork there in many of the things that I ended up getting involved in. For example, when he was on the nominating committee, I'm sure he put me up for being on the board of directors of my professional society. I have a very strong feeling that he was back there in the woodworks somewhere in my winning the Outstanding Young Man of the Year for our professional society. He's back there in the woodwork all the time. So I get a phone call from so and so or something saying, "Would you like to do this," or "Would you be willing to do this," or "You have just won the following award," or "YOu have been nominated for something. I know he's back there doing that sort of thing. There are also a number of other people that are back in the woodwork doing things like that.

Sherkow: Did you have people like that help you in getting jobs?

Widnall: I haven't had that many different jobs. I've been at MIT most of the time. But for example, there's a guy back there in the woodwork who is now the dean of engineering at Cal Tech, and he was the assistant secretary of the department of transportation and talked me into coming down to Washington and work for a year. In my career there have been a lot of people, probably ten people who are important in one way or other for encouraging me or being involved in getting me involved in something. That's very important. It's a very important part of one's professional development. I do hope that I play that role for other young people, because I think I really owe people a lot for that.

Sherkow: When you went here you mentioned that about half of the women that entered MIT when you did, dropped out, flunked out.

Widnall: Yes. Right. Flunked out or dropped out.

Sherkow: Did you have women friends when you were at MIT in your whole eight years or nine years?

Widnall: I wouldn't say my close friends were women. I certainly knew all the other women, but I don't think I had any close friends that were women. They weren't my best friends. I had one friend who was a woman my freshman year and she flunked out. Maybe I learned my lesson or something like that. (Laughs)

Sherkow: Are the women that go to MIT different or unusual?

Widnall: Yes.

Sherkow: What is unusual about them?

Widnall: The very small number of women that went to MIT when I was a freshman were generally pretty courageous and pretty determined. Most of them, I think, had a very strong self-image. I think the ones that stayed clearly had to have that. I think a lot of the ones that flunked out were the ones who were basically confused and didn't have that. So when the whole thing started falling apart for them, they really didn't know what to do about it. The women who survived were survivors. That's basically a good word for that. They were survivors. They knew what to do when you get in a situation where the going gets rough.

Sherkow: Didn't they have counselors or people like that here?

Widnall: No. MIT did not do a very good job of that, I don't think.

Sherkow: They do now don't they?

Widnall: They have really a much better setup. Now, of course, they have a woman's dormitory, and there are a lot more women students. It's a very different atmosphere. In fact, the women students at MIT now do not have to have those same personal characteristics as as the women students who were able to succeed when I was a freshman. I think they're still a remarkable group of women, but what we would like to see at MIT is that a woman student can come to MIT and feel comfortable without having those personal qualities. In other words, she can be just like the male students that come to MIT. You can admit a wide variety of personalities, and all of them can find a place at MIT. That was not true of the women students many years ago.

Sherkow: Do you think it's true now?

Widnall: I'd like to think it's true. I'd like to think that with the large

number of women that we have with the dormitory system and with the coed dormitories and all of the other things, that the women who come here, can have basically the same personality characteristics as the men, the same range of personality characteristics and still manage to survive and enjoy MIT.

Sherkow: Realistically speaking, don't you think that women that get accepted here maybe have to be a little bit more the excelling type than the men?

Widnall: I'm not sure. I really am not sure it's really necessary that they be any different from the men, in fact maybe even less so. In other words, they may find the environment more comfortable than the men do.

Sherkow: When they're selecting people to come to school here, do they have the same requirements for the men as the women?

Widnall: Yes. I've served on admissions' teams and been involved in the admissions process. Certainly the qualifications are n ally the same.

Sherkow: My feeling was that years ago, when they admitted women into here, they had to be brighter.

Widnall: They did have to be brighter. As long as there was a quota on the number of women students that could come to MIT, it was always working out that the women students were brighter. Once they eased the housing problems, then they could admit women on an equal basis.

Sherkow: Did you ever feel lonely or isolated here at MIT as a student?

Widnall: that's a difficult question. I always was very self-reliant.

I think it's a strong statement--when I say I had no women friends, that must indicate that I was kind of a loner, although I had my friends in class. I didn't feel lonely at MIT at all. I was always dating five or six different people, so I always had five or six close friends at any one time. In addition to the people I was dating of course, I had a number of other close friends, especially people in my classes that I was very close friends with. In fact, I'm still close friends with them. I have people who were classmates, who are now off doing other things. Some of the closest friends I still see at least once a year. These happen to be men, but they were my friends. There was never any boy-girl relationship with these people. They were just my friends. So I had lots of friends. I certainly never felt that I had any more time to invest in friendships. I was pretty satisfied with life at MIT.

Sherkow: I think I read somewhere that you wrote that when you went here, you were singled out because you were a woman, and if you were a genius, that would be okay, but you weren't extra special, terrifically brilliant, and you were somewhat uncomfortable with that situation.

Widnall: I think maybe in my freshman year I might have been like that, but when I was in my junior, senior years especially, I was one of the top students, in my department. So as far as running around taking courses with the people that I was going to school with, I was always number one or two or possibly three in all the courses that I was taking. So I didn't mind being particularly singled out in that situation.

Sherkow: Do you have any regrets about coming here?

Widnall: No. Not at all. I don't have any regrets about coming to MIT.

Sherkow: How long were you here?

Widnall: I've always been here.

Sherkow: How long did you go to school here?

Widnall: I came in 1956, which is twenty years ago this September, and except for the year in Washington D.C., which is only two years ago, I've spent virtually all of my time at MIT, one way or another.

Sherkow: Would you like to go somewhere else?

Widnall: No. MIT changes faster than I do. In other words, MIT now is very different than MIT was when I was here as a freshman, and it's not like being at the same place.

Also relative to my field, MIT's a good place to be in my field, and I have a very active relationship with people at other universities. In other words, there is no particular reason to go to another university, because I see the people that are in my field at that university a couple of times a year. I travel, or they travel, or we go to conferences or something like that. MIT is just a base of operations. It's not confining in any sense. It's just an address (to) which the government can send money. but the work in my field goes on in many places around, and I usually get to visit these people, or we correspond or something like that. So there's no particular advantage to be in one place or another.

Sherkow: I found this Globe article, dated 1965.

Widnall: That's an old one.

Sherkow: It's right in there.

Widnall: (Reading the article) These newspaper articles are--

Sherkow: Do they distort?

Widnall: Oh yes.

Sherkow: But don't you see what I mean? I read that as background information on you, and it very clearly says that that bothered you, the fact that you were singled out, because you weren't super brilliant. It says, "and still does bother you," "and still does..."

Widnall: I don't feel that way at this point, and I can't remember those feelings.

Sherkow: Were you in the newspaper a lot?

Widnall: Well, yes. The newspapers and things were always coming by. I think maybe what I really felt was being singled out, especially when you do that sort of thing for newspapers because the stories are usually quite distorted, and when you read them, it doesn't really seem like you at all. I guess I don't like that. I don't like the distortion that goes along with these people who write articles on women in this and women in that. Even though I go along with it because I think there is a message that needs to get across, but I always find it personally very painful to get involved in something like that.

Sherkow: Does that still happen? Are you written up a lot?

Widnall: I try to avoid it. It doesn't happen a lot, but there are always people who are calling you up and doing this and doing that. The reason they're doing it is because you're a woman. I tend to go along with it because I think that I would like young women to see that there are women that are doing things. But I happen to be in a field that is not particularly easy to communicate to the public, and so there is always bound to be some distortion. If I were in a field that is

easy to understand like computer science or structural analysis, I think that would be a little more straightforward.

Sherkow: It does seem to me that the media has a difficult time.

Widnall: They do have a difficult time, and I sympathize with them.

Sherkow: Oh no. I don't sympathize with them. It seems to me that they should be bright enough so that this problem with distortion and printing not quite what the person said but something that sounds like it, is one of their problems.

Widnall: I think you just have to accept that, because you can't put any time and energy in to trying to change it.

Sherkow: I just have found that this has happened a lot. It just seems to me to happen over and over. I know that you do serve a useful purpose in that you're a role model for women. I mean your picture's there; there's certain things they can't distort.

Widnall: I guess I take the point of view that the press knows how to communicate with the public better than I do, and so I'm sort of happy to let them serve as an interface.

Sherkow: The funny thing is there was an article recently in Cosmopolitan on women engineers, and a friend of mine who is a mathematician read it because Vera Pless was one of the women interviewed. She thought it was a terrible article. It was very condescending, and she thought that if women would be interested in going into engineering for those reasons, they probably wouldn't. It was so condescending, and it was emphasizing that "these women are ordinary". I thought it was a good article for somebody in junior high.

Widnall: I think that's the thing. I guess Vera just hasn't reached that point where she realizes that maybe those people can communicate better with the public than she can. Cosmopolitan obviously knows what it's doing, or it wouldn't be selling as many magazines as it has. It has an audience, in other words. It has an audience, and it knows how to write for its particular audience, and that's the people that are likely to read that article.

Sherkow: Maybe it would influence them.

Widnall: that's what you have to expect out of that particular magazine. I'm delighted that they did an article on that subject.

Sherkow: Mildred Dresselhaus liked it a lot.

Widnall: Yes. Well, Millie's probably come to terms with that.

Sherkow: I thought it did a pretty good job.

Widnall: I think it's maybe something that scientists in general have difficulty doing, and that's coming to terms with another person's professionalism.

Sherkow: Did you receive fellowships at MIT all along the way?

Widnall: Yes. Right. Fellowships or research assistantships. I was always supported the way a typical graduate student was supported.

Sherkow: When you were working on your Ph.D. were there other women that were also working on Ph.D.'s?

Widnall: No.

Sherkow: You were the only woman?

Widnall: In our department. In fact, our department has very few women students and very few women in graduate school. I think even now we have maybe only three women in our graduate school. I've never understood why that's true. I have a class of sixty-five sophomores, and I have only one woman. Other engineering departments at MIT have a larger number of women.

Sherkow: Electrical engineering?

Widnall: Electrical engineering has a larger number of women.

Sherkow: Chemical Engineering?

Widnall: Chemical engineering has a huge number of women, relatively speaking.

Sherkow: What about mechanical engineering?

Widnall: Mechanical has a huge number of women. Mechanical has got biomedical engineering, and that tends to attract a large number of women. Chemical engineering has historically always had a number of women students because it follows directly out of chemistry, and for some reason that seems to attract a large number of women. Civil engineering draws heavily from people who are interested in computer science and operations research. Aeronautical engineering just simply has not attracted a large number of women.

Sherkow: I didn't think that there were a lot of women in electrical engineering. There are?

Widnall: I think there are, relatively speaking. I don't know what the

number is, but if you take the percentage of women in the school of engineering I think you'd probably find electrical has a percentage that is reasonably close to the average percentage. I don't know what the numbers are.

Sherkow: But you don't understand why there aren't more women in aeronautical?

Widnall: No. I don't understand that. There were when I was an undergraduate, in fact. There were two other women in aero as undergraduates when I was going through, and that was from a very small base of women.

Sherkow: There must be a reason.

Widnall: I don't know what the reason is, unless it's just that of the things that are attracting women in engineering, we simply don't have any of those things, such as the biomedical engineering and the computer science and the computer software and the chemistry. Those are subjects that we simply don't emphasize, and that's what I suspect the reason is, that it's not anything particular about aeronautics. It has to do with the lack of some subjects that have always been traditionally strong for women. I think that's the reason.

Sherkow: But isn't this area that you're in a good one for women to be in terms of jobs?

Widnall: Sure. Sure it's a good one. Engineering, in general, is a good place for women to be. What I'm talking about is a relative difference. In other words, what I'm saying is that once women have chosen engineering, which in general I wish they would do more often, then when they start to choose the type of engineering that they're going to go into, aeronautics

seems to lack some of the strong emphasis on subjects that women have traditionally gone into, such as chemistry and computer software and medicine. Biomedical engineering seems to be very strong. That's kind of tangentially related to chemistry and biology, and that seems to be attractive to women. So we have some women in aeronautics, but you can count them on the fingers of one hand. I think we have three undergraduates and three graduate students or something like that, which is probably a very small percentage relative to the other engineering departments.

Sherkow: Are you actively involved in trying to recruit more women?

Widnall: Not for aeronautics specifically. I work with Millie Dresselhaus a lot in general engineering. I figure that if you can encourage women to go into engineering, I don't particularly care what field they choose. Engineering really is quite a common profession when you get into the upper levels. In other words, people end up doing all sorts of things that are almost independent of what they did their undergraduate work in, so I don't really care what particular sub-discipline women choose because I don't personally think it makes much difference, except for some very strong thrusts. You can't work in chemical engineering if you have not developed a strong background in chemistry. But, there are many things that you can do with the degrees that come from any individual department.

Sherkow: You weren't asked to be a member of this N.S.F. program at Simmons College.

Widnall: No. That doesn't sound familiar. I guess I"ve heard something about the Simmons thing.

Sherkow: There's sixteen women, scientists and engineers that are presenting their biographies, and then they have sessions later on in the afternoon where they can personally talk to the women, and women from neighboring colleges have been invited.

Widnall: No, I'm not involved in that program.

Sherkow: Mildred Dresselhaus was one of the engineers. They lacked the engineers as the role models. I think she was the only one. It's that age-old problem that engineering is somehow still viewed as a masculine profession. At least in this conference it's not promoted as much as the other sciences are.

Widnall: That's sort of shortsighted, but it's a natural thing that tends to happen. The opportunities for jobs in science are much fewer than they are for jobs in engineering, but the scientists would be the last ones to admit that. So you end up with this ridiculous situation where you have a woman professor of astronomy coming and talking to women undergraduates, in full recognition of the fact that the country has too many astronomers, and there are simply no job opportunities for anybody, including women.

I think part of that has to do with the fact that engineering as a profession does not connect with the high schools very well. In other words, on the high school faculty you will have somebody who teaches high school physics, you will have somebody who teaches high school chemistry and somebody who teaches high school mathematics. But there's no equivalent person who connects to a department of engineering. So it's just one step removed from the connection between high school and undergraduate school.

Sherkow: That's why the course that you teach for freshman is really good.

Widnall: It's very important. I'm willing to do it every semester. I've already promised that I would do it next semester. I think that's very important. That's something that fills a gap between what students have learned in high school and what kinds of decisions they're expected to make once they get into college.

Sherkow: Wouldn't it be possible to interject some kind of engineering education in high school?

Widnall: Sure it would, but I'm not about to put in the time and energy that it would take to do that. The problem with all that stuff is there's just so many professional educators running around doing this and doing that. It's an enormous timewaster. I think everybody, including Millie, has to be extremely selective about what we volunteer or say that we will participate in. Millie and I are both pretty careful about what we get involved in.

Sherkow: She gets asked to do so many things.

Widnall: Right. Pick and choose just a few things. Otherwise, we never get any work done.

Sherkow: That seems like something that educators should get involved in; people that are right at the high school now.

Widnall: They have a responsibility to do it. I think there are people who are helping and interested in that topic. There's the Society of Women Engineers, and they've been doing that for a long time. That's really probably the most effective group to do it....(interview interrupted)...

Sherkow: You got fellowships or graduate assistantships when you went to MIT. Do you feel there was any discrimination at all in who MIT handed out those awards?

Widnall: No. No, not in my department. That's all done by department, and that was not done in my department. I'm not sure it wouldn't be done today. But at that time, there was just no issue about the fact that I was a woman. The thing about that was well. I received the prize for being the 'most outstanding undergraduate."

Sherkow: The most outstanding undergraduate at MIT?

Widnall: In my senior class, in aero. Let's see what it was called. Let's see if I've got one of those things. The prize was a set of books. That's what it was. It was this particular award. It was supposed to be for outstanding academic achievement. So starting from that, obviously going on as a graduate school student, there wasn't really going to be any issue about the fact that I was a woman.

Sherkow: What was this about "the first MIT woman elected to membership in the National Engineering Honor Society?"

Widnall: The National Engineering Honor Society did not accept women as members when I was an undergraduate at MIT. They had a special sort of thing. I think it was really disgusting now that I look back on it. I guess it didn't bother me too much at the time. They had something for women students, which they called the Woman's Badge. MIT had never initiated a woman in the society to get that award. Again, it was sort of like the Beaver Key thing. When I was a junior all of my peers in my class were being initiated into this honorary society. There

was really no way that I could be ignored because I was so visible...(interview interrupted)...I think that if I had had straight A's and had been a little quiet student off in the corner I don't think that I would have been noticed. So the people in the honor society which only took men, wouldn't have done anything about it. But the fact of the matter was that I was terribly active and a class officer. The same issue came up with respect to Beaver Key. In other words, they just simply could not ignore me. So none of them could feel right about being in the honor society and not doing something special for me. They just couldn't do that. So it really became the competition among all of them as to see who could get this done the fastest. So they had this big meeting, all the men, what were they going to do about Sheila? This was not just in aero'--this was aero', electrical, mechanical and chemical. I knew almost all the people in the society. They just had to do something, so they went through this thing to make sure that I got this woman's award, that Tau Beta Pi had for undergraduates. That was fine. As far as I was concerned at the time it was fine because I didn't have to pay an initiation fee, I didn't have to go through the initiation ritual which was hazing, and you have to write an essay, and you have to come to meetings, and you have to do this, and if you don't come to meetings, you get fined. I think they're still doing that sort of thing. So I was spared all of that, so I got a free dinner and an award and everything, and that's fine.

Sherkow: Is it now open to women?

Widnall: It's now open to women. They wrote me a letter about five years ago, and they said that now I could join if I wanted to pay forty dollars. I wrote them back, and I said that it would have meant a lot at the time, but I was not really interested in joining at this point. But they do take

women, and I assume at this point that our women students are members of the society just the way the men are. I also suspect that it's probably less important than it was at that time. At that time, it was very important. The students were very conscious of engineering honorary societies. It was very important to me at the time that there was some recognition.

Sherkow: What about this other award? It says that you were "one of two coeds, the first and only, ever elected to the MIT junior class honorary society?"

Widnall: That's the other one, Beaver Key. We talked about that last time.

Sherkow: For extracurricular contribution?

Widnall: Yes. Right.

Sherkow: You mean all those activities that you were in? You mean Beaver Key wasn't open to women either.

Widnall: No. Beaver Key was not open to women.

Sherkow: Was that simply because there were never very many women at MIT?

Widnall: That was part of it. I don't know. Men are kind of funny sometimes. Sometimes they do things because they simply don't think about it. They simply don't think about it, and it takes a pretty unusual thing in order to force them to think about it, and once they do think about it then they generally do the right thing.

BEGIN TAPE TWO, SIDE TWO

Widnall: See now it's all happening at the same time. My junior year was really a big year. Not only did I have straight A's, but I was running everything in the school, or so it seemed. (Laughs)

Sherkow: This still happens though, even today, that it's hard for women to get into the National Academy of Science, and it's hard for women to get into different national honorary organizations.

Widnall: Yes. I think again a lot of it is simply omission on the part of the men. They just don't think. I think they have to be forced to think.

Sherkow: Well by now--

Widnall: Well, (laughs) it hasn't changed as much as you might think. It really requires a greatly increased sensitivity to these issues. Most men simply have not reached that point yet.

Sherkow: I guess the women's movement is a good thing.

Widnall: Oh, the women's movement is a very good thing. It's really forcing people to think. For instance, I'm now on a board of the National Academy. I'm not a member of the Academy, but the Academy does its work through boards. They have a few of these boards, and I'm on the board that deals with space and aeronautics. Now it's very clear that in some sense it's inappropriate for me to be on that board. The other day we had this big discussion about how we had to get more young people on the board. I got into a discussion about what it meant to be young, and they thought someone under forty-five.

That's what they thought was young. For that particular board, that was really appropriate. The people on that board are the vice-presidents of the major aircraft companies, deans of engineering and heads of departments.

Sherkow: How old are they?

Widnall: Some of them are sixty-five and fifty, fifty-five, sixty. They are people who are at the peak of their professional careers. I am younger than the next guy by certainly ten years. So in some sense it's appropriate that I'm there. It's very obvious to me that I'm there because I'm a woman. On the other hand, before I became a member of the board, I knew almost everybody on the board. This is my peer group. I just happen to be a little younger than most of them, but I knew almost all of the people on the board before I became a member of the board. So it wasn't like I suddenly came in a situation where I did not know any of the people, so it's not that inappropriate. But it means being in some place at a slightly different time than you would expect to be there.

Sherkow: Mildred Dresselhaus mentioned being on some committee where she feels that all the other people that are on there--they are all men--have had so many more accomplishments than she's had, and she's just there because she's a woman.

Widnall: I'm surprised that Millie would say that because--

Sherkow: Not that she doesn't feel she's had accomplishments, but that they've all had so many more.

Widnall: I feel that about the guys on the board too, but I also feel

that when I'm their age that I will be fully equivalent in my accomplishments to what they are. It's just that if you look at it now, I'm really literally twenty years younger than the average person on the board.

Sherkow: I guess some people object to being singled out as a woman first and a scientist second or an engineer second. I'm not saying that's the case with her. That's just an observation.

Widnall: Yes. I don't know. I don't know what board she's on that she would feel that. But it's clear that the National Academy has been under pressure to put women on boards, and so you often do end up in a situation where you feel that this is a waste of your time because it's slightly inappropriate for you to be there.

Sherkow: What did you do your thesis on?

Widnall: I did my thesis on unsteady aerodynamics.

Sherkow: How did you decide on this topic?

Widnall: The way the graduate student support system works is that you have a research assistantship, but the topic is pretty well chosen for you by the government contract that's paying your salary. Although there's a certain amount of freedom within that, that is basically what you work on. That's the way it is still. I have graduate students working on topics that I have chosen and managed to find the support for. I think it's a reasonably good system.

Sherkow: Government contracts did you say?

Widnall: Yes.

Sherkow: The connection between academia and government is pretty

close then.

Widnall: It's pretty close. But I think that's entirely appropriate for engineering. I've always felt that if I can't get money to support research in a certain area because the area's not important, then the student who does the research is not going to be able to get a job when he finishes. So in some sense it ties the work at the university, which is really just an apprenticeship for the students, it ties the work at the university to the problems that really need working on. I really don't have too many objections to it. I've never had difficulty getting support. My students have always been in great demand. I've had many situations where the students were really in unusually good demand because they had done work in these particular areas that were important.

Sherkow: How did you feel about your topic? Did you like it?

Widnall: No. (Laughs) I didn't really like it. I felt that I wanted to work on slightly more classical problems, but it was all right. I was perfectly happy to do it, and it was a nice topic. Maybe if I had chosen a more classic topic, I would have floundered around a lot more. But the topic was very straightforward and presented no real challenge. It was a matter of simply getting in and doing it.

Sherkow: Did you come up with any independent discoveries?

Widnall: Yes. Obviously in the thesis (I) did several things that were new and original and that are still being used by other people to do other things.

Sherkow: Did your career proceed along this topic?

Widnall: No. I carried it a little bit on, maybe for another half of

a year or something like that, and then you start doing new things. Then you continue to develop, and you end up doing other things. Every once in a while, you initiate research in an area that draws out of what you did for your thesis. I have done that. I've had two students that have worked on topics that are vaguely related to this field. I currently have some work going on now that is vaguely related to the field. So we've continued to draw on the field, but I've not stayed in the same field. I've made sure that I did other things.

Sherkow: Could you briefly describe what it was that you were doing?

Widnall: That's very difficult. It's straightforward in the sense that what I was doing was developing methods to predict aerodynamic loads on wings in surfaces, in particular looking at hydrofoils, running in the water. That's what I was doing. But the technical intricacies of doing that are something that is very difficult to talk about.

Sherkow: Did you say the load?

Widnall: The loading, right. The pressure, the lift. It's a field known as a wing theory, where you predict what's going to happen when you take a wing and you fly it either in the air or in the water.

Sherkow: So you did it, but you weren't enthusiastic about the particular topic.

Widnall: No. I would say I was not enthusiastic about the particular topic.

Sherkow: Does aeronautics mean airplanes?

Widnall: Yes. It can mean airplanes.

Sherkow: I don't know much about your field at all. As a matter of fact, I would wager that a lot of people that will end up reading this transcript also will not know about it.

Widnall: That's why it's difficult to describe it. What I really do is I'm in fluid mechanics, which means that what I fundamentally do and enjoy doing is predicting the motion of fluids. Now aerodynamics is a particular branch of fluid mechanics, but I don't work only in aerodynamics. I work in other related fields. My work is generally theoretical, although I've had students get involved in experimental work. But we study really a wide variety of problems. We're working on wind generation of waterways. We're working on: how does a bird fly; what is the mechanism of producing thrust by flapping? We're working on predicting loads on wings at very high angles of attack. We're working on predicting helicopter noise. We're working on predicting motion of vortex rings and other kinds of complicated flows, flow stability, and other things.

Sherkow: When you worked at Boeing those four summers, what kind of problems were you doing?

Widnall: That's much more straightforward. When I worked for Boeing I was working in structures. When you work in structures the main problem is: is the airplane going to fall apart? So what you do is you either take a wing section, and you load it up, to find out if it breaks; or you calculate what is going to happen to an airplane when it flies, and how much the wing is going to bend. Or you test a little section of the wing or of the airplane. There's all sorts of things that you have to test to make sure nothing's going to break.

I think that's a little easier to understand.

Sherkow: Did you enjoy that?

Widnall: Yes. I enjoyed it. When I'm really involved in what I'm doing, I enjoyed the people, and I enjoyed the things we were doing. I was an undergraduate. I wasn't terribly sophisticated in my engineering tools. On the other hand, I was working on some pretty interesting things, and I was learning. The things that I was working on were neither too advanced for me or too easy for me. There was always something I could do that allowed me to learn something and yet make a contribution at the same time. I don't think you can ask for anything more than that, especially at a summer job. I also made a lot of money; at least for an undergraduate working at a summer job, it was a lot of money. So that was very satisfactory. The people at Boeing were very nice, and they treated me very well. I still have a lot of close friends there, although many of them are starting to retire now. But that was a very good experience.

Sherkow: What about this involvement that you had with John Hancock Building? How does that relate to your field?

Widnall:...(interview interrupted)...I'll tell you a little bit about the John Hancock problem. First of all, my field in fluid mechanics, ranges from very fundamental work to very applied work. It is very difficult to predict what is going to happen in any particular situation. On the other hand, the results from any particular situation are not particularly useful in another situation. People who work in fundamental work like to stay as far away from a particular situation as possible. On the other hand, if they're good--and I think I am

good--they have a lot of contribution tomake to any particular situation.

Now the issue with respect to the John Hancock Building was you have a particular situation, you have something going on. I didn't want to get too involved in the details of the project in the sense of testing that particular building and spending a whole year of my life getting involved in that particular thing. On the other hand, I felt that I had a contribution tomake in making sure that the project was soundly set up. So my involvement in that project really had to be in the early stages. I wanted to make sure that MIT did a good job; it didn't fall flat on its face, because in my view the person who was actually doing the wind tunnel measurements did not have a complete fundamental understanding of flow fields.

Also there was another faculty member who would have been involved in the early stages of the design of the wind tunnel test. I also had to help design the pressure instrumentation because the test engineer had no background in acoustics, and it turned out to be an issue of acoustic response of transducers. So I was involved in the design of some of the test procedures and the interpretation of some of the test data and made some suggestions as to what was going on. But then I left the project at that point and went back to my own work.

Sherkow: Was this before or after it was built?

Widnall: This was after it was built. We didn't get involved in testing that building until they began to have problems.

Wherkow: Did it help, the work that you were involved in?

Widnall: I think so. Yes. We identified some rather serious problems that were going on in the building.

Sherkow: Whose fault was that?

Widnall: I can't even begin to comment on that. The issue of fault is a very complicated issue. I really don't know whose fault it was.

Sherkow: Yes, but aren't the architects of that building being sued?

Widnall: Everybody's being sued. Everybody who was involved in it is being sued. The issue is not a clean-cut issue. There's an issue of air forces; there's an issue of glass; there's an issue of structure; there's an issue of sunlight; there are all sorts of issues. The only issue that I know anything about is the issue of the aerodynamics. The issue of glass is at least a combination of aerodynamics and the structures and materials, and I don't really know anything about the materials. So I don't actually know anything about the real reason why the windows were coming out.

Sherkow: Did they all come out?

Widnall: They replaced them all. The ones that came out were the ones in a certain section of the building, and when they broke, the glass fragments scratched the windows in nearby windows. Once glass is scratched, it loses its strength dramatically, so they had to take those out.

Sherkow: The nearby windows?

Widnall: Yes. The nearby windows. In other words, one window can break, and the glass from that can scratch twenty-five other windows, and all of those windows have to be replaced.

Sherkow: Was anybody killed from the glass that fell?

Widnall: No. I don't think anybody was even hurt. I think the time

it all came out was one night. There was a storm one night. I think that was a major storm. In fact, Hancock's got a little brochure that describes the night of the storm. There were really big winds.

Sherkow: A number of people made a lot of mistakes with that building.

Widnall: But what I did in that problem is very similar to what I do in my field in general. I'm willing to get involved in applied problems, but I'm only willing to do it at the very beginning. I'm willing to dip in in the very beginning and help people get something set up properly. But I'm not willing to get involved in the nitty gritty of completing the research on something that is very very applied because it's really not what I do. What I enjoy doing is doing some more fundamental work. I'll often go in the applied problem, and once I have identified some fundamental problems that are related that are very interesting, then I will get out of the problem at that point and work on those. That's what I do for my own personal pleasure. As long as I can keep getting support for doing that, that's what I will do.

End of Session

SHEILA WIDNALL

November, 1977

Part II

Women in Science and Engineering

MC 86

Oral History Collection

MIT ORAL HISTORY PROGRAM

Project on Women as Scientists and Engineers

Interview with Sheila Widnall by Shirlee Sherkow

Cambridge, Massachusetts November 16, 1976

Session 3 transcribed by Janet Billane

Sherkow: I'm Shirlee Sherkow, and I'm here at MIT with Sheila Widnall for Session Three. We're going to go back in time just a little bit in terms of the chronology of your employment. We've already discussed the summers that you worked at Boeing. The next one is, in the summer of 1960, you were in Sweden at the Aeronautical Research Institute. Could you just describe what you did there and why you went?

Widnall: I don't remember why I went, except that it was a summer job and that it was an opportunity to go to Europe for the summer and have a job working in my field. I got the job through Professor [Marten] Landahl, who is a colleague here at MIT, from Sweden. It turned out after I had agreed to go to Sweden for the summer that I also decided to get married, and it turned out almost by accident that my husband had planned to sail in the Transatlantic Race, in sailboats, which finished

in Sweden. It was a coincidence. So I spent the summer working in Stockholm, living there, and he spent the summer sailing across the Atlantic in a forty-foot sailboat. He arrived in Sweden about July 25th, and then he came to Stockholm. We spent about two more weeks in Stockholm, and then we spent the rest of the summer just touring around.

The job in Sweden was really just a summer job. I was working in the structures division. I was not really in fluid mechanics at that point, although I was getting ready to transfer to fluid mechanics. So I worked in structures. But things are very quiet in Sweden in the summer because everyone takes very long vacations. So I arrived in Sweden, and I reported to the fellow that I was supposed to report to, and he said, "Here, read this. I'm going away on a five-week vacation." (Laughs) I literally never saw him again. From the professional point of view, it was not a particularly challenging job, but it was certainly a lot of fun to be there and I met a lot of interesting people.

Sherkow: Why did you do it?

Widnall: Oh, just to have a summer job, to live in Europe for the summertime. It was fun, and I'm glad I did it. Of course, the fact that my husband was involved in a similar activity at least as far as ending up in Europe that summer was important, although at the time I had decided to go to Sweden I was not engaged. So that was a very independent decision. It really had nothing to do with the fact that he was going to sail in the Transatlantic Races.

Sherkow: So your marriage had started just about right then?

Widnall: Yes. Right. We were only just married at that point.

Sherkow: What kind of effect did it have that right after you got married you were separated for part of the summer?

Widnall: First of all, if we hadn't gotten married, we would have been separated for the summer, so the fact that we got married and then separated was not really a big deal. We both felt that it was a great opportunity to take a summer off in some ways and go to Europe and that it was a nice way to do it.

Sherkow: Was your husband at the time also a student?

Widnall: Yes. He was a student. He was at MIT in the electrical engineering department, working on a master's degree.

Sherkow: This is a sidelight, but you're both interested in sailing, right?

Widnall: Yes.

Sherkow: Was that a competition that he was involved in?

Widnall: Yes. It was a race.

Sherkow: How did he do?

Widnall: He wasn't the skipper or the owner of the boat. He was what's called the watch captain. They were one of the smaller boats in the race. That's called a 'Class C'; it's a handicap race. As I recall what happened is that the wind died down after all the larger boats had

finished the race, so the smaller boats were at a disadvantage in the overall relative to the larger boats because the wind had died. But I think they finished second or third in their class. I don't think they did particularly well, but ocean racing is very much a game of chance. People who do ocean racing don't expect to win very often; you try to win on the average.

Sherkow: Do you both still sail?

Widnall: Yes, we still sail.

Sherkow: Do you have your own boat?

Widnall: We have two boats. We have a summer boat we race at Marblehead, and we have a boat that we race in wintertime at Marblehead, a small frost-bite dinghy.

Sherkow: How large is your summer boat?

Widnall: It's thirty-three feet long. It's an international class, one design racer. It's a very long, very thin, very heavy keelboat, a very nice racing boat.

Sherkow: Do you live up there in the summertime?

Widnall: No. We just drive up on weekends to race.

Sherkow: It was highlighted in some of the articles that I read about you, that both you and your husband sailed and your husband won all of these awards.

Widnall: Yes. He's very good. He's a very good sailor and has won a lot of things and actively competes.

Sherkow: It's nice that you both have that in common.

Widnall: We didn't have it in common. I didn't sail before I met him. I picked it up.

Sherkow: After the summer in Sweden, professional directories indicate that from 1961 to 1962 you were an MIT research staff engineer.

Widnall: Yes. It's correct, but meaningless. I was basically doing what a graduate student would be doing, namely working on a research project, but I decided that I didn't want to pay tuition. I wanted to make more money; I didn't want to have to pay tuition. So I simply talked my research supervisor into giving me a one-year's job instead of being a graduate student. It didn't interrupt my progress at all. I still finished my PhD thesis at the same time that all my classmates were doing it. It really had no effect on my academic career, except that it cost the Institute one-year's tuition.

Sherkow: Were you doing the same work on your thesis?

Widnall: Yes. I was doing my thesis for work.

Sherkow: But you were getting paid for it?

Widnall: Yes.

Sherkow: How did you like that arrangement?

Widnall: I thought it was fine. I felt that the research assistantship had a lot of elements of a job, and I thought I might as well get paid for it.

Sherkow: Did it take three years for you to get a PhD?

Widnall: Yes. I got it in '64, and I finished my master's in '61.

Sherkow: Is that the same thing that happened from '62 to '64, when you're listed as being an MIT research assistant?

Widnall: Research assistant is a graduate student.

Sherkow: But there was a difference.

Widnall: Yes. There was a difference. There was one year spent at what's called a staff member, DSR (Division of Sponsored Research) staff engineer, and two years spent as a research assistant. But it really amounted to a three-year graduate program for a PhD.

Sherkow: At the Historical Collections, I saw pictures of you working on your thesis. There were pictures taken of computer printouts.

Widnall: Yes. That was--right.

Sherkow: (Laughs) Why were they taking these pictures?

Widnall: I don't know. I can't remember. I don't remember whether it was some guy from the Boston Globe running around taking pictures or whether MIT wanted them for some reason. They were always taking pictures.

Sherkow: There's a weird conglomeration of pictures in the folder that's not representative of any particular chronology.

Widnall: No. It's just that you'll get a call someday from somebody, and they'll say, "We want to come over and take pictures." You say, "Okay." So they come over, and they always get very excited about computer printout or anything else that you happen to have around the office, and they make you write on the blackboard; then they take these pictures, and then they leave. I've got a whole stack of pictures that you probably haven't even seen in my folder there that I keep, in my humor file.

Sherkow: From '64 to '66, you were a Ford post-doctoral Fellow at MIT. I've read in certain articles again that apparently you were the first woman to be awarded such a degree.

Widnall: Yes. I think I may have been the only one. I don't think there was ever another woman at MIT who had a post-doctoral Ford Fellowship in the School of Engineering.

Sherkow: What is so unusual about this?

Widnall: It's not terribly unusual. There were simply no women receiving PhD's in engineering around that time period. The Ford post-doctoral Fellowships were basically to encourage young PhD's to go into teaching, so it was supposed to be a two-year position as an assistant professor.

Sherkow: Weren't there other women who graduated when you graduated that were also in engineering?

Widnall: No, I don't think so.

Sherkow: You were the only woman.

Widnall: Well, there weren't very many. I can't think of anybody offhand who got a PhD in engineering around the same time. There might have been somebody, but I honestly can't think of anybody. But you could check the MIT records to see how many women were in graduate school in the School of Engineering at that point and how many were working on a PhD. But I can't think of a single one at that point.

Sherkow: How did you feel about being the first or the only?

Widnall: I don't know. I didn't think very much about it. I think I was quite used to it by then, and I was certainly enjoying what I was doing. I had a lot of friends among the graduate students and among the faculty, and I was enjoying what I was doing. It seemed right to me. I wasn't too concerned that nobody else was doing it.

Sherkow: Had your interest been in teaching and in research?

Widnall: That's hard to say. When I was a graduate student, I was involved in teaching, probably more than almost any other graduate students in the aero' department ever was or has been. I had a colleague, a fellow student, who's now a professor at the University of Southern California, and when we were graduate students, we did probably more teaching than graduate students have ever done in our department. We taught the undergraduate fluid mechanics course for about two years. We also offered a special course in computer programming that we

developed ourselves, and we simply taught it. So we did a lot of teaching when we were graduate students.

Sherkow: Why was that so?

Widnall: Because we enjoyed doing it. It was a lot of fun to do.

Sherkow: The opportunity obviously was there for graduate students to do that?

Widnall: Well, we had to make the opportunity. In fact, I think suddenly the faculty discovered that there were graduate students teaching, and they got all concerned about policy and whether that was the proper thing to have going on. So then we weren't allowed to do it anymore. But we did it for a couple of years. I think we did a very good job of it.

Sherkow: Did you enjoy that? Is that when your interest in teaching started?

Widnall: Yes. I enjoyed that.

Sherkow: You indicated last time that I was here, that your interest was more theoretical than applied. So that would indicate to me, being a layman and not a scientist, that you might be more interested in teaching than in research. Is that true?

Widnall: No. Not than in research. My research is more theoretical than applied. So I would say that I probably have a very, very strong interest in research. There are two different kinds of things that

engineers do. One is to do research, which is strongly theoretical, even if it happens to be experimental, it's still strongly theoretical. The other is to apply what is already known to specific situations. I don't do that very often because I think it's a waste--I won't say it's a waste of time, but it's a waste of my time because it doesn't have a very long useful lifespan; when you get today's answer, then tomorrow you need a different answer. I would rather spend my time on developing things that have a much longer useful life, although I do a lot of applied things; I'm sitting here now working on a problem in subway noise, rail-rapid transit noise prediction and control. It's a consulting job for a friend. I'm very good at getting into new problems and starting up. I know how to start up things, and then I like to start them up and then pass them off to somebody, which is what I'm planning to do with this problem as soon as I get it all organized. I will turn it over to the people in this engineering firm, and they will finish it.

Sherkow: That seems like a big problem.

So essentially from '64 to '70, you were assistant professor at MIT. Did you consider any other offers anywhere else other than MIT?

Widnall: I didn't actively look for other places, partly because my husband was located in this area. If I had not stayed at MIT, I probably would have gone to work for Bolt, Beranek & Newman, Inc. That's an acoustical consulting firm in Cambridge, and I had worked for them summers and on a consulting basis. I was quite involved with a lot of the things that they were doing. So I probably would have gone to work

for them if I hadn't stayed at MIT. But I was going to stay in this area at least for a certain period of time. I suspect that if I hadn't been at MIT, then maybe the two of us would have eventually left Cambridge and gone to the West Coast or something like that. But I wasn't actively looking for something besides MIT.

Sherkow: So you were interested in staying here if something could work out?

Widnall: Yes, I was willing to stay.

Sherkow: They wanted you here. Right?

Widnall: Yes. There was a time when I was about two years on the faculty, that both of the people who had been my thesis advisors decided to leave MIT, and that left absolutely nobody in my field, except me. So they asked me if I would stay at that point, since there was a hole in the department that was that shape. So I stayed.

Sherkow: Did you feel that it was unusual to just move from being a graduate student here to being an assistant professor?

Widnall: I don't think that's too unusual at MIT in engineering. It is, I'm sure, in science, but in engineering, MIT hires many of its own graduates. They just stay, become members of the faculty.

Sherkow: Why is that? What is special about engineering?

Widnall: MIT is clearly Number One in engineering. There is no place

that can touch it overall, and there are very few places that can touch it in any given area. So that when you hire your own students, you're basically hiring the best students. Obviously, that's not true in every single case for every single field in every single place. But on the average, it tends to be true, whereas in science MIT is not the best place. So the people in the school of science tend to hire graduates from other universities for faculty members.

Sherkow: What was the reaction of your colleagues here at MIT when you became an assistant professor?

Widnall: I don't know what you mean by colleagues, at that point?

Sherkow: The other people who were teaching here.

Widnall: I was changing colleague groups at that point. I was changing from other graduate students, who had been my colleagues, to members of the faculty.

Sherkow: Members of the faculty, then.

Widnall: I'm not sure. I was very much younger than all of the rest of them, and I'm sure they still thought I was a student. Having lost my two thesis advisors, I didn't really have any close colleagues for several years. I didn't really have anybody I was working with. I was working by myself. The head of the department at that point, when the whole thing solidified, was Rene Miller. Those were the years when Draper was just retiring, and then I can't even remember who was head.

I guess Bissplingoff was head for a while, but that didn't last very long. Then Rene Miller was head of the department; he still is head of the department. So he was very supportive. He was the only person in the department who was particularly supportive of me as a faculty member, basically because everybody else was off doing their own thing.

Sherkow: But you were the first woman faculty member here?

Widnall: Yes. I was the first woman faculty member. In this department certainly.

Sherkow: Was it difficult breaking into the informal faculty networks?

Widnall: I never really worried very much about that. First of all, the really important informal network for me is not at MIT. It's in the community at large; it's with people at the other universities that work in my field. At that time when I was a young faculty member, there was nobody at MIT who was terribly important to my career, except in the sense of evaluating me for being allowed to stay at MIT. But there was nobody at MIT that I needed in order to make professional progress. There was nobody who knew something that I didn't know that I wanted to know. Those people were all at other places, at other universities.

Sherkow: I was thinking more of the kind of thing that you hear a lot about today, going out to lunch, being included as one of the boys.

Widnall: I don't worry about that. Those guys are all so much older than I am that it wasn't really an issue. I didn't want to got out to lunch with them. I still don't go out to lunch. That was just not

something that was an issue, and I never really felt the lack of it.

I guess what happened at that time, what was important, was the MIT Commission on Education. I don't even remember when that started up, except it was about in April. It must have been 1968, or something like that. It was '68 or '70, something like that. I was a member of that. That had a lot of young faculty people on it from other departments. That's really my peer group, the young faculty people from other departments. If I went out to lunch with anybody, I went out to lunch with those people, and I still go out to lunch with them. The people in my own department, with the exception of Larry [Louis] Bucciarelli, who was a contemporary of mine--he's now over at Science and Technology--there was nobody in fluid mechanics who was a close friend at that time. I guess there was one person. There was one person who was an assistant professor, who is now no longer at the Institute, who was also a Ford post-doctoral Fellow. We shared an office for the first two years when I was an assistant professor, and we went out to lunch together I guess. But there's a great gap between me and my age group and the remainder of the faculty in fluid mechanics of about ten years.

Sherkow: That would make a difference in your feelings.

Widnall: That makes a difference.

Sherkow: Why did your two thesis advisors leave MIT?

Widnall: One of them went to Stanford; I don't know why, except that he was from California originally, he did all his consulting on the

West Coast, his father lives in San Francisco, Stanford is a really nice place to go to, the living is really nice, and I guess he got a good offer. But I don't know why people move. The other one was Professor [Marten] Landahl, who came from Sweden originally and then was offered a chair in mechanics at the Royal Institute, and he decided that he would move his family back to Sweden. So he went back there. Now he has come back. Since he started in '70 or '71, he comes back every fall semester. So he and I work together. If I work with anybody, I work with him.

Sherkow: He comes back just one semester a year?

Widnall: He comes back in the fall, the fall semester every year and then goes back to Sweden. He leaves his family; he comes all by himself, and he's here for the fall semester, and then he goes back to Sweden for the rest of the year.

Sherkow: Fall semester isn't that long.

Widnall: No, it's not that long. It works out very well. But at the time, when I was a young faculty member, he left MIT in about '66 and was gone for about six years. He didn't come back until '71-72.

Sherkow: Do you enjoy the fact that he is back here now?

Widnall: Oh, yes! We work on similar kinds of problems. We talk to each other; we share students; we work with each other's students. We even have some joint projects together. So he is my colleague.

Sherkow: How did you feel about teaching here?

Widnall: What do you mean? I don't understand the question.

Sherkow: What are your feelings about the students here. Do you enjoy teaching certain courses? How many courses do you normally teach?

Widnall: Let's see. It's very variable. I like to teach good students. MIT has a reasonable number of good students. The thing I like the best is when I have very good graduate students who are doing very good work, and in order to have very good graduate students who do very good work, you have to teach very good graduate students in your graduate courses. So that all hangs together, and I have a graduate course which is now offered in the spring that will have an enrollment of about fifteen to twenty students in it. Then I've taught a version of that graduate course--it used to be a two-semester course; now it's a one-semester course. I've taught that particular course for many years, ten years, something like that. The course I'm teaching now, in addition, is at the undergraduate level, and I'm just doing that for fun. I'm doing that because somebody's got to teach undergraduates, and it's a lot of fun to do it. It's part of being a teacher to teach undergraduates.

Sherkow: Are you still the only woman faculty member in your area?

Widnall: In this department [aeronautics]. In engineering, we have about seven or eight, altogether.

Sherkow: You actually progressed from associate professor from 1970-74 to professor in 1974. Did you feel that you advanced at a normal pace?

Widnall: Well, now let's see. I think it was quite sporadic. I think when I first was at the Institute, it was a disadvantage to be a woman. I think my initial salary as a member of the faculty was lower than it would have been if I had been a man. I think my initial appointments were much more poorly constructed than if I had been a man. I think that in those days, people did not feel the same responsibility towards the career of a woman that they do for a man. In other words, they weren't concerned that I had somebody to support. They weren't concerned that I might like to take a long-term view of my career. So the Institute kept me on a series of one-year appointments for about the first three or four years of being an assistant professor. I think I was an assistant professor too long also. They had a different way of doing things in those days. You didn't come up for tenure based on how long you had been at the Institute but how old you were. Now that makes a big difference if you start on the faculty when you're very young.

Sherkow: That's changed?

Widnall: That's changed.

Sherkow: How old you were! It sound like a seniority system.

Widnall: Yes. Well, it was, sort of. In other words, thirty-five years old was sort of a magic age to worry about tenure, which means if you start at age twenty-five or twenty-six, it means they don't have to worry about your promotion for several years. Whereas nowadays, because you're only allowed to stay at the Institute seven years before they have to give you tenure or you're out, people don't stay as assistant professors

longer than about four years because the system just doesn't work that way any more. People get promoted after four years to associate professor, and then in two more years they're considered for tenure. Then people are either made full professor when they get tenure, or they're kept as associates. I think it's the School of Engineering that keeps associate professors with tenure. The School of Science tends to make them full professors when they get tenure. But in any case, I was kept as an assistant professor for far too long. I think it had something to do with being a woman. People just did not take my career advancement as seriously as they would have if I had been a man.

Then, when the Affirmative Action thing started, the whole thing was reversed. Then you could accelerate the whole thing much more easily than you could, if I had been a man. For instance, my promotion to full professor was almost an example of somebody just doing something casually for me. It was clear that I was going to be promoted in the near future, and I had this job offer in Washington. The people in Washington said, "It sure would be a lot easier to qualify you for this particular GS level if you were a full professor. Do you think you could see about doing that?" I said, "Yes. I think I could probably do that." So I called up the dean, and I said, "It would be a lot easier if you would just make me a full professor." He effectively said, "Yes. I think we can do that." So they just put through something special, and it sailed through. Part of it had to do with the fact that I did have this job offer and everything, and part of the thing had to do with that I was a woman. It was very clear they were going to promote me in the very near future, so they did it specially. So it worked to be

an advantage in, say, the last five years. But it was a definite disadvantage before that.

When I was a member of the commission, which was a special faculty committee, I received a very mysterious twenty-five hundred dollar a year raise, which was given to me in the month of October. It came as a result of the Institute taking a pretty close look at how it was paying its women faculty and obviously finding some great discrepancies between what the women were getting and what the men were getting. But now, I think, that's all been corrected. At this point, that's really not a problem anymore.

Sherkow: But initially you were aware of these discrepancies, but you wanted to stay here anyway?

Widnall: Yes.

Sherkow: Did you hope that it would just work out somehow?

Widnall: Well, I wasn't too concerned about it. The fact of the matter was I wasn't doing it for the money.

Sherkow: At no point in this whole career, actually starting with the assistant professor[ship] in '64 and then becoming professor in '74, ten years, did you ever seriously consider a job anywhere else, or just getting out of MIT and working at a different place?

Widnall: I think that's true, although I had very strong ties with some industries. A lot of that has to do with geographic mobility, the

fact that either my husband or myself were fully occupied in something and it was difficult for the other one to decide to move.

Sherkow: What kind of research problems were you involved in all those years? You were doing research as well as teaching . . .

Widnall: Right. I was doing research as well as teaching. Some of the earlier things--we were always involved with aerodynamics in one way or another. We worked in unsteady aerodynamics. We worked for several years in aerodynamic noise. That was a very productive field. I still do a little bit of that but not as much as I did then. I worked in aerodynamic noise both at MIT and at Bolt, Beranek & Newman. We traded students back and forth and ran experiments at both locations.

Sherkow: In terms of topics, did you move from research field to research field?

Widnall: Sure. I've worked in many different areas. Well, six or seven. They were contiguous areas. You take one sideways step and you move into a new field. But I've worked in aerodynamics; I've worked in wing theory; I've worked in unsteady aerodynamics; I've worked in aerodynamic noise, acoustics; I've worked in vortex flows and waves, turbulence, other things. All these fields are related, and you move sideways into a new area.

Sherkow: That's part of being a professional, isn't it?

Widnall: Yes. I think most people do that. Most of the people I know, certainly at universities, move from problem to problem.

Sherkow: You knew that before you were a professor?

Widnall: I don't know if I knew it. I mean, you sort of do it. It's just part of being a professor.

Sherkow: Do positions come from what is called the "Buddy System?"

Widnall: That's very difficult to say. The Buddy System is based, in part, on the university that you were trained at, and if that happens to be MIT that's a very good place. MIT people tend to do very well. They do know each other. But I guess I wouldn't call that a full-fledged Buddy System.

Sherkow: But the fact that you had gone to school here beginning with your freshman year it seems that you had a built-in step in the door.

Widnall: People have a great fear of the unknown, and I think no more so than when they're hiring somebody. People cannot face the problems that are connected with hiring mistakes. They just can't. That's one of the most difficult things that people have to deal with, is a mistake in hiring. It's bad for the person. It's very embarrassing for the supervisor. People will go to almost any lengths to avoid the pain and anguish that comes from having to fire somebody or from having to admit that there has been a mistake. People don't like to work with people that are hiring mistakes. So they will just go to any lengths to avoid making them. So they tend to be very, very conservative in their hiring decisions. They rely, I think, too much on personal recommendations then. They rely very much on the recommendations of people that they know. It's

much worse in government! Government is just full of that. You just have to know somebody, because everybody is so afraid of making a mistake that they just will not move unless somebody knows somebody. I thing engineering is probably freer of that than most other fields, but it has its share of concern with making sure that you're making the right decision.

Sherkow: As I understand it, that is one of the concerns of women professionals and problems associated with women and jobs. This is documented in certain places; very often, more often than not, women don't have those well-known recommendations and they're not known. They might be very good.

Widnall: I don't have any doubt that if I had not been a student at MIT, I never would have become a member of the faculty. There's no chance in the world that if I had simply sent in an application that I would have been hired. I think that what women have to do is to make sure that they do attach themselves to those people who can make the recommendations. Those people are human beings, and, in fact, what they want more than anything else is to work with good students. If a woman has the makings of a good student, then she shouldn't hide that talent by not knocking on doors and becoming known to the people who are in a position to write those letters.

Sherkow: Also you're saying too, aren't you, that you have to pick a good graduate school to go to in the first place?

Widnall: Pick a good graduate school to go to and pick a good advisor and make sure that people know who you are and make sure that you make enough noise so that you're not lost. If you do all that, then being a woman is an advantage because everybody remembers you.

Sherkow: Yes. There's so many different kinds of feelings associated with being in science and engineering. Some people are just naturally not that aggressive, and the fact of being alone or one of a small minority has been crushing for some women.

Widnall: Yes, it's too bad.

Begin Tape Three, Side Two

Widnall: The problem that you get into is that there's a natural selection operating. If you're not willing to demonstrate aggressiveness and go-get-it-iveness as a graduate student, then you're very unlikely to demonstrate it as a professor at some place or as a manager in some industry. It's an acquired skill, and those letters of recommendation that are written on that basis are really testimonials to the fact that you have become an independent person.

Sherkow: But the idea that I have felt behind a lot of these kinds of autobiographical statements is that men don't have to be extra-aggressive and women do. Women have to be just that much more aggressive and persevering and do really great work. Yet the average unaggressive guy that's in the program does pretty much as well as the aggressive woman.

Widnall: I think there's a little bit of that. I think the real inequality is the fact that the perceptions on the part of this person who is going to write this letter are simply colored by the sex of the person. It's very, very unfair, and it's very unfortunate. They do it without thinking, and they do it because they're just not questioning their basic assumptions. It takes an awful lot of education and awareness to get them out of that.

Sherkow: You just reminded me of something that somebody else who I've talked to has mentioned which relates to these ideas. She said one of the problems is simply that the worry was always there that the co-worker can't get too close to this woman because people are going to think they are having an affair.

Widnall: Oh that's a different problem.

Sherkow: But isn't that an example of the difficulty of just being one of the guys? You can never just have this good working relationship and not be questioned on a number of different levels.

Widnall: That's one problem. But there is another problem. I think a more serious problem comes when the person that is simply doing what he considers a straightforward evaluation of a person's competence and capablity, and is simply not able to do it on a sex-blind basis. That's, I think, a much more serious problem, and it's ubiquitous. I think that even the simple ability to make a determination of quality is colored by the sex of the person that you're evaluating. I think that's much more serious because that's a real basic ability that people ought to have.

When they lack it, it's really a problem for the woman who's involved. The other social issue is just a much more complicated issue.

Sherkow: Isn't this one of the goals of Affirmative Action: to get more women in the selection process so it is not ninety percent men recommending men and women?

Widnall: Well, that's one effect. It has one effect on making sure that women are there, but I think it has another equally important effect in that it will insure that even if the panel is entirely composed of men that those men have had experiences of dealing with women on a very serious level. In other words, that they themselves have had important women colleagues, even if those women don't happen to be on the selection panel; that the men involved will still show an effect of having worked with women on a serious level.

Sherkow: But do you have confidence that re-education is really going to change things?

Widnall: It's happening. It's happening very slowly, but it's definitely happening. I see it all the time. It just happens slowly but surely; it does make an effect. I think the problems that we have are the fact that there's still a very small number of women in engineering particularly, and there's an even smaller number working on PhD degrees. So there just are very, very few women at the levels of the profession where they're going to have much of an impact. Those numbers are still very small.

Sherkow: Does the question of marriage and simply the fact that if somebody's going to stay home, it tends to be the woman--is that one factor that just works against this looking at things non-sex-biasedly?

Widnall: I don't know. I wouldn't make the assumption in this day and age that if somebody stays home, it's going to be the woman. Many of the people I know have worked out all different kinds of ways of handling that issue. I think it's a decision that should be up to the individual people that are involved and that it should not be something that enters into any evaluation of the professionalism of a woman graduate student. That's unwarranted interference with a student to make that assumption about the student and then to prejudice your evaluation by taking that into account.

Sherkow: Doesn't that happen at the level of giving fellowships or assistantships?

Widnall: It's not supposed to happen--it's not supposed to happen. It's certainly immoral. Some people will try to stamp it out every place they encounter it. Other people are just not sensitive to it.

Sherkow: I happened to be on an admissions committee at a college. I still remember that one of the faculty members said, "Now we know this woman doesn't need a fellowship because she's got a husband." She was very, very qualified. When we were just looking at the records, we felt that this person really deserved the money no matter what her marital status is.

Widnall: I hope MIT doesn't do too much of that.

Sherkow: My feeling is that MIT has a much better track record than Harvard.

Widnall: Yes. MIT is much better than Harvard.

Sherkow: MIT is really making efforts and making progress in terms of hiring more women and admitting more women. I don't know the statistics, but everybody here seems to agree that that's the case. But it's a long road to go. You mentioned ealier when you got married. Was it in 1961?

Widnall: No, 1960.

Sherkow: Did you ever feel you had to make a choice between marriage and a career?

Widnall: No.

Sherkow: You thought you could handle both?

Widnall: Yes. Because as I mentioned, my mother worked and managed both. So that there was never any question that I would be able to do it.

Sherkow: You have two children, right? How old are they?

Widnall: Yes. Twelve and eight.

Sherkow: How do you manage having a full-time career, and I assume your husband has a full career--and just taking care of the two children?

Widnall: Yes, he does. Well, it works out. The children go through different stages. I mean there is an appropriate thing to do when they're under two, and there's an appropriate thing to do when they're under five, and there's an appropriate thing to do when they're under eight, and there's an appropriate thing to do when they're under twelve. We've moved through those stages trying to do the right thing. It's always worked out.

Sherkow: Have you shared the responsibilities of raising the children?

Widnall: Yes.

Sherkow: When do you have time to be with your kids? When you get home at night?

Widnall: When we get home. The arrangement that we have now, which is new this year--this is again an adaptation to changing times--but my son is now twelve, which means he's in junior high; my daughter's eight; they're both very independent--we actually do not have a babysitter at this point. My son will be coming home from school at three-thirty, and I will pick up that phone, and I will call him to make sure that everything at home is okay. If I'm on a business trip I will call him long-distance from wherever I am just to make sure that everything is okay at home. Then we have a graduate student living with us this year, a woman graduate student, who's in her first year in planetary sciences. She's from England, and she lives with us, and she helps with the housework and helps with the dishes and all of that sort of thing. It's

just an additional adult to help around the house. She will babysit in the evenings if we want to go out, or if we want to go away on a weekend, she will take care of the kids. That's what we're doing now.

But before, when the children were very young, we had people living with us, who did hold other jobs; they worked in the house. They were for the most part Norwegian girls who were learning the language and living in the country for a year. Then we went through a period where both kids were in school, and we would have a high school student come in after school and do housework and take care of the kids and cook their supper, and we went through that cycle. Now we've dispensed with the high school student in favor of a graduate student, and the kids are home alone in the afternoon.

Sherkow: When your children were very small, did you have any problem in getting to work in time? Did you have any problems?

Widnell: Well, no, not particularly, because when the children were very young, we had somebody living in, living with us, so that if one of the children were sick or something like that, there was somebody at home all the time. There have been times when I've stayed home because of the children. But on the other hand, my schedule is usually pretty flexible so that I can stay home.

Sherkow: What does your husband do?

Widnall: He's an engineer. If there's some problem at home, and one of us has to stay home, and I can't stay home, he will stay home.

Sherkow: Does he work in Cambridge?

Widnall: Yes. He works in Cambridge. For instance, yesterday was Monday, and somebody had to take the kids to the orthodontist at about four-thirty in the afternoon, and he did that because it was just more convenient for him to do it than it would have been for me to do it.

Sherkow: Do you feel that your husband's career ever affected your career mobility?

Widnall: If I had wanted to go somewhere else, then, yes, I would have felt that it affected my mobility. I find that I cannot easily take a sabbatical to go to another university. On the other hand, there are two different ways to operate, and one of the ways is to take a lot of sabbaticals and move from place to place like a nomad. Lots of people in my field do that, and they go to Europe, and they spend a year here and there. But the problem is that when you do that, it leaves your graduate students and your research program back at home base in somewhat of a shambles. So if you want to build a strong research program at your home base, you really have to stay there. You can't just go wandering off. Although if you care about your own personal career and not so much about your students and your ongoing research program, you might choose to go wandering around the world and work with different people. But you have to make some kind of a choice, and it's very hard to mix the two. I've chosen to stay in one place and try to build a strong research program for myself and my graduate students here, rather than go wandering off and work with other people. It's just a different

style. So given that I have done that, I have no particular desire to take a sabbatical and go someplace else, unless it happens to be to Harvard, which is just a subway ride away and would not interfere too much with either my family life or my research group here at the Institute.

Sherkow: Do you ever regret having made that decision?

Widnall: Well, that's very hard to say. It would be a very much different kind of career, and I really don't know what it would be like. So I honestly can't say what it would be like. The fact of the matter is that since Professor Landahl has chosen to return to MIT in the fall at great personal sacrifice in order to do his research here, basically reassures me that I've made the right decision in staying here, because if he decided that he wanted to go waltzing around the world and work with different people in different places at those times, then he could clearly do that as easily as come here every semester. So it must be that the most productive thing to do is basically to stay here and work. So that seems to make sense to me.

Sherkow: Your husband works for a company, right?

Widnall: Yes. He works for a company.

Sherkow: Is it possible for your husband to take positions in other places?

Widnall: He could, but again at professional sacrifice. He's the manager of his department, and when you're in charge of the livelihood and the professional lives of about thirty to fifty people, you can't just take a year off and go wandering off someplace. We did go to Washington for a year. That was something we made a decision to do, but it certainly had an interruption in terms of our professional careers.

Sherkow: How long has he been a manager?

Widnall: You're always a manager in some sense. You're either managing yourself, or you're managing one other person or two other people or five other people or ten other people or thirty other people. It's just a question of degree. Before he went to Washington, he was probably in charge of five people, and now he's in charge of thirty people. But as a professional, you always have responsibility for other people.

Sherkow: Yes, but at certain points in your career it's easier to consider a move than when you're so far advanced, and you're so successful that you really wouldn't consider it. In the beginning--maybe more in the first couple of years of your marriage.

Widnall: Yes. You could do it then.

Sherkow: You got your PhD three years after you got married?

Widnall: Four years.

Sherkow: But your husband got his degree at a different time, later?

Widnall: Yes. He got his degree about two years later. We were students for the first six years.

Sherkow: So it just seems to me that maybe a couple of years after he had gotten his degree that it might have been easier to consider a move than right now.

Widnall: Except that he was working in the Apollo Project which was the most important thing that was going on in his field, and he was doing that in Cambridge. So this really for us is a very good place to be.

Sherkow: Did you ever take any time off while you were pregnant?

Widnall: No, no.

Sherkow; Just when you went into the hospital and then did you come back to work right away?

Widnall: Yes, right. Within about two weeks.

Sherkow: Did you ever consider working part-time when your children were very small?

Widnall: No.

Sherkow: I just wanted your personal opinion on an idea that's come up in a book by Helen Astin called Women Doctorates in the United States. She proposes that there whould be new tax laws allowing professional women or working women to deduct expenses that they incur by employing domestic assistance. I was wondering what you thought of this particular idea? Do you think it's feasible? Do you think it's something that might really help the situation?

Widnall: Of course, there already are childcare deductions, so it's part of that. Basically I agree with it. On the other hand, it's very difficult to get those things passed. I do feel that if women are going to be allowed to deduct it, that men should be allowed to deduct it also.

In other words, if domestic labor is the cost of holding a job, then the deduction has to be equal to men and women.

Sherkow: I would assume it probably would be set up like that because it would be reverse discrimination if it wasn't.

Widnall: But I think that's very unlikely to pass without some income limitations because that's the kind of law that Congress is very reluctant to pass.

Sherkow: Do you plan on having any more children?

Widnall: No.

Sherkow: You mentioned that you have a graduate student living in right now. Do you anticipate that situation going on for a few years?

Widnall: It depends on how easy it will be to find the student to replace the present student when she finishes her education and goes back.

Sherkow: When is that going to be?

Widnall: I don't really know. She's a first-year student, and I don't know whether she'll finish up with a master's or whether she'll stay, or even if she stays, whether she'll want to stay with us.

Sherkow: Is she at MIT?

Widnall: Yes. She's at MIT.

Sherkow: How many hours do you spend in a typical week on domestic activities--and your husband, also?

Widnall: That's very hard to say. I do all the cooking for the family. I do a lot of the worrying about the children, making sure that they've got everything they need, like mittens and boots and hats and coats and all of that, and all of the paper and pencils and rides to this and that and the other thing, the music lessons and all of that. I'm also the one in the house that fixes everything. I do all the painting and all the wiring and all the plumbing and all of that sort of stuff.

Sherkow: What does your husband do?

Widnall: He pays the bills. He worries about the outside of the house, the grass and the leaves and all that sort of thing. He does things like dentist appointments; he's in charge of dentists and doctors for the kids.

Sherkow: That's a big thing.

Widnall: Yes. That can be a big thing, but that's his responsibility. He's in charge of the boats, obviously. He's got to paint the boats, pull them in and out of the water and all that sort of stuff.

Sherkow: That's a big task.

Widnall: I don't know what it adds up to in the course of a week. I usually try to reserve Saturdays for doing things like that. But obviously I do cooking everyday, but that doesn't take too long. It takes about a half an hour a day, I suppose. I make bread; I make all our bread.

Sherkow: Do your children eat at a cafeteria at school?

Widnall: Yes, at lunch. So I don't really know what it amounts to.

Sherkow: What's a typical day like? Do you have any kind of pattern?

Widnall: Yes. We have children in school, and they have a certain time they have to be in school. We have breakfast at seven o'clock, and my son has to be out the door by seven-thirty, or he'll miss the school bus. Then, because I'm in a carpool, I leave about eight-twenty-five for work. I always leave about five-fifteen from the Institute when I'm in the carpool. Then I get home, and I cook supper. Then I will spend time with the children worrying about homework or playing music, or doing something else. Then I may do a little work, stuff that I can do when I'm tired, like answering letters and reading other people's reports or graduate theses or things like that, or I might read a book or do something else.

Sherkow: Was it easier when your children were real little?

Widnall: No.

Sherkow: Was it harder then?

Widnall: No. It's different. It's more <u>fun</u> when the children are older because they are doing more interesting things, and we have more to offer them. My son is doing a project in space colonization, and I have very ready access to a lot of material that other parents wouldn't have access to--photographs and slides and special reports; this, that and the other thing--that other people just don't know about. So we're in a position to share a lot more with our children when they get a little older.

Sherkow: Is your son interested in science?

Widnall: He's interested in lots of things. He's interested in music. He plays the violin. He's interested in science. He's just interested. He's interested in lots of things.

Sherkow: Do you get out much? I'm thinking in terms of going to movies or entertaining?

Widnall: It depends a lot on how busy we are. I think that we tend to get so busy that we are very, very glad to get home in the evening, or we're very, very glad for the weekend to finally come. We don't initiate a lot of entertaining. We will occasionally go visit somebody or meet them at a Chinese restaurant so that nobody has to do the cooking. We will have an occasional party. We have a very large backyard and a swimming pool. We occasionally have picnics in the summertime, where we invite a hundred people and have a barbecue, or something like that. We do that occasionally, and we usually have a large Christmas party.

Sherkow: Where do you live right now?

Widnall: I live in Lexington.

Sherkow: You live in Lexington and apparently have a two-story house, a large two-story house?

Widnall: Yes. I suppose it's a three-story house, actually.

Sherkow: Do your children go to private school?

Widnall: No, no. They go to public school in Lexington. Lexington has very good schools.

Sherkow: Would the possibility of moving to another place upset your

children and upset you, consequently?

Widnall: It would upset me. I don't want to move. I can't see any reason for moving. I have everything I want, and there's no particular reason to move anyplace else. I do enough traveling. I can go any place I want. I can visit anybody I want. I can call up anybody I want on the telephone. I like Boston as much as any section of the country, all things considered.

Sherkow: I asked if your son was interested in science; I should ask if your daughter is, too, because it's not fair.

Widnall: . . . except that she's only eight. She's younger. I don't know what she's interested in. She's just not as fully developed. She's very young.

Sherkow: Had you always planned on having two children?

Widnall: Yes. I think so. Two is a good number.

Sherkow: And you wanted a boy and a girl?

Widnall: Well, I didn't care. But a boy and a girl was nice.

Sherkow: If you had taken time off, would it have been difficult to come back into the field?

Widnall: Oh, I think it would be virtually impossible. The competition for faculty positions at a place like MIT, and the quality of work that you have to do in order to qualify in any reasonable sense for a position

like that is just so demanding that you really have to ask yourself the question of why in the world you are staying home. Given all that, it makes absolutely no sense to spend your days at home for any reason at all, if you're really serious about what you want to do.

Sherkow: Doesn't it depend on the field to a certain extent?

Widnall: No. I don't think it depends on the field. Not at MIT. I can't think of a single field at MIT for which I would recommend somebody staying home for a couple of years of their life, at least not a real professional person. When I use the word 'professional' I'm talking about this combination of having to establish a research program and having to establish the support structure and having to produce results. Now, I'd have to exclude people in the humanities because they are not under pressure to get external support, and they don't have research programs; they don't have graduate students. It's conceivable that somebody in literature or history could spend more time at home away from the Institute and still put together a complete professional career. I think that's possible, but I don't think it's possible in science. I know it's not possible in science. I don't think it's possible in engineering. I can't see how it would be possible in architecture or planning. There's just simply too much that needs doing, and you have to work at it full-time.

Sherkow: The case comes to mind at the First International Congress of Cell Biologists which was here in Boston this year, they happened to have a women's session, and one of the big areas of concern was about

having a career and a family. There were several women that said, "I really want to be with my kids when they're little. My husband works. I don't have to do it for the money. I resent the fact that it's made so difficult, that I can't take a year or two off and then return to work."

Widnall: It depends on what you want to do. In other words, if you want to be--if you want to work at a hospital--

Sherkow: I think they want both.

Widnall: Well, you can do both, but you can't expect to be a full professor at MIT and do both. You can be a technician at Mass. General Hospital and do both; there's no problem with that. But any time that you take away from your profession just means that you're simply less productive at your work. That's fine. There are many jobs for which you can do that. But you can't get something for nothing. It really comes down to that. You can choose the way you want to spend your time, but you can't expect the profession to adapt to the way you've decided that you want to spend your time because there are simply too many people who are doing other things.

Sherkow: Did you personally have any problems with nepotism rules?

Widnall: No.

Sherkow: You wouldn't, because you've been at MIT the whole time.

Widnall: No. My husband may have had some problems with nepotism rules.

I was on the faculty when he finished his PhD. We don't have nepotism rules in our department. That's just not an issue.

Sherkow: Do you have any feelings about why there's so few women in engineering? I think we touched on this before.

Widnall: I think we did, probably. I think it's partly the image of engineering as being unfeminine.

Sherkow: Where does this come from?

Widnall: It comes from the media, and it comes from engineers, themselves. Engineers may have a view of engineering which is twenty years out-of-date, and they communicate that to other people. Engineers have an image of engineering that is very masculine. When they talk about engineers, they almost always talk about, "He does this, and he does that." That sort of thing is off-putting to women who are rather sensitive to how people talk about that given field. That's changing. I think the number of women in schools of engineering is going up, and it's going to go up to thirty percent. But it takes awhile.

Sherkow: I've been noticing more and more literature on women in science. But engineering tends to be excluded.

Widnall: I think there are two reasons for that. I think science connects more directly to the high school guidance counselor structure, so that those people feel comfortable with science; they don't feel comfortable with engineering. They don't know what it is. All they know is that if a boy is good with radios and gears and motors that they

encourage him to be an engineer. Those are not particularly useful skills in engineering, but they don't know that. They assume that that's what engineering is, and so they encourage any boy who has that kind of leaning to become an engineer. If a girl demonstrates that kind of thing, they send her off to the psychiatrist because girls are not supposed to play with motors and things like that. So, I think a lot of it has to do with what I would term not an anti-engineering feeling in society, but almost that; it almost comes to that. I think there is a strong anti-engineering feeling among most scientists. I think that a lot of that filters down to the high school career counseling structure, a lot of looking down on engineers as very strange creatures. That affects the choice that women might make as to what field they would go into.

Sherkow: It seems to me to be a big problem. When I went to undergraduate school, at Washington University, there was a school of engineering. Now I don't even know where I got this, but engineers were weird; they were ten years behind in the style of clothing that they wore, and they were just strange.

Widnall: The reason they are ten years behind in the style of clothing that they wear is that if a high school teacher sees a boy who's ten years behind in his style of clothing, she will encourage him to become an engineer. (Laughter) So it's only natural that we end up with some of the weirdest people in engineering just because that's the nature of the advice and counseling that children receive at the high school level. It very much has to do with the image of the profession. It takes a long time to change.

Sherkow: Is the profession doing anything to combat this?

Widnall: Well, no, because it's full of people who are ten years--(laughter)--behind in not only the clothing that they wear but the mental attitudes that they bring to problems. It's just a long-time problem. The people in the field are those very people who teachers encouraged to become engineers. Their image of what engineering is, is very close to the image of the people who encouraged them to be engineers in the first place. It's a big cycle, and it takes an awful long time to dig out of it. It's true that there are many types of engineering for which those people are ideally suited, and they should become engineers. But there are many other types of engineering which are very exciting and very important to society, that require the talents of our brightest, most energetic young people. Those, hopefully, are the people who are coming to MIT to study engineering.

Sherkow: I'm sure it'll change with more inflation and scarcity of jobs, and as you mentioned, more women are going into it.

Widnall: More women are going in. In my freshman seminar in engineering, I think I have thirty percent women or something like that in that course.

Sherkow: You feel it's a good field for women to go into, right?

Widnall: I think it's an excellent field for women to go into.

Sherkow: There's a lot of opportunities.

Widnall: There are a lot of opportunities, the problems are fun, and the people are nice. Everybody seems to have a good time doing it, and you make a lot of money (laughs). I think that those are very good, compelling reasons for people to choose engineering. I've talked to the women students who've gone out to get their jobs in industry, and most of them are having a really good time. They're making very good salaries, and they're thoroughly enjoying themselves. All of them are enjoying those little problems that you have when you're the only woman: like there was no ladies' room in the company, and you have to install one; all sorts of other interesting little things that cause you local crises at whatever little firm you happen to be at. But everybody seems to enjoy participating in that whole process, including the people who are making the changes. It seems like a very worthwhile activity that everybody's having a lot of fun at.

Sherkow: I think one of the obstacles is what you mentioned about high school counselors. At the high school level, the information is just not getting transmitted that this is a good field to go into, and one must take certain courses. The feeling that I get is that people, when they're a little older than what might be desired, are learning that engineering is something that they could pursue. In other words, when they're freshmen in college as opposed to when they're freshmen in high school, when they could take all the math and science courses which are necessary for a good engineering background.

Widnall: But it is a decision that has to be made reasonably early in

your career, even in your high school career.

Sherkow: Yes. So there is a problem there.

Widnall: There is a problem. But it's slowly but surely getting itself worked out.

END OF SESSION

MIT ORAL HISTORY PROGRAM

Project on Women as Scientists and Engineers

Interview with Sheila Widnall by Shirlee Sherkow

Cambridge, Massachusetts November 23, 1976

Session 4 transcribed by Janet Billane

Sherkow: When you were first married you lived in the newly-constructed, at that time, student housing for married couples. How did that work out and when did you move to the location that you're in now in Lexington?

Widnall: We lived in the student housing until I think it was about 1967, something like that. Then we rented a house in Cambridge for a couple of years. Then we moved to Lexington. We moved there in 1968.

Sherkow: What is student housing for married couples like?

Widnall: It's very nice.

Sherkow: Is it apartments?

Widnall: Yes. Apartments. It was small, but convenient and close to campus. We had only one child at the time.

Sherkow: Did you live with other married couples from MIT?

Widnall: Yes. The building was full of MIT married couples.

Sherkow: Did you develop any friendships through living in that kind of situation?

Widnall: I would say a couple, but not really continuing friendships.

Sherkow: Last time we were talking about the different jobs that you had, and we went through the whole MIT length of time. However, you didn't talk about the 1974-75 time period when you took a leave of absence and worked for one year at the U.S. Department of Transportation as their first director of university research. Could you talk about why you took this job? How did you feel about being their first director?

Widnall: I guess I took the job because I always have--or I had--I'm getting better--a great deal of difficulty in saying no when somebody asked me to do something. The person who asked me was somebody who I had a lot of respect for, so I looked forward to going down to Washington and getting involved in something for which I had no previous background or training or experience. It turned out that a trip to Washington was sort of compatible with my husband's interest in politics. So it was a reasonably good thing for the family to do.

Sherkow: What did your husband do?

Widnall: He worked for Congress. He was a Congressional Fellow from

the AIAA [American Institute of Aeronautics and Astronautics], and he worked for the House Committee on Science and Technology. Actually, he got the AIAA to start a Congressional Fellow program because he wanted to be a Congressional Fellow, so he talked them into starting one.

Sherkow: What did you do there?

Widnall: I ran a program with a budget of about six million dollars. I talked to university people about their ideas, and I evaluated their proposals. I talked and persuaded and cajoled other people in the agency as to which proposals we should support. We kept tabs on the progress and the research on all of the proposals that we supported. We renewed the contracts and made sure there were results on the contract and that the results were made available to people that could use them. It was the typical government program where in order to continue the funding of a program, you have to continually justify the program is doing things, and the country's getting its money's worth.

Sherkow: I don't really understand what you did in that position.

Widnall: I was the boss, and I ran everything.

Sherkow: But what were you running?

Widnall: I was running the spending of about six million dollars for research in transportation.

Sherkow: You were the first director, so how did you feel about being chosen as the first?

Widnall: The field of transportation is not my field, so my initial reaction to the job offer was one of, "this is something I don't really want to do; I would rather stay at MIT." Then after talking it over with my husband, we decided that maybe going to Washington might be fun. I always enjoy getting into a new situation where you have to learn the ropes very quickly, or you have to make the ropes, depending on what the situation is. I think I did an effective job of that.

Sherkow: What was the reaction of your colleagues?

Widnall: Which colleagues?

Sherkow: At MIT?

Widnall: I don't really have colleagues at MIT. Or I didn't then, really. I guess people who work in fluid mechanics were quite surprised that I would take a year off and get involved in something like that. People who worked in transportation couldn't imagine why I was asked to do it since I was not somebody who worked in transportation. I think as it later turned out I understand the reasons why I was asked to do it. At the time he asked me to do it, the person who asked me to do it knew that he was leaving to become the dean of engineering at Cal Tech. I think at that point it was important to find a director for the program because the program was running by itself, and it was in serious trouble. If he was going to go and leave the agency, it meant there would be

nobody to protect it, so I think since he was the one who started the program, he wanted to get somebody in there to run the program. I had known him for several years. Although we didn't work in the same field, I think that we had a lot of mutual respect. I think the other thing was that the agency was under pressure to hire women. I just don't think there are that many women in engineering, although there's no reason why it had to be an engineer, it could have been an economist, or something like that. But the fact of the matter was that as far as this particular person is concerned, when somebody mentioned the words, 'woman engineer,' I would have been the first person he would have thought of.

Sherkow: Did you bring your children with you?

Widnall: Oh, yes. We moved down.

Sherkow: Did that work out all right?

Widnall: I think it had some advantages and disadvantages. I think taking children out of school and putting them in a new school system is probably not a good thing to do, but people do it all the time. I think being in Washington was very exciting for the children. They got a lot out of that, out of going to the museums and going to the Congress and all the different things that we did.

Sherkow: So you were there for just one year, right?

Widnall: Just one year, almost to the day.

Sherkow: How would you evaluate what you did there?

Widnall: There's several different ways to evaluate it. I think in terms of the job that I did for the agency, I did a very good job. As far as the personal cost, the personal cost was very high. It meant giving up fluid mechanics research for a year and abandoning all my graduate students and having to start up all over again when I got back. I think when you do something like that, it takes about two or three years to get over that kind of move, that kind of change.

Sherkow: Is that the kind of thing that you wouldn't consider doing again?

Widnall: I think that's probably right. I probably wouldn't do it again. I've done it once. I know what it's like. I'm not saying that I'm sorry that I did it; I'm glad I did it, but I wouldn't do it again. It's not that personally rewarding a career, and the personal cost of doing it is very high.

Sherkow: I thought we might talk about some of the contract work that you've done. You have done a lot of that type of work. I thought that we'd begin with your long-time association with Bolt, Beranek and Newman and if you could talk about the work that you've done for them, why you've done it, how it was initiated, and your continuing relationship with them.

Widnall: My relationship with them began in about 1966, a very long

time ago. My initial reason for seeking them out was because I was looking for opportunities in this area to do work in fluid mechanics and aerodynamics. So I initially worked for them during the summer while I was a young faculty member. I just kept up a long-term association with them. I don't work as much with them now as I did because the situation has changed. The people that I worked most closely with for one reason or another have left the company, and the volume of support available for fundamental studies has gone way down. So it's not as much fun for me to go out and work there because they're not doing as much that interests me.

But at the time when we were really doing a lot, I was working closely with a person named Hanno Heller, who was German. He was a very good experimentalist, and so we had a very successful collaboration where he would be working the experimental part, and I would be doing the theoretical part. We worked on three or four different projects on compressor noise and unsteady aerodynamics and reentry aerodynamics and a number of other things. But he has left to go back to Germany; he left about two years ago. So I really haven't been--

Then I had a student who went to work at Bolt, Beranek and Newman after he finished his PhD. He worked there for about three years, maybe four. This year he became an assistant professor at Princeton so he's no longer out there, so that the people that I really worked with are no longer there, and I really don't go out there very much. I now have an arrangement with a firm in Los Angeles that I consult for.

Sherkow: What is MIT's feeling about having their faculty members do consulting work?

Widnall: I think they, for the most part, have good feelings about it. There are regulations that say you're supposed to spend only one day a week consulting but I think at a place like MIT, especially in engineering, it's absolutely crucial that the faculty consult. Otherwise, they would lose complete touch with what is going on in industry. If they lose touch, then they're not going to be doing the right thing in the classroom and working with the students, but it can be abused.

Sherkow: I have a list of a number of different organizations or companies that you did consulting work for. I thought if you could very briefly indicate what you did there and perhaps why you decided to study that particular problem, that might be helpful. I think probably the first one here is the Dehavilland Aircraft in '64.

Widnall: That was a long time ago. As part of my doctoral thesis, I developed a program for calculating unsteady aerodynamic loads on hydrofoils and wings and did a small amount of work with Dehaviland to help them take the program and get it running at their plant. That was a very small thing.

Sherkow: Is the situation such that you initiate the contact or do they?

Widnall: Not usually. I usually don't initiate the contact. Usually people will call me up and ask me to do something.

Sherkow: Then in 1965, you did some work for Boeing.

Widnall: Again that was in connection with this numerical method. In fact, lots of the consulting work was that. The McDonnel Douglas wanted to use the program to do the flutter analysis on the F14 or F15, whichever one they built. I did some consulting for them to get the program running in their plant and on their computer. We modified it a little bit for the kinds of aircraft that they were particularly interested in. Then there's another small job at a place called Devore Aviation, which was the same thing. They wanted to be able to do these kinds of wing calculations--

Sherkow: Do you find these contract jobs helpful to you?

Widnall: It depends a lot on what I'm doing. Sometimes I just simply do it for the money. Other times I do it because I'm really interested in the job. Sometimes it's a little bit of both.

Sherkow: In 1972, you did some work for the Urban Systems Research and Engineering. What did that involve?

Widnall: That involved some studies of helicopter noise. As I recall, what the project was all about--it was an FAA project, and it had to do with operational quiet helicopters in urban areas. Urban Research is a firm of economists and city planners. They were interested in the community impact of helicopters.

Sherkow: Did they have a sociologist there?

Widnall: I'm not sure. I really don't know. The people that I interfaced with were the economists and the planners, the people who were putting it together.

Sherkow: Then there was a NASA sponsored research, which involved studying active aerodynamic methods to accelerate aircraft wake dissipation.

Widnall: That's different. That's not a consulting activity. That's an MIT research contract that involves graduate students and is done on campus.

Sherkow: Did you get involved in that kind of thing because of the interests of your students?

Widnall: No. That's standard operating procedure at MIT. Faculty members at MIT work on research contracts to support both their own research and the research of their students. That's the standard way of life around here.

Sherkow: Back to some of this contract work that you've done. Do you do a lot of traveling when you do consulting work?

Widnall: Not a lot. Bolt, Beranek, and Newman is located in Cambridge. I'm leaving for a trip next week, which is sort of typical of these trips . . . (Interview interrupted) . . . I'm leaving on a trip the second week in December which will involve two consulting jobs. One of them involves visiting a firm in Los Angeles called Poseidon Research which was founded by a faculty member from UCLA, who's a very close

colleague, very excellent fluid dynamicist. He's formed a small company to do research in fluid mechanics. I've been working with him since September. I made a trip also in September to visit them and start work on this project. So that will be two trips this semester to Los Angeles. Then I'm going to stop up in Tacoma, Washington, where my parents live. I'm going to stop at a firm which is the firm of the man who talked me into going to MIT. He wants me to consult on acoustic predictions for the design of a rail-rapid transit system that he's involved in. Since he contacted me about that consulting job, I've gotten a number of references together, and I've sent them out to his people, and I've talked to them on the phone. I'm starting to get ready to go out and see them. I'll spend one Saturday with them. Then I'm stopping in at NASA to visit a former student to initiate a research project.

Sherkow: When you do this, you go alone, right?

Widnall: Yes. I'm also going up to Cornell next week for two days, one day to give a seminar, and the other day to work with a colleague to get some preliminary work done so that I can go out to NASA Ames and give that to the student so we can get started on the project out there.

Sherkow: How does that usually work out, being gone from home?

Widnall: Well, I don't like to travel too much, but you have to do a certain amount of it.

Sherkow: Does your husband take care of everything then?

Widnall: Yes.

Sherkow: Does he do traveling?

Widnall: Yes. He travels. In fact we have a problem. It doesn't happen too often, but he will be traveling at the same time I'm traveling two weeks from now. Of course, we have an English girl living with us, so we'll have somebody living with the children so that we can both travel at the same time. But we don't like to travel at the same time.

Sherkow: Do you feel that you have time to do this consulting work and all that's involved with it?

Widnall: It's very lucrative.

Sherkow: You make the time?

Widnall: Yes. You make the time. Also both of these situations are special situations. For instance, I feel a great sense of gratitude towards this person in Tacoma who encouraged me to go to MIT, and when he calls up and says, "Will you help me out on this job, and I'll pay your rate," I'm only too happy to say, "Yes." The other thing is that the person that I'm consulting for in Los Angeles is probably the country's best fluid dynamicist, and working with somebody like that as a consultant is very, very attractive.

Sherkow: This is another government research grant, I guess; ONR sponsored research?

Widnall: Right.

Widnall: [With] all of those MIT contracts, there is no--I won't say no personal incentive for doing it--but the major incentive is to keep the graduate student research activities going in the department. All of those things, if left to my own devices, I might not work so hard and get involved in so many different contracts. But we try to provide support for students to work on master's theses and doctor's theses. You have to find a contract for about $25,000 per student. By the time the student's salary is paid, the overhead, the computer time, and this, that and the other thing, it takes about $25,000 at a minimum to support a student. So you have to get somewhere between $100-$150,000 every year to support six students.

Sherkow: Do you have to find this?

Widnall: Yes.

Sherkow: Is that difficult?

Widnall: No. I would say it is not difficult. Only, what is difficult is to do really good research with students who are just starting out at the first graduate level. It really takes an awful lot of time to supervise students. I think that's the difficult part of it. It's not difficult to get the money. It's difficult to find the time to make sure the project goes all right.

Sherkow: You also did a NASA-sponsored project on the aerodynamics of bird flight.

Widnall: Yes, that's still going on.

Sherkow: Why was that done?

Widnall: There's some very interesting unsteady aerodynamic problems associated with the thrust produced by flapping wings. It's really a very nice project. If you're asking if it has practical application, I'm not sure if it has practical application. On the other hand, much of biology is like that. You study biological systems to try to learn the way they work and how they optimize themselves. That's a very long-term study. But there are a number of questions involved in bird flight that only an aerodynamicist can answer. This should be made available to people who are studying birds in order that they can complete their studies, because people who study birds are typically not aerodynamacists; they're biologists.

Sherkow: Have you been involved in any other contract jobs since the vita that you gave me was printed?

Widnall: I don't remember. Actually the vita that you have doesn't really have very much about contract research, I wouldn't think. I can tell you what we're doing now, if I can remember. We have an NSF project on the wind generation of water waves. We have the NASA project on the unsteady aerodynamics of bird flight. We have an NSF project which is a continuation of our work on vortex rings, vortex flows. We have the ONR project on high-lift wings. We have a NASA project on helicopter noise. I think that's all. We have some large number of students,

like eight students, working on these projects.

Sherkow: Do you feel that about twenty percent of your time is devoted to contract work?

Widnall: Oh, no! It's much more than that. Fifty percent of my salary is paid by the government, so it's at least fifty percent of my work.

Sherkow: What are your feelings about working on government research?

Widnall: It's fine. I don't have any problems with it. It's the way the system works. It's sometimes unfortunate that you can't find the money to do exactly what you want, but on the other hand, there's no particular reason why the society should support people to do exactly what they want, anyway.

Sherkow: In 1969 you were chosen to be on this commission on MIT education. Could you discuss the results of this overview of MIT?

Widnall: I think that's very difficult. The commission was set up by Howard Johnson when he was the president of MIT. It was set up to look at an extremely broad range of topics. The commission had a couple of structural problems, like the real problem that we had was that I think it was very clear at the outset that [Jerome] Wiesner was not in favor of setting up the commission. We were to be in session for two years. At the end of our first year [Howard] Johnson resigned, and Wiesner became president. I think at that point we were basically a lame duck committee because the new president of MIT had not really wanted us in the first place. We published a report which dealt with some very long-range

issues in education. But I would say the net result of the commission was almost nothing except for the people who were actually on it. It was a very personally rewarding activity. It's very difficult to say what really came out of it. It may be twenty years from now I might be able to detect some outcome of that activity, but at this time I really can't see it.

Sherkow: Why didn't Wiesner back it?

Widnall: I don't know. He had been on the earlier commission, the Lewis Commission, which was 1945 or something like that. That committee was constructed very differently. The Lewis Commission was composed of very powerful senior faculty members. The MIT Commission was, by and large, junior faculty members with some students, although we had some senior faculty members as well. It may be that Wiesner felt that that was not a particularly good way to get anything done. Or he may have decided that that wasn't the way to run an institute anyway; that one governs by a kind of gut reaction to whatever issue comes up, rather than setting up some committee to come up with creative suggestions, which in general I would probably agree with.

Sherkow: Do you feel like you fulfilled any of the purposes that were involved in setting this up?

Widnall: I think so. I guess the other thing that I should mention is that the commission pivoted on a time of enormous change for the Institute. Our first year of operation, these 10,000 students in the

Boston area marched on the Draper Labs and broke all the windows in the social science--the economics building, political science building. There were bombs going off. The second year all the students were off of that and studying like mad. So there was an enormous change in the whole character of the life at MIT. I think our initial recommendations were framed for a time of turmoil and were really not particularly necessary in a time of seriousness and getting down to business and everybody studying very hard. So that's another thing that makes the commission a very funny sort of activity. For instance, one of our recommendations dealt with insuring that members of the community other than faculty had some sort of a forum to express their views. Well, after the tension and the turmoil was over, the other members of the community didn't particularly care whether they had a forum to express their views. Everyone went back to business as usual, so the issues sort of faded. Of course, nobody could have predicted that at the time.

Sherkow: Were any of your recommendations implemented?

Widnall: That's not clear, either. There are things going on at MIT right now that relate very strongly to some of our recommendations. It isn't really clear what will ultimately happen.

Sherkow: But initially.

Widnall: Initially, no. But ten years from now, I think we might find that we had been very prophetic in some of our recommendations about undergraduate education.

Sherkow: Were you glad that you served on this committee?

Widnall: Yes, oh yes. Right. I was.

Sherkow: One of the results of that committee was creating the Division of Educational Research.

Widnall: No, it wasn't.

Sherkow: It's written up that way.

Widnall: No. Well, it's not. You have to be extremely careful. The commission, in fact, would have come out violently against the creation of the Education Division and did so a number of times in private session. What actually happened was that the commission recommended an undergraduate college, which is very different from a division on education and research. That recommendation was taken up by a task force, headed by Hartley Rogers, which was called the Rogers Task Force. I served on the Rogers Task Force. The Rogers Task Force came out with a recommendation for the Education Research Division. But the commission never came out with that recommendation and never would have because it ran rather counter to everything that we were concerned about. I still think it was a bad idea.

Sherkow: Then in '71, you were on the nominations committee. How did you feel about having a significant role in the selection and evaluation of faculty?

Widnall: I wouldn't say we evaluated faculty. What the nominations

committee does is nominate faculty members to serve on the various faculty committees. It's a lot of work. I think it's a fairly straightforward committee. I didn't feel we had a lot of power. On the other hand, we were very concerned with doing a good job, making sure that we got good people on all the committees. We used our own definition of what 'good people' was, which is, I guess, where the power of a committee comes from.

. . . (Interview interrupted) . . .

Sherkow: You were talking about the nominations committee. You mentioned that you did a lot of work on that. I was wondering, when do you find time to do these things, and why do you do them?

Widnall: I'm terribly busy. I'm always busy. I try to do too many things, and I don't do all of them well, but I do a lot of things. I just find time for them.

Sherkow: Do you ever feel you're overcommitted?

Widnall: Yes, always. But that seems to be the mode that I'm always in, so what I try to do is get overcommitted with good things, things that are fun and enjoyable and profitable, rather than wasting my time. But I expect to be overcommitted. That seems to be just a natural part of being a faculty member.

Sherkow: You listed 1971 as a date when you became involved with women at MIT.

Widnall: 1971? Okay, I suppose.

Sherkow: It's listed as 1971 in your vita. I thought we could begin with the Women's Forum and the part that you played in organizing that.

Widnall: Let's see. The Women's Forum was organized by Millie Dresselhaus and Emily Wick; they were the people who initially started it. I don't think they knew what was going to happen when they started it. What did happen was that large numbers of women at MIT came out of the woodwork. This was an IAP activity in whatever year it says somewhere in the record. The people came out, and we just did it.

I didn't play any role in the initial conception, but I think I played a very strong role in the organization of the Forum and in getting a proposal written to Paul Gray that eventually resulted in Mary Rowe coming to MIT. I wrote that proposal. Not only did I write it, but I drove it through the Forum until we finally got it voted on, which is a political process. There's a lot of compromise involved. People who are not used to being involved in that sort of thing were nitpicking here and there on why don't we do this and why don't we do that, and it takes somebody to drive through all of that, or you never end up getting anything done. So I did that. Once we got that proposal finished, then I withdrew from that activity and let the people who were additionally concerned work it all out. Of course, the net result of all of that was that we ended up with Mary Rowe, which was really good.

Sherkow: As I understood that proposal, what was actually recommended was more than one person.

Widnall: That's right. We asked for two people, one to worry about faculty and high-level positions and the other to worry about staff and clerical people. Now, the Institute didn't give us two people. I think the result of that is that a lot of the work that needs doing is being done by volunteers like myself and Millie, and everybody else who has to work, but maybe that's the way it should be at a university. The people who have a voice at a university are typically faculty, and it's very difficult to legislate any kind of job which will automatically give the holder a real voice at a university. But I'm not unhappy, the way it turned out. I think Mary has done an extremely effective job, and she works very well with all the women at the Institute, including the women at Lincoln Lab. Our concern about having a woman be concerned about academic hiring has really been taken up by the women faculty and by the MIT administration itself. I think they've done a very good job of that, worrying about women faculty.

Sherkow: You were the manager for the Forum proposal. Why did you feel so strongly that these positions should be created? Please talk about your interest in this matter.

Widnall: When you do a piece of work like that, committee work or a proposal of some sort, it really is just the basis for the beginning of the discussion. I don't think we ever felt that we had the only right solution, but we had something that we were willing to talk about and it was an initial starting point. I think that it served that function. My role in all of that was that I had no particular desire for any one

plan versus any other plan, but I was extremely concerned that the Forum put together a cohesive, comprehensive proposal of some sort, and we had to have it done by the first of June. In other words, I wanted to make sure we did something, rather than just wallow around and talk a lot and not end up doing anything.

Sherkow: Yes, but what I'm trying to get at is the substantive matter of why you even wanted to be involved in this issue.

Widnall: It's not that I don't want to talk about the substance. It's that I think the substance is much less important than the process. In other words, what I wanted to make sure happened was that the women of MIT got together as a group and spoke with some reasonable voice, saying that this is what we want to happen. I almost didn't care what they said, as long as they all understood that it was some kind of a political consensus that we had to put together, that we had to form--

BEGIN TAPE EIGHT, SIDE TWO

Widnall: . . . that it was a political consensus that we had to put together, that we wanted to form a group for women at MIT which by definition included everybody, [and] that we wanted to insure that the group that was formed was not seen as a radical group or a fringe group by the women who were part of the MIT community. So what I'm really talking about is building a broad-based movement for women at the Institute and getting the women who were participating in that very used to compromising, not having everything exactly the way they wanted it to be, but in some sense recognizing that it was very important that we

have a women's group that sort of spoke for everybody. We even had a 'Right-to-Lifer' who was a member of the group, but she finally dropped out because she thought we were pretty far out. (Laughs)

Sherkow: You also were involved in the women's faculty group.

Widnall: Yes.

Sherkow: Admissions work, some concentration on freshmen, and organized efforts to get more women in engineering.

Widnall: Right.

Sherkow: Could you talk about your involvement in those things?

Widnall: A lot of that was done along with Millie. Both of us were involved as what were called 'Carnegie Fellows' to work on some of these activities. We did a lot of different things. We started the Women's Faculty group which is still going on. Women's Faculty group meets once a month, and we organize various things that are of interest either to the women students or to the women faculty themselves. We've done admissions projects. Last year we had a very interesting set of work-shops on how to get tenure. We worked on the tenure process and explained it to people and what it was all about and encouraged them to write up their own resumes to see what their case was going to look like when it started going forward for approval, because we wanted people to go into that knowing as much about it as possible, so it wouldn't come as any great shock when they were considered for tenure. The other thing we did last year that was very successful is our study

of the athletic department which resulted in the hiring of three new women faculty members and a new locker room and all sorts of . . . (Interview interrupted) . . . Okay, where were we?

Sherkow: You were talking about the work that you did through the Women's Faculty group.

Widnall: Yes. Then this last spring we did a study of the women's athletic program. That resulted in a number of rather significant changes in the athletic department in terms of space, coaching assignments, and new faculty and administrative positions. And we have a new director of women's athletics.

Sherkow: What kind of work did you do in admissions?

Widnall: The most active time was the time that MIT had admissions teams. That was the year that we received more applications from women than we had ever received. I think applications were up about three hundred percent. There was a sudden increase in the number of applications. There was a lot of concern on the part of many of the male faculty members and the various deans in schools around MIT, especially in the School of Engineering; they sort of made the assumption that these women would not go into engineering, and therefore they were arguing for a quota on women students. They were saying something like, "With this large increase in the number of women applicants, we're going to have to put a quota on women students." Needless to say, we were very upset about that and worked in many different ways

to insure that that didn't happen and also to insure that there were women faculty members on all of the groups of the faculty members who were doing the admissions.

We had about seven or eight women faculty members involved in that process. Each woman faculty member took it upon herself to read the admissions folders of all of the women students that were in her group, so that we could really be sure that the women students were being fairly evaluated and that sufficient understanding and credit was given to their extracurricular activities. For some reason, it's considered better to be captain of the football team than to be an excellent dancer. We felt that that had a bit of sexism in it, and we wanted to make sure that the activities that women typically excel at were given the same kind of weight that the activities that men typically excel at.

Sherkow: Now what work did you do in the efforts to get more women into engineering?

Widnall: We initiated a freshman seminar called, "What is engineering?" In the advertising for that, we specifically encouraged women students to enroll. In fact, I'm teaching that this semester. It's still going on. It's gone on now for about three or four years--three years I guess, and it's given every semester. It always typically has about fifty or sixty students; about one-third of them are women. We made a movie, "Women in Engineering." We have given IAP activities of various sorts, and in general have just tried to encourage women students in many different ways.

Sherkow: What kind of special work did you do with freshmen?

Widnall: What do you mean? I don't think I did any special work with freshmen other than the freshman seminar. There are always a lot of social activities for freshwomen. There's teas and coffee hours and stuff like that, and the women faculty show up to these things and meet the students and have the time to chat. Again, I think women faculty help a lot by just being visible.

Sherkow: You were also on MIT's Equal Opportunity Committee, where MIT's Affirmative Action Plan is reviewed. What were the results of that?

Widnall: That's a waste of time. That committee has no power. It's a committee in search of a role. I thought the whole thing was a waste of time, so I eventually resigned from the committee and asked to be replaced. I think Millie is doing it now because I noticed it on her calendar the other day.

Sherkow: Is it not addressing itself to the real issues, or what's the problem?

Widnall: I think the problem is that it has no power. It does not pass on appointments. The most it could do is advise on procedures. That's a dry, dull thing to get involved in. It's typical of a lot of standing committees. It just kind of talks, and I really thought it was pretty boring.

Sherkow: Who set it up?

Widnall: I suppose Gray or Wiesner, somebody like that.

Sherkow: That's a big issue now.

Widnall: What's a big issue?

Sherkow: That Affirmative Action is being changed.

Widnall: Affirmative Action is a big issue, but the Equal Opportunity Committee is not where it's happening.

Sherkow: I was wondering why you initially got involved in women's issues?

Widnall: I suspect out of a sense of personal responsibility. I think that if the women who are successful, and I guess I count myself in that group, are always saying things like, "There's no discrimination," and "I never had any problems," and things like that, I think it deals a real psychological blow to women who are experiencing real discrimination. I really do believe that women are discriminated against, and in order to try to help out in any way I can, I try never to say things like, "I've never been discriminated against," and "There's no problem." I try to get involved in the problems as I see them and to work on them in whatever way I can. As I say, I think that women who are successful have a bigger responsibility to do that than other women.

Sherkow: Were you at all influenced by the participation of other female faculty members here?

Widnall: That's difficult to say because I'm sort of a loner, and it's not obvious to me that I'm particularly influenced by anybody. I guess maybe the way to say it is I was very gratified by the participation of

the other women faculty members in these issues. But I think I had a strong sense of personal involvement which was really independent of whether or not the other women faculty were involved.

Sherkow: How has your thinking on women's issues in general evolved over time?

Widnall: That's probably difficult to remember. I think I was probably pretty unaware of the issues until about 1970, because I was just basically off doing my own thing.

Sherkow: What changed you during that period of time?

Widnall: I think a general awareness in the Institute and in society in general. It happens very quickly when it happens.

Sherkow: Did you have any particular incidents that sort of spurred you on?

Widnall: No, no. I don't think so. I guess it was just a turning away from some of the things that I was doing and taking on a new activity.

Sherkow: So you view yourself as an activist right now?

Widnall: Yes.

Sherkow: But initially as a student here you were just--

Widnall: Yes. These things were just not issues when I was a student.

Sherkow: Are you saying that when it became a public, national issue, that that was when your involvement came?

Widnall: I'm not sure it was so much national as it was at MIT. It became a very strong local issue, with the women students and the Women's Forum and the other women faculty and the increase in the numbers of women faculty. The issue surfaced in terms of some study committees on women students and life at MIT for women.

Sherkow: Are you active in any national organizations?

Widnall: No, I wouldn't say I'm very active. I'm too busy.

Sherkow: Are you a member?

Widnall: Yes. I'm a member of NOW, although I don't know if I've paid my dues for the last year.

Sherkow: How would you summarize your philosophy about the cause of women's rights in general, and if you want, MIT in specific, and then your own participation and effectiveness in dealing with these problems?

Widnall: I guess my fundamental philosophy is that women should be able to choose whatever it is they want to do, and that women and men should be able to work out some way of living together that doesn't always make the assumption that the woman is going to take care of the house, or the children or the cooking or whatever it is; in other words, that people have to learn how to arrange their lives without making some basic assumptions. I guess I'm very much against assumptions. I think that people ought to continually examine their basic assumptions, so it naturally follows that I think that women should be encouraged to become engineers, scientists, doctors, lawyers, and whatever else. Moreover,

when these women marry, they should expect to have as full a professional career as their husbands, and that there's no particular reason why a woman has to choose between a profession and a family, since it's very clear that men don't have to make that choice.

I think that there are two roles that I can play in the women's movement. One of them is by being very visible and being very successful at what I'm doing, which means I have to be competent, and I have to go out of my way to make sure that I stay visible so that other women will be encouraged and that men will be used to working with women. The other thing I can do is a more local thing. I can do things at MIT which make life at MIT better for women faculty and women students. But my real clout and power is likely to be at MIT, in terms of really making change. So that's where I tend to put my active energy.

Sherkow: How would you evaluate the place that women hold at all levels at MIT, from students right through to faculty and then to administrators?

Widnall: As far as I can tell, the women students are in good shape in the sense that they should be admitted on the same basis as the men--as far as I can tell, they are. For the most part, they receive an adequate education in the classroom. There are some examples of male faculty members being either openly hostile or putting women students down. That still goes on at MIT. I don't think the reverse is true. I don't think that women faculty put male students down, although I'm not sure. So I think that women students academically have the same environment as men. I think the environment for women from the point of view of social and personal life may not be quite as good. On the other hand, there's certain advantages in being a minority group, so that there's some plusses on that side, too.

I think the women faculty are still very small in numbers. I would like to see the Institute hire a much larger number of women faculty. As far as I can tell, the environment for women faculty is pretty good, but again decisions on faculty are very personal, very subjective decisions. I'm never really sure that women are getting the benefit of the doubt when these decisions are made. I think there still is a Buddy System that involves male faculty judging other male faculty. I think the women are falling outside of that.

Sherkow: What about the non-faculty staff and the administrative positions?

Widnall: As far as I can tell, from everything I have seen, the Institute is doing reasonably well in non-faculty administrative women. I know quite a few of them who have moved from this office to that office and have steadily been promoted. As far as I can tell, I think the Institute is doing reasonably well in that.

Sherkow: Biweeklies also?

Widnall: Well, biweeklies are secretaries, and of course there'a a large number of women in that category.

Sherkow: The largest.

Widnall: The largest?

Sherkow: Just about.

Widnall: I mean, one would not really go out of the way to encourage MIT to hire more women in the biweekly category, because that's the same

thing as encouraging MIT to hire more biweeklies.

Sherkow: What I understand the problem to be is that these people don't have anywhere to go. Is MIT making an effort to help some of these people?

Widnall: There's some structural problems. It's very, very difficult to provide an advancement ladder for everybody who initiates a job at MIT. That's very hard to do, especially in the secretarial ranks. I'm not sure the situation would be any better for clerical workers at any industry. In general, the advancement possibilities are pretty limited.

Sherkow: My feeling is that when it comes to management, that's usually the place for men and usually not the place for women; that's been the standard.

Widnall: We have a lot of women at MIT that are doing "management" of some sort. But at MIT there are two rather distinct ladders for management. One of them is the faculty route, and the other is the administrative route. There are certain jobs that are simply closed to people who have come up through the administrative assistant route. It's absolutely inconceivable that anybody would ever be the president of MIT without having been a faculty member, either here or at another major university. That is true for a whole host of offices in the administration, that there's a natural ceiling on administrative positions.

Sherkow: How do you feel that MIT is dealing with the position of women in management level jobs?

Widnall: I think it's probably uneven. I know a great number of women

in administrative positions, and there seem to be a fairly large number of them. When we have our women's faculty lunches, we include women staff and administrators from most of the offices that have anything to do with students, financial aid, and the alumni office and the admissions office and the medical department. We never have any difficulty in locating several high-level administrators who are women in these offices. So women seem to be well-represented in at least those sorts of activities at the Institute. I just don't know anything about the other activities.

Sherkow: What about the hiring of faculty in the engineering department?

Widnall: The school of engineering has now about seven or eight women faculty, which is not really great. On the other hand, it's still true that women make up about one percent of people receiving PhD's, which even if your hiring were purely sex-blind, then you would have one woman faculty member for every hundred male faculty members. The School of Engineering has about three hundred and seventy faculty members, which says we should have 3.7 women, and we have more like eight women. So in some sense we're doing twice as well as you would anticipate that we should do, which is not the case for the School of Science or for the School of Humanities, where the women are under-represented if you use as a ratio the percentage of women getting PhD's in the field. So actually we have more tenured women in the School of Engineering than they have in the School of Science. We have more full professors in the School of Engineering than they have in the School of Science. I really think it's a remarkable record.

Sherkow: Or else their record is just so poor.

Widnall: That may be it. We have three full professors in the School of Engineering and the School of Science has one and one additional woman who's tenured. So I'm rather pleased with the School of Engineering, except for the department of chemical engineering which has not done very well.

Sherkow: What is the engineering department as a whole doing to get more women into different fields of engineering?

Widnall: Of course, you start back with my freshman seminar. The freshman seminar is designed to encourage people to go into engineering. Then there are some activities that various departments are doing to try to encourage women who have gone to undergraduate degrees in science to switch to engineering for a master's degree which is a perfectly reasonable thing to do. In fact, it's probably a good thing to do. I know that several departments, including my own, have done active advertising to encourage women to transfer from science to engineering at the master's level.

Sherkow: So do you feel that the engineering department is doing all that it can do to get more women into school here?

Widnall: I don't think that's where the problem is. I think the Institute as a whole should increase the number of women undergraduates by active recruiting. I think that's one thing we should do.

Sherkow: The women graduate students?

Widnall: Undergraduates. The graduate students--it's a much more difficult problem. We can only admit the students that apply. I think we've done a reasonable amount of advertising for women students, and they have not applied. You can say, "Well, you never do enough." On the other hand, the time and energy of MIT's faculty is simply limited, and it's not worth it. The return on the investment of time is simply not great enough to encourage MIT faculty, myself included, to go out and do very much for beating the bushes on women students. If women are not going to take the opportunities, then there's nothing we can do to force them into it. If you make information available, and you monitor the process of admissions and financial aid, I think that's about all you can do.

Sherkow: Where do you feel the largest problems are?

Widnall: I think the largest problem is that most women are not really ready to take control of their own lives. They're not really ready to be responsible for themselves. They're not really ready to realize what it means to contemplate having to earn your own living. Until you get to that point, I don't think people are going to be willing to put in the time and effort and the financial cost of going to a graduate school like MIT. I don't really want women students here if they're going to do a half-baked job. I don't want to go out and beat the bushes and get a bunch of mediocre chemists to come and become chemical engineers. That's not going to help anybody. So I think that all we can do is do a moderate amount of advertising and hope that good women students will apply.

Sherkow: What do you feel are the key problems for women at MIT?

Widnall: I suspect the key problems are finding a home in a department. I think that's probably the key problem. That can be a problem--it's a very severe problem at the graduate level. Many of the problems at the undergraduate level are a little different. That's just maybe finding your way around the Institute. The department is a part of that, but there are lots of other things that are important to undergraduates besides the department that they're in.

Sherkow: Why is finding a home so difficult?

Widnall: I think finding a home really means finding a faculty member to work for and developing a good working relationship with that person. That seems to be more difficult for women students than it is for men, and it may be that the faculty doesn't particularly know--or at least many of them don't know how to work with women students, and they subconsciously treat them differently than they treat the men students.

Sherkow: Do you think that's true?

Widnall: Yes. I do think it's true. Not of everybody. I guess what I really believe is that all men treat women differently than women do, but I also believe that women treat men differently than they treat women. So I think there are differences there. But the real question is whether the differences are going to affect the academic performance of the woman student.

Sherkow: You feel that they do in some cases?

Widnall: In some cases I think they do.

Sherkow: I just have to relate this incident. Technology Studies has these seminars; I think they're every week. Anyway, I went to one last year and it happened to be about women. Sally Hacker was the speaker, I believe, and she was relating statistics of Bell Telephone Company employees in Iowa. The questions that followed her speech were absurd. What I'm referring to is the fact that the consciousness level of the men that were there, and I'm talking about really bright men--they're not so far above everybody else that they're geniuses and all they can do is think in terms of math equations and things like that--but the consciousness level was so low. They were saying, "Why are there so many women against the women's movement?" They were saying things like that. I just felt like they've got leagues to do.

Widnall: But a lot of the women who come to MIT are in that same place.

Sherkow: Sure, it's obviously not everybody.

Widnall: So it's not clear that there's not going to be a bad match between a woman who feels that way and a research supervisor who feels that way. They may get along just fine. The really important thing is that the research supervisor sees this woman as a person who could do good research, because people tend to live up to your expectations of them.

Sherkow: I guess what I'm getting at is simply that if your consciousness is raised and you're sensitive to some of the problems, then you're going

to relate to your students better. And you're not going to feel like, "Oh, this is some overly sensitive woman," or you're going to negate the experience that she's relating, and you're just not going to be able to relate. And then you're just going to wish that she was one of the guys, and you didn't have to even deal with it.

Widnall: I think that's an attitude of a lot of male faculty, they would just as soon that they didn't have to deal with it. What that tends to create is a kind of avoidance of women students as just being too much trouble.

Sherkow: Yes. That's the feeling that I got from this seminar; they couldn't break through to the answers to all of their questions, but nobody has the answers to all of those questions.

Widnall: But on the other hand, a woman student, by the time she gets to a place like MIT, had better have developed some tactics for dealing with that because the situation at MIT is not particularly different from the situation in industry or the situation at other universities. It seems to me that that's a necessary part of a survival kit, to know exactly what to do in situations like that, to be fully aware of what's going on and have learned how to deal with it in a way that you can live with. Women have to learn how to do that. Maybe MIT's a good place to learn.

Sherkow: Why not? I was just rather shocked. I don't feel that I have any market on what's been going on. All you have to do is simply keep up, even on a peripheral level with some of the readings, like Ms; just get Ms and read it.

Widnall: Oh, but, they don't--they don't read that.

Sherkow: There are some men that do.

Widnall: Yes, but, by and large, the MIT faculty doesn't read it.

Sherkow: They just seem so insulated from the problems. I personally felt sorry for all the women who didn't know how to handle all of these problems because not everybody is built like a rock and knows how to handle these situations. I think MIT is making some efforts by having the Women's Faculty group, Forum, and similar groups, the Cheney Room, and having special events that try to sensitize women to some of the problems they're going to encounter. But it often seems to be an insurmountable--a large problem--it's not insurmountable, but we do have a problem.

Widnall: I don't think it's insurmountable. It can't be. It's a big problem. On the other hand, it's a lot different than it was five or six years ago, a lot different. There are some people who are just in the woods, but there are a lot of people who have changed a lot in the last five years.

Sherkow: Please indicate your feelings about the trends today that indicate positive changes for women. You don't have to limit this to MIT.

Widnall: I think that there are a lot of hopeful signs, but I think the most hopeful signs are the increase in enrollment of women in serious professions. The whole thing has ultimately got to be built on that. There's absolutely no way that you can build a movement that works for

equality of men and women if women are going to stop their educations at an earlier level. You have to have women lawyers, doctors, engineers, scientists and everything else, or the whole thing doesn't mean anything at all.

Sherkow: You feel this is happening.

Widnall: I think it's happening. The statistics on the enrollment in law school and medical school and graduate schools in general are--I won't say they're excellent, but they're certainly very, very gratifying. The number of women that you meet in responsible positions is increasing all the time, in some places more than others, but still the number of women faculty at MIT is dramatically different than it was. We have so many women faculty that we encourage the women faculty to ignore us--I mean, to ignore the other women faculty in the sense that we don't have such a small number that we've got to turn everybody out if we're going to have a meaningful group. We have so many women faculty that we can basically offer this as a service to women faculty who want to come, who want to work with other women and work with women students. But we also encourage women faculty to just stay in their labs and do the best possible research that they can and worry about themselves. We have so many women faculty that we can do that. We have so many women faculty that the load can be spread over lots of different people at different times.

Sherkow: Did you personally ever experience salary differences with male or female co-workers?

Widnall: Well, I don't have any female co-workers. But yes, I'm sure that MIT underpaid me when I initially started out by about two or three thousand dollars a year.

Sherkow: Did that bother you?

Widnall: I guess it didn't bother me then because I really wasn't aware of it, but it bothers me now. MIT, of course, fully corrected that in about 1970, '71.

Sherkow: How do you feel we can tackle the problems of discrimination?

Widnall: I think it has to be a . . . (Interview interrupted) . . .

Sherkow: I think you said 'mass movement.'

Widnall: Yes. It requires a mass movement so that everybody gets involved and so that discrimination simply becomes sort of irrelevant. But it is going to require that women take the kind of responsibility that they should for their own lives. It's going to require that they prepare themselves for responsible careers because there's no sense setting up search committees to insure that women will be considered if you can't find any women with the qualifications for the job.

Sherkow: What about the possibility of the education of non-sensitive people?

Widnall: You mean people who have already grown up?

Sherkow: Yes. There are a lot of those, and they are also in very responsible positions.

Widnall: Yes. I think it really takes a shock of some sort to get somebody out of their old habits. Some people are better than others. It's interesting. There's a time when men go through that sort of thing when their daughters start choosing colleges. I think that's a particular time when men become extremely aware of discrimination against women.

Sherkow: Their daughters don't get into certain colleges?

Widnall: No, it's not that. It's when they try to help their daughters choose a career, and then they start realizing what the implications of that career choice are. And they start wondering why it is that they don't see many women in management or in this or that. They try to figure out how they can help their daughter choose something that will be a good career, and then they look around, and they don't see any women in those careers, and they wonder why that is. I wouldn't write all men off. I think men that have teenage daughters are particularly aware of these issues, and that's a good time to catch them. There's another situation if a man's wife is going back to school or making some kind of a change in her life, and then he can become [sensitized]. But I think it takes some external thing to have to happen. But most people have children, so it's not so bad. But I don't think you could take a given individual and soften them up in any particular way, unless you really put them through some sort of traumatic experience.

Sherkow: So education is--

Widnall: Education is for young people. The young people in junior high are really quite radical.

Sherkow: Of course. That's because they're not old.

Widnall: I mean the women students. From everything I can tell, they're not about to take second place.

Sherkow: Yes, right.

Widnall: I told my son that the chances of him getting a woman to cook and sew for him were pretty small (laughs), and he'd better learn how to cook and sew himself.

END OF SESSION

MIT ORAL HISTORY PROGRAM

Project on Women as Scientists and Engineers

Interview with Sheila Widnall by Shirlee Sherkow

Cambridge, Massachusetts November 24, 1976

Session 5 transcribed by Janet Billane

Sherkow: Yesterday we were talking about women and women's issues at MIT and in society as a whole. We didn't really finish; I had a couple more questions. I wanted to ask you how you felt about female role models.

Widnall: I think I have mixed feelings about that. I think they're important, but I also feel that the women to whom they're important don't realize it. I should explain that. I think the typical woman student at MIT really feels that she has no need for female role models. I think that's a typical reaction of the kind of women who come to MIT, until something goes wrong. Then I think they're very happy to have someone to go to in a crisis situation. I think the issue is a very complicated issue. I think that just bringing women professionals to campus and having them speak to random groups of women students may or may not be terribly effective. I think what you need are women in the community that can be counted on at critical times. But other than those critical times, I

think most women in a profession like to have the feeling that they're doing it all themselves. That's a very strong motivating factor for most of the women that I know, that they don't feel the need for any kind of special singling out or special treatment. They certainly don't perceive the need for female role models.

Sherkow: Have you had students coming to you in crisis situations?

Widnall: Yes. I think students tend to draw more closely to the women faculty when there is some kind of a problem. It may be that the athletic situation was an example of that; that there was a problem in the athletic program and that the women students really needed some help and really wanted the situation to improve. I think at that point they were very happy that the women faculty were willing to take on that kind of a project.

Sherkow: Do women students ever come to you with personal problems?

Widnall: I would say not so much. We don't have very many women students in aeronautics. I think the women students I know, I know them more through these common activities that we're involved in. Most of the women students I know, if there's something they want to talk about, they will talk about it only obliquely in connection with some other kind of activity that you're involved in.

Sherkow: Do you ever feel resentful or "put upon" that as a woman professor you have to think about these questions of role models and helping out when there aren't a lot of women faculty members here?

Widnall: No. I don't feel that way. I think the women's movement is very

exciting, and I think these issues are very exciting. I think it's a lot of fun to be involved in them. It's very rewarding. It's also very time-consuming.

Sherkow: I get the feeling from things that I've read and from speeches that I've gone to that some women seem to resent the fact that they're being asked to be at this particular event because they're women scientists, not because they're great scientists and they're just being asked, but it's the combination of the two.

Widnall: Well, no. I never resent that. I say no to a lot of things, but I never--I think it's too much trouble to get angry. It really is. I think you just have to sort of accept the strange dislocations that happen. You just have to decide whether that's something you want to participate in or not. But it's certainly a waste of time to feel any sense of resentment towards it. Most of the time, the people are well-meaning, and you certainly don't want to get angry at tham.

Sherkow: I think you're in the position of having an obligation just because of the situation.

Widnall: Yes, and I don't mind it. But on the other hand, I do say no for lots of things just because I just can't. A few universities have asked me to come down and speak to women students. I'm willing to do that about twice a year but no more than that.

Sherkow: What kind of progress do you feel that NOW and the AAUW [American Association for University Women] and SWE [Society for Women Engineers] and even the AAAS [American Association for the Advancement of Science] have made in terms of women?

Widnall: I don't really know in detail all of the things they've done. I think that there are very powerful movements going on in society which have certainly been helped and pushed along, by NOW [National Organization of Women], in particular. I don't know very much about the AAAS. I'm not a member, and I very seldom participate in their activities. That's a funny sort of organization. It's not clear to me that women would fare very well in it with that group of people.

I think the Society of Women Engineers has been very helpful to women students. For some reason which I do not completely understand, the MIT engineers have not particularly been interested in the Society of Women Engineers. Maybe that's a general reflection that MIT students, in general, are not interested in national student organizations. But on the other campuses, that Society of Women Engineers student chapter provides a very important social format for women students. It's an extremely important organization for them. I visi d student chapters at Oklahoma and Illinois and Cornell and other places. I know that it plays an extremely important role on the campus. For some reason, the students at MIT either don't need it, or they don't really know about it, or everybody's too busy, or nobody's going to organize it, or for some reason it hasn't started. I would be the last person in the world to take on the organization of a new activity.

Sherkow: They do have a group here.

Widnall: There's a Boston group. It's not clear to me that there's actually a group on campus; I don't think there is. There seems to be some confusion about that. As far as I know there isn't a student group--there's a Boston group, and the Boston group tries to encourage

women students to come. It's a little different atmosphere when it's an on-campus student activity, such as the ones that I visited at other universities. They have a lounge, they meet in the afternoon for coffee and doughnuts, they get speakers, and they talk, and things like that. It may be that the Cheney Room at MIT serves the same function for all of the women students that the Society of Women Engineers would serve on a much larger campus.

Sherkow: What about WISE [Women in Science and Engineering]? Are you familiar with that organization?

Widnall: I don't [belong]. Yes, I'm vaguely familiar with WISE. I think all of these things are important. I think that everything that is done raises the general level of awareness among the women and among the rest of the community. So putting the whole thing together, there are enormous numbers of people in the country that are involved in these issues. It has something of the character of a mass revolution.

Sherkow: Do you think it's fair to say that if you're involved in a lot of these activities, that you just can't be doing top-notch work in your field?

Widnall: If you're involved in a lot of them, then I suspect that it's definitely time taken away from research. But so is living, and so is almost anything else that you might want to do. I think each person has to strike some sort of a balance.

Sherkow: I've just interviewed some people who feel that they've been undermined for their activities in women's groups by their colleagues, whom they depend on for support.

Widnall: That's a different issue.

Sherkow: Their colleagues say that they're on too many committees, and that they just do too much. The women don't feel that their work has been affected, but their colleagues just use that--

Widnall: So they feel that their colleagues resent them for it and judge them for it?

Sherkow: Yes. And that affects their ability to get grants.

Widnall: I don't have any problems with that. I'm really so independent of my colleagues. I really could care less what people at MIT think about me. Now, the national issue is a little more serious. To the extent that I'm working on other things, I'm not working on fluid mechanics, and that over the long haul will have an effect on--

Sherkow: With the particular person I'm thinking of, all of their professional activities were group activities, so something was different . . . . (Interview interrupted) . . . I was just saying that for the person whom I'm thinking of, the work that they do is group research.

Widnall: Yes. That might make a difference. As I say, I have one close colleague that I work with. I don't know; he may feel a certain amount of effect from the fact that I'm just not around as much as I would be if I didn't have some of these other distractions, but it doesn't make enough difference for me to change it.

Sherkow: I think the fact that you feel an obligation is an important issue because some women just don't feel that way. They just don't want to be a

role model. They just feel that, "I want to do my own work, and that's it." You're in such a small minority that, in a way, you have to feel some kind of obligation, I think.

Widnall: But a lot of women at MIT don't. I think it's important to let them feel that way.

Sherkow: I don't think everybody has to be involved, but I think some people do--especially people who are in the higher positions--people like Mildred Dresselhaus who are so special and so different.

Widnall: Yes, right.

Sherkow: And apparently she does feel that way, so that's really good. What are your feelings about the women's movement in general?

Widnall: Oh, I have very positive feelings about it because I think the main reason that small segments of the women's movement have been successful is because of the much larger movement that's going on in the society as a whole. There's obviously a direct connection between militant feminism in the junior highs and the ultimate enrollment of women in engineering. In fact, we can't do without it. When you try to work on some really small part of the problem, you find that the problem is not going to yield unless you can get to this major impact on society. So the women's movement has made it possible to have a success in one of these small areas, just because it's so completely changed the climate in the society, as a whole, in terms of the aspirations of young women and the image that their parents have of what they might do and all of that. So I think that's been very, very positive.

Sherkow: Do you think TV is a real negative influence?

Widnall: Well, that's interesting. I suppose you could say TV is getting better. There are a lot more shows now that have women as stars. They are equally bad as the programs that have men as stars, but at least there's a kind of a change in that. I think it's just the fact that TV now feels that women have interesting lives and could conceivably be the main object in some show. I think that's a big step forward.

Sherkow: Do you feel that women scientists could benefit by a national spokeswoman?

Widnall: No. I think the whole success of the women's movement has basically been that it's very diffuse. What is really going on which is a revolution is this whole idea of a kind of leaderless movement that has many leaders and many people who will speak out and many people who feel responsibility. I think that's exactly the kind of movement that you want to build. We've tried to do that at MIT. We've tried to keep it very diffuse. We've tried to make sure that everybody felt comfortable with what we were doing and that there wasn't any one person who was a leader in that sense. In terms of passing responsibility for calling meetings and organizing things, we try to get that passed from person to person in a very, very informal way so that everybody feels involved and nobody [is left out]--there's not a sense of somebody being a spokeswoman for any particular group.

Sherkow: Why do you feel so many women are opposed to ERA?

Widnall: I think that's just lack of education, lack of understanding.

Sherkow: Do you think they're threatened at all?

Widnall: I think many women feel that they have rights that, in fact, they don't have. For example, I think the major issue in the ERA which causes women to oppose it has to do with the alimony and separation payments in the event of a divorce and those support issues. The fact of the matter is that women have very few rights in that area and they don't stand to lose anything under ERA in those areas, because they have so little to begin with. It probably is not going to change at all with the Equal Rights Amendment.

Sherkow: How do you feel we can reach pre-high school women concerning their pursuit of engineering or an engineering career?

Widnall: I think it probably is too early to even think about engineering in pre-high school. I think what is important is to think about a career and to prepare [for one]--or even a career that includes math and science. I think that's really all that's needed to prepare oneself for a possible career in engineering.

Sherkow: How do you feel we can interest more women in math and the sciences?

Widnall: I think a lot of that really has to do with the parents. I think it has to do with the image that parents have of what is appropriate for daughters. So you have to change that. The best way to change that is with this extremely high level of national awareness about women in their careers and their future lives. There's no doubt that women have the ability to do it. But it's very clear that the women get deflected in the early high school years, and they sort of get shunted off into more appropriate feminine career paths.

Sherkow: Yes. I've read articles that indicate that math is a masculine endeavor. So, even though girls in grade school do pretty good in math, in fact on the average better than males, they drop out or they just don't do well in high school.

Widnall: They either don't do well, or they stop taking it, or they just fall off in one way or another.

Sherkow: You feel that by educating parents about--

Widnall: I think parents--I suppose there are some high school teachers that have problems as well. You sort of hope in this day and age that there were not, but some of my colleagues have reported incidents that have happened to their daughters in advanced math classes in the high school which indicate that there is a problem with the high school math teachers, with some of them, with respect to women students.

Sherkow: I always think that things are getting better, but then [I wonder]. For example, I have a library degree, and I held a Sunday job in Arlington last year for the term that they had it. It was just a trial program. This year they are doing it too, and I went for my interview (laughs) and as I was about ready to leave, I asked the woman, "Is there anything else?" She said, "One day when you worked here last year, you wore boots." I said, "Really?" I didn't remember at all because it had been about a year. She said, "Yes. We frown upon that, and that's really bad." I just got this whole feeling of living about ten or twenty years ago. They had sent me a dress code at the time--I assume they'd sent it to everybody--which was so outdated as to be ridiculous. I mean, you couldn't even wear pantsuits. They were practically telling you to wear make-up, and

things like that. But I think that things are changing, and then things like that happen that make me feel strange.

Widnall: Well, the society is so uneven. I mean, there are parts of the society that are just way behind other parts. You have to decide--you either have to stay with the parts that are fairly forward-looking, or you have to figure out how to get into the other parts and change them.

Sherkow: Maybe the librarian field is one of those backward parts. Do you feel there's a real problem with lack of self-confidence with your female students?

Widnall: I think that's difficult to answer. We don't have a lot of women students in our deparment. They women students that I know in the Institute are the women students who tend to get involved in some of the various projects and things that are going on, and they don't seem to have a lack of self-confidence. But people talk about it all the time. I think the women graduate students that I have spoken to feel that they themselves have a lack of self-confidence. It may be that some of the women faculty have a lack of self-confidence.

Sherkow: What can be done about that with the graduate students?

Widnall: I think the best solution is to improve the environment because I think that success breeds success. I think that's the only way that people really establish self-confidence--to be successful at the things that they try to do, so that women should have opportunities to succeed at whatever it is they're doing.

Sherkow: Do you feel that the atmosphere in the engineering school as a whole is conducive to feelings of confidence?

Widnall: Well, I think that the atmosphere in the engineering school is good. On the other hand, it can be very uneven. Graduate students are local phenomena. They tend to deal primarily with a very small group of people that are in the research group that they happen to be located in. So it can be very, very uneven. In fact, some graduate students are simply left out of it, and nobody seems to realize it because everybody assumes that they are being taken care of by somebody else. But the graduate student environment is very variable. It's highly dependent on the research supervisor that you work with, and it's highly dependent on the research program and the other graduate students. In order to really improve that, you have to make sure that every possible research environment the women student would find herself in would be a good one.

Sherkow: In the many speeches that you've made for different audiences about women--let's say in engineering--what are your feelings about their reactions and raising their consciousnesses, and similar things to that?

Widnall: Well, the groups that I've spoken to are mostly high school students. I think the reaction is typically one of enthusiasm and, in a sense, non-commitment. I think high school students are very glad to get information, but they're certainly unwilling to say what it is that they're going to do with that information.

Sherkow: So you really don't know?

dnall: Well, I don't think they know, either. Listening to somebody talk

is just one small event in your whole life. It's always very difficult to say how much one thing contributes to career decision or whatever.

Sherkow: How would you summarize your personal obligations to women?

Widnall: I do two things, I guess. I try to be very good at what I do so that I will serve as an example, not so much to other women, but I think to men, that women can do competent work in professions. Then I try to get involved in whatever the women, particularly at MIT, whatever they need at any given time.

Sherkow: Do you think the case of someone like Gail Parker at Bennington has had a negative effect on women in academia?

Widnall: No, I don't think so. Bennington's a very strange place. Nothing that happened at Bennington would have any impact on MIT, except possibly in the humanities department.

Sherkow: Have you served on any government committees, especially those not dealing specifically with women's issues?

Widnall: Oh, sure.

Sherkow: A lot of them?

Widnall: Well, you can't do too much of it. But I serve on an NSF Advisory Board to the Division of Engineering. I've been a very active participant in the National Research Post-doctoral Fellowship Selections; I've done that for about five or six years now. I was chairman of the Engineering Panel last year. I've been very active in that. I'm on a panel of the National Academy which is an advisory committee to NASA. I guess those

are the formal advisory committees that I'm on. Then I do a lot of informal advising and working with people and stuff like that.

Sherkow: For a while you were associate technical editor of the Journal of Aircraft. Could you discuss why you did this, the kind of work that you did, and the time that you had to do this?

Widnall: I guess I did that for about three years. I was the editor in charge of aerodynamics, for the most part. I guess one of the reasons I did it was because it would give visibility to women. In other words, there would be a woman editor of one of these journals or an associate editor. The other reason was--as I say, I always have difficulty saying no when people ask me to do things and this seemed like a reasonable professional activity to be involved in. What it consisted of was receiving the papers from the author that were in my area and then selecting reviewers and getting reviews on these papers and then evaluating the reviews and the paper and making a decision about whether or not the paper would be published. If the paper was not to be published, I would usually have to write a letter to the author saying, "Well, you really should make the following changes," or something like that.

Sherkow: Did you like doing this?

Widnall: Yes. I liked doing it. I hardly ever sent a paper out to a reviewer that I didn't know. It gave me an opportunity to keep in touch with everything that everybody was doing. So, yes, I enjoyed it very much.

Sherkow: Did you have the time for it?

Widnall: Well, you sort of make the time.

Sherkow: Is it something that you might consider doing again?

Widnall: No. Not for the Journal of Aircraft. I might be willing to do it for another journal, but not the Journal of Aircraft.

Sherkow: You've been on several advisory committees. I guess you've just mentioned the NRC Panel and the NSF Review Panel. I don't think you mentioned the DOT/TSC Advisory Committee on Aircraft Wake Turbulence.

Widnall: Oh, well, that was an ad hoc group that just met for a few times and then--well, I guess it's still in existence, but we haven't met for a long time. These things come and go, depending on what the topic is and what's going on.

Sherkow: What about the WPAFB Division Advisory Group?

Widnall: That's another group that meets every once and awhile. That's Wright Patterson Air Force Base. That's an Air Force advisory committee.

Sherkow: So is it about the airplanes?

Widnall: Yes. It's about research and development programs at Wright Patterson Air Force Base.

Sherkow: What about the AIAA Technical Committee on Aeroacoustics?

Widnall: I'm not on that anymore. It was a long time ago that I was a member of that committee. That's not a government committee. The AIAA is a professional society. I'm on the board of directors of the AIAA. But I'm not on that acoustics committee anymore. That's a technical committee that just plans meetings and serves as a center of expertise in that

particular topic for the professional society.

Sherkow: Are you on any other ones since then?

Widnall: I can't think of-- No. That's not something that I would initiate at this stage in my career.

Sherkow: Why? Because it takes so much time?

Widnall: Well, it's not that personally rewarding. It takes time. I feel I've moved out beyond that.

Sherkow: Now you are a member of the AIAA on their board of directors. What does that involve?

Widnall: Well, being on the board of directors involves going to meetings of the board of directors. It involves the financial issues of the organization. It involves the policy issues of the organization and what projects the organization will take up. Almost all important things that the organization wants to do are brought before the board of directors.

Sherkow: This seems to be the major organization--

Widnall: In aeronautics--

Sherkow: Yes. That you're on. How do you feel about that particular group?

Widnall: I don't think it's a major organization that I'm on. The ASEB Panel is much more important than that. The board of directors is a fine organization. I mean, somebody's got to do it. I'm on it obviously because

I'm a woman. When I ran for the board of directors I was running against another woman which really annoyed me because I felt that the nominating committee, in putting two women up for the same position, was very clearly doing it to get to a woman on the board of directors.

Sherkow: But you ran anyway.

Widnall: Well, I didn't know at the time that my opponent would be another woman. I just was asked to run, and I said, "Sure, I will."

Sherkow: You're also a member of the Space and Aeronautics Board of NAE.

Widnall: No. NAE, National Academy of Engineers.

Sherkow: Is that the same kind of situation where you're just deciding on the major policies?

Widnall: No. That's an advisory committee to NASA. But it's an advisory committee to NASA upper management, rather than an advisory committee to any specific research project. We review lots of NASA programs and comment on them.

Sherkow: Do you feel that that's important?

Widnall: Yes. That's important. Besides, they pay your travel (laughter).

herkow: I'm not sure if you mentioned this before, but this Lawrence Sperry Award in 1972--what did you get that for?

Widnall: I got that for--it's on the wall over there--contributions to the understanding of vortex flows. It's for fluid mechanics. This year I'm chairman of the Lawrence Sperry Award Committee. In fact, I've just finished

selecting the new awardee.

Sherkow: How did you feel about that?

Widnall: Oh, I was very excited about that because it's a very nice award to have received. In fact, if I had known there was such an award, I would have run for it. (Laughter) But I didn't know anything about it. It came as a complete surprise.

Sherkow: In 1974 you also got the outstanding achievement award of SWE [Society for Women Engineers].

Widnall: Yes. This year I'm the chairman of the SWE Awards Committee, so I'm doing these two things this year for awards that I've won previously.

Sherkow: How do you feel about that particular one, the SWE award?

Widnall: Well, I think that was also a very nice award.

Sherkow: Now you're a member for life.

Widnall: Yes. I'm a member for life. I think that's a good organization. They've certainly done a lot. It provides a good forum for women engineers.

Sherkow: Now you also have had invitations to participate in international conferences in England and Poland. You note that in your biography. Could you talk a little bit about why they're special and you feel that they're important?

Widnall: I think the one in England was special because that's a Euromech Symposium, and Americans are not generally invited to Euromech Symposia. In fact, they usually exclude them. So that particular invitation was a

very important invitation because in order to receive it, myself and another person from Cal Tech had to pass before some official Euromech review board to get special permission for us to be invited.

The Polish meeting is just typical of many international conferences. It's a meeting that's held every two years in fluid mechanics. It's a very good meeting, and lots of good people go. But it's really open to everybody. Anybody could go.

Sherkow: Why does the English conference tend to exclude Americans?

Widnall: That's the way they set it up. They felt that they wanted something distinctly European and that if they included Americans, the Americans would simply swamp it because there are generally so many Americans that are doing research in any given field. So they specifically made it a European conference.

Sherkow: So how did you get on it then?

Widnall: Well, I was doing work in the area that they were holding the symposium on, and the work couldn't be ignored, so they had to invite me.

Sherkow: What was that like when you were over there?

Widnall: It was a lot of fun. I knew most of the people at the conference. There was a good meeting.

Sherkow: When you went there, did you go alone?

Widnall: No. I took my son. He was nine. We were over there for three weeks and traveled--we were in Poland for a week, and then we went to France and went on a holiday for a week. Then we went to England to the other conference.

Sherkow: What was this Polish conference like? The Polish Academy of Sciences.

Widnall: Yes. Polish Academy of Sciences. It was a very good meeting. They had very good people there. We were there for a whole week, and it was a very enjoyable conference.

Sherkow: Did you present papers at any of these?

Widnall: Both of them. When you're at a conference, you're supposed to present a paper. If you just go to listen, you're sort of only half there.

Sherkow: This year you're on the Selection Committee to choose the American Delegation to this Polish--

Widnall: No. That was two years ago. We had a committee with some NSF travel money, and we were able to pay the air fare of about ten Americans to go to this meeting.

Sherkow: So which committee are you on this year? Is this the England--

Widnall: Oh, no. This year, there's nothing going on.

Sherkow: Do you normally go to several conferences a year?

Widnall: Yes. Not several--maybe two. I don't like to travel too much.

Sherkow: Do you think they're beneficial?

Widnall: Yes.

Sherkow: As an exchange of information?

Widnall: Yes, partly that, and partly to find out what other people are doing and talk to other people. The papers presented are only about half of what goes on at a conference. The other half is what you find out talking to people in the coffee breaks--find out what they're doing and what they're going to be doing next year, or who did what, that sort of thing.

Sherkow: Does it cause any kind of inconvenience to your family when you go on these?

Widnall: No. I don't think so. I mean I can't stay home all of the time.

Sherkow: How did you feel about being on the Selection Committee to choose the American Delegation to the Polish Conference?

Widnall: I felt fine because that meant I would definitely get to go. It was fine. It's just a recognition by my peers that when somebody thinks of a fluid dynamacist on the East Coast, that I'm one of the first people that they might think of. The Selection Committee has one person from the West Coast and one person from the Midwest and one person from the East. This is a fairly informal thing. It's a little like the womaen's faculty movement. It's an informal group of people who are loosely connected because they work in the same field. A large part of being on this sort of committee is the fact that you volunteered to do it. The other sense is that your offer to do it was accepted in some sense by the community.

Sherkow: How do you feel now that everything has turned out, for lack of a better word, in terms of your expectations as matched against the realities of your life up to this point?

Widnall: I'm very happy. I enjoy what I'm doing. My only desire at this point is to continue to do good work in fluid mechanics. That's my professional ambition. Then everything is going very well with my children and my family. I am enjoying that a great deal. So that's very gratifying. So I would say that I'm very, very happy and that everything is going very well and that I can only anticipate that that will continue.

BEGIN TAPE FIVE, SIDE TWO

Sherkow: Please discuss the expectations that you had throughout life and then the actual outcome of whatever you did.

Widnall: I guess I'm very flexible. I don't plan terribly far ahead. I don't have any rigid idea of what the next ten years are going to be like. I don't plan very far ahead. I always seem to enjoy whatever it is that comes along. So what I'm doing now is probably very much different from what I thought I would be doing when I was in high school. But that's no particular reason to try to reconcile those two different views because what I'm doing now is what I'm doing now. It really has no relationship to what I thought I might be doing.

Sherkow: What are your personal assets and capabilities that you are most proud of?

Widnall: I think my strongest quality which is not all that useful in the work I do is the ability to get the job done. I usually organize and administer things pretty well when I'm interested in what's going on. I always seem to be able to do that pretty well. When I say it's not useful--it's certainly a useful skill. On the other hand, if I had to choose the

skill I would most like to have, I guess I'd like to be better in doing research in my field. In other words, if I really could trade that for simply being a better mathematician or being more intelligent or anything, I think I would do that. I guess one is never intelligent enough for the demands of one's field. But if I had to choose, that's what I would like to be. On the other hand, I do have the ability to get a lot of different things done. That's a useful skill. I also have a skill of what you might call useful neglect in the sense that if I think something is not really that important I'm simply able to neglect it until it finally goes away or withers and shrivels, so that if I have a lot of things undone, it doesn't bother me if I think they're not really that important. If you don't have that, then you end up feeling much too busy, and then you're constantly frustrated.

Sherkow: What do you feel are the most important discoveries that you've made?

Widnall: I think it's very difficult to capsulate that. I'm sort of a typical worker--toiler in the vineyards, I guess you might say. I work in a certain field of fluid mechanics, and I've done several different things that I think are nice. I don't think any of them are earthshaking or revolutionary the way every once in a while something will come along. On the other hand, I think the work has been good, and I think it's been competent. We've done some very nice work on the vortex rings. We've done some work on noise that I think is very nice. But I see my work as something that I do primarily for my own enjoyment. So I often don't carry a problem as far as maybe society would like to see it carried just because I don't enjoy doing it all the way.

Sherkow: When you say noise--

Widnall: Aerodynamic noise, helicopter noise.

Sherkow: What are your personal goals now in life?

Widnall: When you say personal goals, are you referring to professional goals, or do you really mean personal goals?

Sherkow: I would think both professional and family, personal. They have to be differentiated to a certain extent.

Widnall: I think they're very modest. I don't really plan ahead. What I try to do is live my life in such a way that I always enjoy what I'm doing. I guess my professional and personal goals would be to continue to enjoy what I'm doing. I really have no way of knowing where that will take me.

Sherkow: Do you anticipate staying here at MIT?

Widnall: Yes. I would anticipate that what I will do, is I will stay at MIT and that I will do research in fluid mechanics. I will try not to get sidetracked off into administration or worrying about some things such that it takes away from my own personal research. But I guess I do see making some sort of a transition at some point into university administration, but I really don't know what the shape of that would be. But I'm not really concerned about it now because I don't want to do it now.

Sherkow: Are you thinking of twenty years or thirty years from now?

Widnall: Let's see. I think I'll be retired in thirty years, so it can't be thirty years. Well, twenty--yes, twenty years from now, or fifteen. I mean, I really don't know. Or maybe even government service for that matter, depending on what happens and what looks good and what I decide to do.

Sherkow: What about your own personal goals and your family goals?

Widnall: Well, I enjoy my family. I enjoy it in a small-scale way; I enjoy each day. I don't have any really long-term goals for the family. I just hope everybody stays healthy and happy and enjoys what they're doing.

Sherkow: So you anticipate being at MIT and living in this area then?

Widnall: At least for the near future, certainly.

Sherkow: What kind of outside reading activities do you have? Do you have much time for that?

Widnall: I think that varies a lot. Sometimes I do a lot of reading, and sometimes I'm just too busy to do very much at all. I haven't done too much lately, although that's sort of unusual. I guess I've been doing a lot with music lately, and that's where the time has gone.

Sherkow: Do you play a musical instrument?

Widnall: Yes. I play the harpsichord.

Sherkow: When you do read, do you read non-fiction or fiction?

Widnall: I generally read non-fiction. I don't enjoy fiction, particularly.

Sherkow: What is a typical week like for you in terms of entertainment and recreation?

Widnall: I guess the first thing to say is there are no typical weeks. We just don't do the same things all the time, so it's really very hard to say. We like to do things as a family. We usually spend weekends together, all of us together, doing something. In the wintertime we may go skiing or Bill may go sailing on Sundays in the wintertime. In the summertime we may all go sailing or racing on Saturdays. We may get involved in some social activities with our sailing friends. Many of our close friends are sailing friends. There may be a party or a dinner or something like that. Or we'll come back to the house and feed the crew, or something like that.

Sherkow: Do you go out much to movies and plays, and things like that?

Widnall: That varies a lot. Sometimes we go through cycles where we go to a lot of movies. Other times we say, "Well, there's really nothing to go to," so we won't bother. Or we go to concerts. There are lots of things to do, and we don't do the same things every week. Or we may call somebody up and say, "Meet us at the Chinese restaurant for dinner," or we may have somebody over for dinner.

Sherkow: Do you go camping as a family?

Widnall: We don't do it here. We do it on the West Coast. In the summer we go to Seattle where my parents live, every summer for about a month. They have a cabin in the Cascades, so we spend a whole month there. We do a lot of camping and hiking and horseback riding and sailing and all

sorts of things.

Sherkow: That's nice. Do you participate in clubs and community activities?

Widnall: No. My husband does. He's a member of Town Meeting, but I'm really much too busy to get involved in that sort of thing.

Sherkow: Would that go too for entertaining people, having people over?

Widnall: We do a certain amount of it. We don't do a lot. For instance, I'm sure we'll have a Christmas party. We'll probably have a Christmas party for Bill's group. Bill has a group of about thirty people working for him, so we'll probably have a Christmas party for them. Last night we went to a departmental dinner at Endicott House. I don't ever have dinners for my colleagues--at least, very rarely. I have one or two colleagues that I might invite over for dinner, but I don't do departmental entertaining. The department has enough social events that everybody can get to them. We don't go out of our way to entertain people in the department. But we have another set of friends who live in Lexington, neighbors, and we may invite them over, generally on a very impromptu basis; just call them up and see what they're doing for dinner and if they want to come over, or something like that.

Sherkow: Do you have a large house?

Widnall: Yes. We have a large house.

Sherkow: Are you, or have you been politically active at all?

Widnall: No. I would put that in the same category as community activities.

Sherkow: Thank you so much for these interviews.

END OF INTERVIEW