SHIRLEY TILGHMAN INTERVIEW
MAKERS: WOMEN WHO MAKE AMERICA
KUNHARDT FILM FOUNDATION

Shirley Tilghman
Molecular Biologist
9/14/2011
Interviewed by Nancy Armstrong
Total Running Time: 55 minutes and 27 seconds

START TC: 00:00:00:00

ON SCREEN TEXT:
Makers: Women Who Make America
Kunhardt Film Foundation

ON SCREEN TEXT:
Shirley Tilghman
Molecular Biologist

Shirley Tilghman

Molecular Biologist

00:00:13:00

NANCY ARMSTRONG:
So, we'll start out just talking about your childhood. If you could just tell me, where you grew up, what your childhood was like, what your family was like.

00:00:21:00

SHIRLEY TILGHMAN:
So, I grew up in Canada. I was born in Toronto, but my father worked for the Bank of Nova Scotia, so we moved all over the country. Ended up going to high school in Winnipeg, Manitoba, in the third coldest city on the planet, and had a wonderful childhood. I had two sisters, I had parents who were wonderfully supportive, and there was nothing about my childhood I would change at this point.

00:00:49:00

NANCY ARMSTRONG:
Did one or other of your parents have more of an influence on you?

00:00:53:00

SHIRLEY TILGHMAN:
I think my father had more of an impact than my mother. I think he is the person who gave me my self confidence, which I think is one of the greatest gifts that you can give a child, is to give them confidence that they can do what they set out to do and, and the ability to like yourself.

00:01:13:00

NANCY ARMSTRONG:
What kind of things were you interested in as a little girl that were unusual?

00:01:17:00

SHIRLEY TILGHMAN:
Probably the most unusual thing was math. I was in love with numbers from the first time I can remember what it was like to be a child. My father used to do mental math puzzles with me before going to sleep, rather than reading me books so… And he claims it was not his idea, it was my idea. So, I think that's probably one of the more unusual things about what I liked. The other is that I grew up playing golf, because my father was a golfer and if I wanted to spend any time with him, I had to learn how to play golf.

00:01:50:00

NANCY ARMSTRONG:
So, is that when you knew you were good at math, had an affinity for math or science…

00:01:54:00

SHIRLEY TILGHMAN:
I always loved it, and I don't ever remember not loving it, so I think I grew up fascinated with puzzles, and any kind of a puzzle. You name it, I'm a sucker for it, and that, I think, did feed into this sense that doing something with numbers was likely to be in my future.

00:02:15:00

NANCY ARMSTRONG:

Were there any other defining moments during your adolescence or teenage years that sort of crystallized your path or your expectations for your life?

00:02:25:00

SHIRLEY TILGHMAN:

I often say that the person who probably had the biggest influence in my teenage years was a history professor, or teacher I guess, he was at the time. A man named Lionel Orlikow, who was an extraordinary man, and the most important thing that he did was to say to me at the beginning of high school, "I think you're smart. I think you're… you could do something with your life but you're not going to do it unless you wake up and understand that the world is much bigger than your little neighborhood in Winnipeg, Manitoba.-

00:03:01:00

-You're going to have to open your eyes, open your mind, become far more curious than you are," and then he helped me do all those things. And I often think that if it weren't for Mr. Orlikow, I don't know where I'd be today but I'm pretty sure it wouldn't be president of Princeton.

00:03:19:00

NANCY ARMSTRONG:

So at that point, did you have a sense of your own power? Did you know what you could accomplish in the world even though you were female?

00:03:26:00

SHIRLEY TILGHMAN:
I don't think I really had a sense at the age of 17 or 18. What I did know is that I was not willing to accept that there were things I couldn't at least try. And this was something that my father had been very important in instilling in me, that if this is something you want to try, go for it. Don't let anybody tell you that you can't do that. But like all 17 or 18 year old girls, I had no idea whether I'd be any good at any of these things that I wanted to try, but I was willing to take a shot.

00:04:01:00

NANCY ARMSTRONG:
When you were growing up, did you notice that boys and girls were treated differently? Were you cognizant of gender differences?

00:04:09:00

SHIRLEY TILGHMAN:
I didn't really notice gender differences when I was in high school. I think I had an equal number of very good friends who were boys, who were girls. I didn't feel that that was getting in the way of anything that I was choosing to do as a high school student. But I was aware that there were external expectations that were different than the messages I was given at home.

00:04:33:00

For example: guidance counselor. Toward the end of high school, we were all given tests and mine…. when I came to my interview with the guidance

counselor, the guidance counselor said, "You came out very well on these tests. We think you'd make an excellent executive secretary." And when I went home and told my father this, he just about exploded; that their notion of what would a very successful girl's future be, it would be to be not just a secretary, but an executive secretary.

00:05:07:00

And I remember that being treated in the family as a joke, as opposed to something that was supposed to be discouraging to me.

00:05:18:00

NANCY ARMSTRONG:
So, what else about school—you did very well in school obviously, what did it mean for you to do well?

00:05:25:00

SHIRLEY TILGHMAN:
Well, I think it gives you confidence. If you do well at anything, I think you gain confidence in yourself and your ability. So I think I left high school a reasonably self confident young woman, believing that if I tried hard and worked hard, I could achieve something in life.

00:05:44:00

NANCY ARMSTRONG:
Was there any particular reason that your family moved to the US?

00:05:48:00

SHIRLEY TILGHMAN:
They didn't move to the US. I moved to the US.

00:05:51:00

NANCY ARMSTRONG:
And how did that happen?

00:05:52:00

SHIRLEY TILGHMAN:
So after university, I went to Sierra Leone, West Africa for 2 years, and I taught high school in a little upcountry village school and met a Peace Corps volunteer, and that's how I got to the United States.

00:06:07:00

NANCY ARMSTRONG:
Can you talk a little bit about your postdoctoral studies at the National Institute of Health?

00:06:14:00

SHIRLEY TILGHMAN:
After graduate school, I was looking for a postdoctoral fellowship in the field of molecular biology and the person who I had chosen to work with, who I

desperately wanted to work with, was a wonderful man named Philip Leder at the NIH. So, I interviewed with him and I suspect the only reason that he accepted me into the lab was because I was Canadian, and he had a fellowship that had to be used for a foreign postdoctoral fellow.

00:06:44:00

And so I fit the bill exactly. I had an absolutely spectacular wonderful time in his lab and he's become the mentor who's stayed with me for the rest of my career.

00:06:56:00

NANCY ARMSTRONG:
And you were part of a laboratory that accomplished something historic, can you talk about that?

00:07:01:00

SHIRLEY TILGHMAN:
So while I was a postdoctoral fellow, I was part of a small team in Phil's lab that was trying to isolate and clone the first mammalian gene. At that time, we knew very little about what genes looked like. We didn't know anything about their structures and the only way we were going to learn, is we were going to have to figure out how to purify a single gene. And so, another postdoctoral fellow named David Tiemeier and I figured out the technology for how to do that, and then we did it, and it was a real breakthrough in the field.

00:07:35:00

NANCY ARMSTRONG:
Did you know at the time, that it was- how historic it was?

00:07:41:00

SHIRLEY TILGHMAN:
I knew at the time it was a really important discovery and that was, like, the biggest… rush, you can imagine.

00:07:52:00

NANCY ARMSTRONG:
And how did your career in science evolve after that?

00:07:55:00

SHIRLEY TILGHMAN:
So when I left the National Institute of Health, I went to the Fox Chase Cancer Center in Philadelphia. And there I began working on how genes work during early development in mammals. So when you go from a fertilized egg to a 8-cell embryo to a many thousand cell embryo how, how does that program get orchestrated? How do genes turn on, how do the wrong genes turn off?

00:08:25:00

And how do they know where they are in both time and space, and that's an area that I worked on really for the rest of my career, one way or another.

00:08:35:00

NANCY ARMSTRONG:
Were there any significant findings that were noteworthy at that point?

00:08:41:00

SHIRLEY TILGHMAN:
So one of the things that the laboratory discovered is that, when a gene is expressed in multiple places, at multiple times, in multiple tissues, the regulation of that program is often accomplished by having many, sort of, regulatory sequences in DNA, each one that activates at its own particular time and place, and that had not been understood until we did our work.

00:09:12:00

The other major discovery that we made in the laboratory was to discover the mechanism for an extremely unusual genetic phenomenon called genomic imprinting. This is a phenomenon where roughly 50 or so genes in the mammalian genome are only expressed when you inherit them from mothers. And there is roughly another comparable group of 50 to 100 that are only expressed when you inherited them from fathers.

00:09:43:00

And we were the first to figure out how that actually works, what are the mechanisms that underlie that phenomenon.

00:09:51:00

NANCY ARMSTRONG:
So that brings you to your next career stop, which was your journey to Princeton. Can you talk about how that came to be?

00:10:00:00

SHIRLEY TILGHMAN:
I decided, roughly in the mid 1980s, that I had to simplify my life. I had two small children. I was a single parent. I was living in a big city, Philadelphia, and I was spending 2 hours a day in the car, driving between nursery schools and kindergartens and my work. And I started looking for a place where I could work and combine raising my beautiful children, without the kind of stress that was on me at the time.

00:10:36:00

And happily, I received an offer from Princeton and in 1986, moved to Princeton where I lived 3 minutes from work, 3 minutes from the primary school, and 3 minutes from the pediatrician. And I could do my science in one of the world's great research universities. So this was heaven sent.

00:11:00:00

NANCY ARMSTRONG:
So 1986, what was the first thing you were doing when you arrived there?

00:11:03:00

SHIRLEY TILGHMAN:

I was learning how to be a professor, so I was running a laboratory, which at the time was someplace between 15 and 20 people, I was raising money so that we could do research, and I was teaching undergraduates and graduate students at Princeton, and it was a wonderful life.

00:11:22:00

NANCY ARMSTRONG:
You became a founding director of a multidisciplinary Lewis-Sigler institute, what did you do with that?

00:11:29:00

SHIRLEY TILGHMAN:
So in 1998, the president of the university at the time asked if I would found a genomics institute, basically an institute that was going to take advantage of the fact that we had just, or we were about to sequence the human genome, and that was going to open up a whole field of biology that was inaccessible until we had those sequences.

00:11:50:00

I thought that was a really exciting idea and a really exciting thing to do, so I began plans for building a building, and hiring faculty and raising money for the institute, and doing things that are not so dissimilar from what I am now doing.

00:12:07:00

NANCY ARMSTRONG:
So, how did that evolve after- Did that project get going? What were the major accomplishments?

00:12:14:00

SHIRLEY TILGHMAN:
So the project did get going. We got two really wonderful gifts that allowed us to fund both the program of the institute, and to begin to build the building. I began hiring the faculty and, and it was then in 2000, when I was asked if I wanted to run to be on the search committee to identify the next president of Princeton.

00:12:42:00

NANCY ARMSTRONG:
And how did that turn out?

00:12:44:00

SHIRLEY TILGHMAN:
Well, I think only history is going to be able to answer the question of how well that turned out. I had been on the search committee for about 4 months, and had originally agreed to be on the search committee because I was eager to have a president who understood what I was trying to do in the new genomics institute and would be supportive of what I was doing. The last

thing on my mind, and literally the last thing on my mind, was that this committee would consider that I should be a candidate.

00:13:17:00

But four months into the search, they asked if I would be willing to think about it, and they gave me a week to think about it, and at the end of the week I had to let them know whether I was going to stay on the committee or whether I was going to leave and become a candidate. And after a soul searching week, I finally decided that I would like to be considered.

00:13:37:00

NANCY ARMSTRONG:
What was the content of your soul searching? What was the most difficult decision there?

00:13:41:00

SHIRLEY TILGHMAN:
I think there were two things that I had to think hard about, as I approached the question of whether I wanted to be a candidate for the presidency. The first was, would I like doing it? I really loved my life. I loved what I was doing. So I was trading something I knew for something that was a little mysterious to me. The second, would I be any good at it?

00:14:06:00

Because the last thing I wanted to do to an institution that I loved and had been very good to me, would be to become its president and not do well by

the institution. So, the second question, I had a very good friend on the committee, named Alan Krueger, who said, "You're not to worry about the second question. That's the search committee's problem to figure out if you're going to be any good at it. Stop worrying about that. Just worry about whether you would like doing it."

00:14:38:00

And after a week, I decided that I had probably done the very best science I was ever going to do, and that I had a chance to do something utterly different that might really make a difference for Princeton if I did it well. And that seemed compelling to me.

00:14:58:00

NANCY ARMSTRONG:
And how was the transition?

00:15:00:00

SHIRLEY TILGHMAN:
It was an interesting transition. You're rewarded in science for knowing an enormous amount about a tiny little swath of the world. You're rewarded as a president by knowing a little about a great big swath of the world, certainly the world as represented by the university, so it took me some time to understand that difference, and to stop trying to micromanage-

00:15:29:00

-and know absolutely everything about every aspect of the university down to where the paper clips are stored. Once I understood that that was not a realistic way to run the university, and once I started to know who I could trust, the transition got a lot easier.

00:15:48:00

NANCY ARMSTRONG:
And what was it like being the first female president of Princeton, and one of the few female presidents of an Ivy League institution?

00:15:57:00

SHIRLEY TILGHMAN:
In the first few weeks after I was named president, I was very cognizant of the fact that I was the first woman and one of the handful of women presidents of the big research universities. And the reason is that I was being asked about it all the time. Once that died down, I think it really stopped being an issue with me, and I had to get on with the task of being as good a president as I could possibly be.

00:16:26:00

NANCY ARMSTRONG:
What do you think, as a woman, you bring to the job? And what are your highest priorities for the job?

00:16:33:00

SHIRLEY TILGHMAN:

One of the things that I think I bring to the job of president of the university is a strong belief in consensus building, as the best way for universities to go about making decisions. And the other I think is a steep feeling of empathy for people's aspirations. So what I often say to my colleagues, the people in the cabinet, is our job is to try and get to yes.

00:17:05:00

When people come to us with things that they want to do for the university, whether these are students or faculty or staff or alumni, our job is not to try and turn those things down, but if they are really things that make sense, our job is to try and get to yes. And I think that's helped in the ten years, to encourage people to come forward with really good ideas.

00:17:35:00

NANCY ARMSTRONG:

So, we talked about this before, but I just wanted to touch on the essence of the issue of what the Harvard president said about girls and science, and what your response was to that, and why?

00:17:49:00

SHIRLEY TILGHMAN:

So, when Larry Summers spoke to a group of social scientists at Harvard, and offered a number of hypotheses to explain the fact that there are fewer

women mathematicians than would be predicted based on their representation in the population, and that there are fewer women at the very highest level of mathematics.

00:18:16:00

I think the concern that I had was the degree to which he represented these hypotheses as though they were all equally likely. When in fact there is an enormous body of social science research, which was well known to this audience in fact, that demonstrates the many ways in which our culture is disinclined to support women who are interested in mathematics, interested in science, interested in doing more quantitative work.

00:18:49:00

There, there's a huge body of evidence. There is very little evidence, that it is genetically ingrained in men and women, one to be stronger in mathematics, men to be stronger in mathematics. And by treating these as though they were equally likely, I think, was simply misrepresenting what we knew about the question he was posing.

00:19:14:00

NANCY ARMSTRONG:
And there was an investigation at MIT, that sort of looked into, not so much girls and science, but discriminatory practices and attitudes for women and men. What did that study find and what did you do in response to it?

00:19:30:00

SHIRLEY TILGHMAN:
So this- There was a study at MIT in 2000, that was spearheaded by a group of women faculty, but then really embraced by Chuck Vest who was the president at MIT at the time, that literally documented the many ways in which women faculty at MIT were being disadvantaged by the institution, and by the way the institution treated its male and female faculty.

00:19:56:00

And I give Chuck Vest enormous credit for having the courage to admit that these were things that were being done at MIT. Now what that study then did was initiate and catalyze studies all over the country in similar institutions, including Princeton, where those findings were actually replicated. So this was not an MIT problem. This was a problem that was seen across academia. I was one of the faculty at Princeton who had been on a committee that responded to the MIT study,-

00:20:31:00

-and one of the first thing I did as president was then put in place a committee that really identified all the ways that Princeton was disadvantaging women faculty, and then doing some things about it to make sure that we didn't do it in the future.

00:20:46:00

NANCY ARMSTRONG:
What kind of things?

00:20:48:00

SHIRLEY TILGHMAN:

Well, for example, we now follow literally on a yearly basis, we follow salaries. Men and women faculty, not just in the sciences anymore, we do it across the entire university. We look at things like space allocation. So are men getting more space than females? We look at nominations for prizes. We look at nominations for things like named honorary chairs.

00:21:13:00

We look at the gender of individuals who are being nominated to be on the university's most important committees, the committees that ultimately make some of the big decisions. All of these are things that were disparate in the past, and we now know that they are really being equally distributed today.

00:21:35:00

NANCY ARMSTRONG:

What are some of the disparate experiences of men and women in male dominated professions, as well as some of the worrisome trends of women in science?

00:21:45:00

SHIRLEY TILGHMAN:

I think one of the greatest concerns that I have in 2011, 10 years, 11 years after the MIT study, is the continuing discrepancy between the number of

men and women, particularly in what are often called the more hard sciences. And here we're talking about physics, mathematics, some branches of engineering, not all branches of engineering but some branches.

00:22:13:00

And what I've seen is that we made real progress in the 70s, the progress then accelerated again in the 90s, but in the 2000s, the increase in the percentage of women in these hard sciences has really slowed down a lot and we are really trying to understand why that is.

00:22:33:00

NANCY ARMSTRONG:
Do you think it's complacency that we've made all these gains and we've hit a plateau?

00:22:38:00

SHIRLEY TILGHMAN:
I think it could be complacency. I have a good friend who is an astrophysicist who says that attention must always be paid, that there is no alternative but to constantly be working on these issues. We're just not where we need to be, at a place for example where we can just stop paying attention altogether.

00:23:03:00

NANCY ARMSTRONG:

What are the most compelling arguments for women's participation in science and what are the current challenges?

00:23:10:00

SHIRLEY TILGHMAN:

I think the biggest argument in favor of continuing to try and increase the number of women in science in general, is that you bring a diverse perspective into the field. As much as I believe that women and men do science exactly the same way, the scientific method is immutable, I think what interests men and women is different. And so the variety of questions that are being asked, the variety of problems that are being solved, are going to be different, if you have women who are really actively engaged in the field.

00:23:45:00

I think that's the number one reason, so it's pure self interest to have more women in the field. The second is also, I think, pure self interest. And that is as women become better and better represented in so many other areas, science is going to start looking really anomalous, and I think it's going to be less attractive in the long run to young men who sees the field of science as a field of where, it just doesn't look like other fields of endeavor.

00:24:17:00

And then I think the third is just a real argument of social justice. That if we as a society are doing things that are discouraging women from following their passion, that is unjust and we should be lowering those barriers and giving women free choice, without all of those subliminal messages that are

often sent to women that say, “Oh, this is something women are going to be good at and should think about doing, and these are other things that you should probably just leave alone.”

00:24:50:00

NANCY ARMSTRONG:
And where does that solution start?

00:24:52:00

SHIRLEY TILGHMAN:
One of the things we’ve learned as we’ve studied the pipeline is that there is literally no place in the pipeline where you can’t do good work in encouraging women to continue in science and in mathematics. So for example, we know that in most universities, there are more women who arrive at university, interested in careers in science than there are that graduate. And that is our responsibility to understand why that is so,-

00:25:21:00

-and to think about ways in which we can reverse that loss of women which is hurtful at the undergraduate level. If you go back though and ask where are the seeds of doubts really sown, they are sown very early in life I think. They are sown by having a kindergarten teacher or a third grade teacher who is afraid of science and who conveys that fear of science to her students.

00:25:53:00

It's conveyed by having people who fundamentally believe that girls are not good at math and so have set very low expectations for how girls will do in mathematics in high school, for example. So I think there is no place in the pipeline. We will not be able to really do good work. And so I don't think universities are off the hook on this at all.

00:26:19:00

NANCY ARMSTRONG:
You've taken some heat for your high level appointments at Princeton, how have you responded to that and why do you think that's happening?

00:26:26:00

SHIRLEY TILGHMAN:
So, the heat that I took for some of my early appointments of extraordinary women at Princeton was frankly mystifying to me. Just mystifying, and there were two parts to my mystification. The one is that people couldn't do the math. If you actually looked at how many men I was appointing, how many women I was appointing, I was appointing roughly equal numbers of both, and yet no one was paying any attention to the men I was appointing.

00:26:54:00

They only were focused on the fact that we had our first female dean of engineering, or the first female dean of the Woodrow Wilson School or school of public policy, or our first female dean of admission. So that was mystifying. People who just were not really paying attention. What mystified me the most

though is that some of the criticism and, and the accusation that I was practicing affirmative action, was being made by female students at Princeton.

00:27:27:00

This is a university where 50% of the student body are women. These women are being drawn from the very best pools of students from around the world. Surely, they believe that women should be qualified for these positions, and yet they too were suggesting that the fact that I was appointing so many women must be a sign that I was actually practicing affirmative action.

00:27:56:00

NANCY ARMSTRONG:
Why do you think that is? I know you said you were mystified, but is that that generation's lack of understanding about where we've come from, in terms of what women have been able to do? Why do you think that is? Why is there some either ignorance or complacency about that?

00:28:09:00

SHIRLEY TILGHMAN:
Well, when I'm being kind, my hypothesis is that this generation of young women, the 18 to 20 somethings, have so internalized the women's movement, so come to believe that gender doesn't matter, that they just don't pay attention to gender until something like this happens,-

00:28:38:00

-and then, what they often said to me when I said, “How can you believe this?” They would say, “Well, we don't see other university presidents appointing that many women to their cabinet, so that suggests that you are unusual in some way.” As I said, I found it mystifying then, I find it mystifying today.

00:29:02:00

NANCY ARMSTRONG:
Okay, we’re going to change topics. I wanted to talk about—and you’ve talked a lot about this—the work-family challenge. First, start from your expectations. Did you grow up that marriage was a given, and how did that view evolve?

00:29:15:00

SHIRLEY TILGHMAN:
I think I did grow up thinking that I would get married and that I would have children. I came from a very happy home and I think that was my expectation.

00:29:26:00

NANCY ARMSTRONG:
And then, you were married, you worked for a period of time during your marriage probably. Can you tell me about that early piece of time when you were first married?

00:29:35:00

SHIRLEY TILGHMAN:
So, after I was married, I was in graduate school and then worked for 7 years before making the decision to have a child. And that wasn't an easy decision. I will say that, by that time I understood what life as a scientist looked like, I had very few role models, women who had very successful careers and had raised children,-

00:30:05:00

-and so, it would have been foolish had I not paused at that point and said, is it really possible to do both and should I really embark down that path. The person who really saved me was the person who saved me so many times, which was Phil Leder, my mentor at the National Institutes of Health. When I called him to say, "Phil, I need to talk something over with you," and I told him that I was thinking about not having children.

00:30:33:00

He said, "Are you crazy? Of course you should have children. Don't let anybody tell you you can't do that. Of course you can do it." And that's what I needed to have the confidence to know that one way or another, by hook or by crook, I would find a way to combine them both.

00:30:50:00

NANCY ARMSTRONG:
You ended up getting divorced and were left with two small children and this, kind of at a thriving point of your career, it was really on the rise. How

difficult was it to balance? Were there sacrifices and do you remember focusing on one at the expense of the other, and how did you work that out?

00:31:08:00

SHIRLEY TILGHMAN:
So, the early days of raising two children and having, what was a sort of a rising scientific career, those were challenging days, I will say. I am not entirely convinced that I really could have recognized how challenging they were at the time. In a way, I think I was in complete denial, and I was sort of living on a day to day mentality.

00:31:35:00

Well, this is what we need to do to get through today and I'll worry about tomorrow, tomorrow. I think it was actually probably a very good, healthy way to proceed. In terms of sacrifices, I think the main thing you sacrifice is variety. Now, you have to give up some things. And to give you trivial examples, you don't take pottery classes when you have a challenging job and you're raising children.

00:32:06:00

You don't talk long walks with friends on a Sunday afternoon. There are just great pleasures in life that you have to decide are things that you're going to hold off until a different stage of your life. And if you love your work and you love your children, those don't even feel like sacrifices.

00:32:28:00

NANCY ARMSTRONG:
Did you have help?

00:32:30:00

SHIRLEY TILGHMAN:
I did not have live-in help when I was raising my children, but I certainly had a network of college students and middle aged women who were just extraordinarily important in this juggling that went on.

00:32:49:00

NANCY ARMSTRONG:
If you had to do it again, would you do it differently? What advice would you give to someone in that exact same position today coming to you and asking you, "How exactly am I going to set this up?"

00:32:58:00

SHIRLEY TILGHMAN:
If I had to do the whole thing over again, I would marry better. And then I would have live-in help if I could afford it. And I realize that that's an option for only a small number of women in our society who are juggling family and work, but I think that it does, now that I know many women who've had that luxury, I can see how it made their lives that much easier.

00:33:28:00

NANCY ARMSTRONG:
I wanted to, on that, talk about- There was a Harvard study that found that about a third of the women with advanced degrees that graduate make a choice to be stay-home moms. And I wondered what you thought of that study, and why are women's careers dropping off at that point?

00:33:45:00

SHIRLEY TILGHMAN:
My understanding from the Harvard study that looked at what women with advanced degrees were doing following graduate school, is that it was very field specific. For example, my understanding is that medicine, for example, is a field that seems very accommodating for women physicians. Some of them may choose to be in practices that have very flexible hours. There's just greater flexibility,-

00:34:14:00

-and so I think actually, medicine is a great success story for women staying in the workplace. The numbers that I remember seeing, that are the most troubling are business school, where I think the numbers were at least a third if not more by the age of 40, women who had attended major business schools had dropped out of the workforce. I think there are a lot of possible explanations for that, but one one of them that I think is really worth thinking hard about, is whether the women enjoy their work.

00:34:47:00

Because if you are in this juggling act, and you don't just feel passionate about your work, and if you are lucky enough to be in a position where you don't have to work, I can imagine being very tempted to just say, for the time when my children are going up, given that I'm given no satisfaction and no pleasure out of going to the office every day, I am just going to drop out.

00:35:15:00

NANCY ARMSTRONG:
Do you think it's tied to knowing that you won't get to where you want to go if you make that sacrifice?

00:35:21:00

SHIRLEY TILGHMAN:
That may be part of the lack of pleasure. I don't understand the business world the way I understand the academic world, which I think by the way is a world that is very welcoming to women right now, but I think it is very possible that the kind of frenetic demands that high level business positions often place on individuals—being available at the drop of a hat,-

00:35:50:00

-or being sent to Delhi with 12 hours notice, being expected to work around the clock if a big deal is about to happen, those kinds of things that you read about all the time—that those become really hard to manage if you believe it's important that you be home at least part of the day with children.

00:36:11:00

NANCY ARMSTRONG:
Have you done anything at Princeton to sort of accommodate women who want to marry a career in academia or science with having children?

00:36:20:00

SHIRLEY TILGHMAN:
We've done a lot of things, to make it possible for women to combine an academic career—whatever the field—and raising families. One of the most, I think, original things that we have done that has made a big difference is we've created a program, which is kind of an emergency services program. So if you call this program at 7 in the morning, within an hour, they will have someone in your home who can stay with a sick child, or wait for the Maytag repairman, or take your mother to her doctor's appointment.

00:36:55:00

And we subsidize the program so it's available to everybody at the university, not just faculty. And it just frees up women in particular who often are the people who are having to do those extra jobs from feeling as though they have to make a choice. So that's one of the things that we've done that I think has really made a difference.

00:37:21:00

The other thing that we've done that I think is having a very strong effect is we have added a year on to the tenure clock for every child. And we have done it automatically. You don't have to ask for that extra year, you get it

automatically. And the reason we made it automatic is when we first put the program in place, we found that the fathers were taking more advantage of the program than the mothers.

00:37:49:00

And the reason is the women were afraid of taking advantage of it and of being accused of being on a mommy track. So this way, no choice, you just get the extra years, and that takes pressure off you in that period where you're trying to establish your scholarly reputation.

00:38:08:00

NANCY ARMSTRONG:
That's amazing. What did you think of the feminist movement, or were you a part of it? And how has your attitude changed overtime?

00:38:14:00

SHIRLEY TILGHMAN:
So I am a feminist, and I am a very proud feminist. And I can recall vividly in the 1960s as a college student in Canada, beginning to feel the first rumbles of the movement, and just thinking it was the most remarkable thing. And along with, of course, the civil rights movement—which were I think linked in many ways, they were separate clearly but as a way to open up human potential—

00:38:51:00

-I was just, from the early days, a supporter. I missed two critical years, which are from 1968 to 1970, which were very critical years in the movement, I spent in a little African village, where needless to say, the movement did not reach. And so when I came back in late 1970, so much had happened in those two years in order to kick start the movement and it was, to me, immensely exciting to see. So, I was on board from the beginning.

00:39:28:00

NANCY ARMSTRONG:
What did you—when you said you were involved—did you march for women's rights?

00:39:31:00

SHIRLEY TILGHMAN:
I did not march for women's rights. But I was certainly someone who was, from the early days, supporting my women graduate students and postdocs, and trying to get them ready for the world that I knew that they were about to enter and understanding, I think, from early days, that they were going to need tools and skills that their male counterparts were not going to need. Or had naturally.

00:40:02:00

NANCY ARMSTRONG:

Was there a click moment when you knew you were a feminist? How old were you? When did that…

00:40:05:00

SHIRLEY TILGHMAN:
I think my click moment was in college. When I first read about Betty Friedan, and read *The Second Sex*, Simone de Beauvoir. All that literature. I remember reading Germaine Greer, and these were the great thinkers of the movement and who set the intellectual underpinnings for how we thought about feminism at that time.

00:40:33:00

NANCY ARMSTRONG:
So you read Betty's book in college, did that tweak your… expectations for your future or your worldview at that point? Or was it already set? What was your reaction to that book?

00:40:44:00

SHIRLEY TILGHMAN:
"Right on." That was my reaction. I think I was naturally ready for Betty Friedan's *Feminine Mystique*. By that time, I was a senior chemistry student in a university that was extremely supportive of women in science, I will say, looking back on it now. But I was also in a very small minority.

00:41:12:00

And so that book both gave you a little bit of moral indignation, which is always a good thing when you're in a revolution, and it also gave me some courage.

00:41:26:00

NANCY ARMSTRONG:
Why do you think feminism has become kind of a dirty word in our society?

00:41:30:00

SHIRLEY TILGHMAN:
I think it's one of the great tragedies of the last 15 to 20 years that feminism has become the new F word. I'll tell you a story. When I- The day I was named president, I had a group of reporters from the student newspaper. They were given the first interview and they asked puff ball questions and went away. And they clearly went away and did a little research on the web, and felt a little guilty about not asking any hard questions.

00:42:05:00

And so they asked for a follow up interview. So they came and they were a completely different group. They were sort of looking very serious, and they sat down in my office and they said, "According to the New York Times, you are a feminist and a liberal." There was this big pause and I said, "And?" And I realized they saw these as negatives and I saw them as enormous positives.

00:42:33:00

And it was a shock to me to realize these students were seeing being a feminist as something that I should feel awkward about, as opposed to proud about. I don't understand how it happened. I can make hypotheses about how it happened. I think there were aspects of the women's movement that began to feel shrill to some.

00:43:00:00

I think there was hostility in the women's movement at times toward men, as opposed to looking to males, getting them to be partners in the movement with us. But the fact that it has gone so far is both a disappointment and a mystery to me.

00:43:23:00

NANCY ARMSTRONG:
Who do you think are the voices from that period of time in the feminist movement—the sort of iconic figures, Gloria, Bella and all these women—who do you think got it right in a digestible form, as opposed to the shrill, sort of, side of it?

00:43:42:00

SHIRLEY TILGHMAN:
I always found Gloria Steinem in particular to be someone who, I think, approached feminism almost exactly the way I would have had I been a leader of the movement. I think she was strong, effective, articulate, and I

never found her to be shrill. So I always admired the role that she played over a very, very long period of time, which is really impressive.

00:44:16:00

NANCY ARMSTRONG:
Do you think that women understand the way life used to be for women? Why don't they understand? And do you think their lack of understanding could cause the gains of the movement to be rolled back?

00:44:31:00

SHIRLEY TILGHMAN:
I think this generation doesn't really understand the nature of the progress that had to be made in order for them to be 50% of the student body at Princeton today, and with the potential to go out and make almost anything of their lives if they are willing to work hard.

00:44:58:00

There are times I feel good about that, thinking, "Well, we have succeeded, and so we have given them a whole 'nother culture as a launch pad for their lives." On the other hand, there are times when I think they're a bunch of little ingrates. So it depends upon my mood on the day, how I'm thinking about their relative lack of understanding.

00:45:25:00

NANCY ARMSTRONG:

Gloria Steinem said recently in an interview that the women's movement would probably take 100 years. So if we're only 50 in, what are the challenges ahead? What is left to do?

00:45:37:00

SHIRLEY TILGHMAN:
I continue to think that the biggest challenge of the women's movement has to grapple with is the work-life balance question. I think it colors everything. I think it makes it really difficult for women to imagine—and I find this talking to college age students now—to imagine how they are going to successfully navigate that terrain.

00:46:07:00

So I think until we think hard about the workplace, how the workplace was designed for a very different kind of culture than the culture we hope to create, until we think about the demands actually that are often placed on people that work, that if you stand back and think about them—and particularly if you think about them from the perspective of other cultures—

00:46:33:00

It just seems almost inhuman, the kinds of demands that are put on workers today, and all of those demands and the way they have accelerated over the past 25 years have really not worked in favor of women.

00:46:49:00

NANCY ARMSTRONG:

So, what would you say, in 2011, what does it take to get to the top as a woman?

00:46:54:00

SHIRLEY TILGHMAN:
To get to the top today, I think it takes self confidence. I'm actually a big believer that self confidence is one of the greatest qualities, most important qualities to instill in our daughters. Because without it, almost nothing else follows. So, self confidence. I think it takes the willingness to really work hard, determination, focus,-

00:47:22:00

-and a sense of humor, because I don't think you can succeed as a woman no matter what you choose today—and especially if your goal is to get to the top—unless you can laugh at yourself and you can laugh at the world.

00:47:38:00

NANCY ARMSTRONG:
So, we're doing a bit better at the university level, but still not elsewhere. Business, banking, as you said, computer sciences, technology. Why is there a lag in so many industries, in terms of bringing women to the top of their industry?

00:47:56:00

SHIRLEY TILGHMAN:

I think the reason why you see progress for women in some places and not in others are largely cultural, and I think the culture falls into two broad categories, that the culture of our society, which is still to this day setting up gender specific expectations for men and women, that children pick up on. But I think it also has a lot to do with the culture of that business or that profession.

00:48:26:00

There are cultures that are very unique to certain professions. I'll give you an example in a field that I know very well which is in biotechnology. Biotechnology, as a field, started out in the 1970s as a really macho field. I used to call it the cowboy culture. And it was simply a culture that most women would have found intolerable to live within,-

00:49:00:00

-and particularly to try and- It would have been very difficult to change at the time. And I suspect that—that's a culture I happen to know very well—but I'd suspect there are others like that and lots of different industries that really make it much harder for a woman to feel comfortable.

00:49:22:00

NANCY ARMSTRONG:

And just going back for a second, did it happen like that for you when you were starting out in… microbiology?

00:49:30:00

SHIRLEY TILGHMAN:

The reason I didn't experience that kind of very strong negative culture—this was in the biotechnology industry that I was talking about—but the reason I didn't experience it, frankly, is because I had the great, good luck of having superb mentors. As a graduate student, I had a man who was enormously supportive of me and my career.

00:49:56:00

I was only his second woman graduate student, and from the day I entered his lab, he treated me like a colleague, assumed that I would perform like a colleague, and as a consequence, I did. And likewise, Philip Leder, who was my post doctoral mentor, could not have been more supportive. So when you have people close to you who are sending really strong positive signals to you all the time,-

00:50:22:00

-they can do a lot to counter what you might be feeling when you go into the broader community and encounter people who you know much less well, who you respect much less well, it's much easier to have those kinds of signals just slide off your back.

00:50:40:00

NANCY ARMSTRONG:

What's the real critical difference, whether it's decision making or otherwise, in the way that men lead and the way that women lead?

00:50:48:00

SHIRLEY TILGHMAN:
I never believed that men and women fundamentally lead in different ways. I've always believed that the qualities of leadership are universal. But I do think that there are trends, if you want that, that are probably a little different. I think women are much less likely to engage in command and control,-

00:51:16:00

-and are more likely to want to do team building and consensus decision-making. But having said that, I can think of exceptions on both sides of that. So I think at the end, leadership is leadership.

00:51:33:00

NANCY ARMSTRONG:
What guiding principle would you pass to young women leaving the university?

00:51:38:00

SHIRLEY TILGHMAN:
What I say to all our graduates, and certainly to the young women who leave Princeton every June, at the end of commencement, I look them in the eye and I say, "Aim high and be bold." That nothing happens unless you are willing to take some risks, and to set your sights high. So, those are the two pieces of advice I try to give our graduates.

00:52:07:00

NANCY ARMSTRONG:
What's the most meaningful or useful piece of advice that you've ever received?

00:52:11:00

SHIRLEY TILGHMAN:
I think the best advice I ever received was my high school history teacher, Mr. Lionel Orlikow, who advised me to open my eyes to the world. To be curious, to want to understand what was going on outside my small little world in suburban Winnipeg, Manitoba, and to understand that that world was tiny compared to what was going on.

00:52:39:00

NANCY ARMSTRONG:
And what piece of advice would you give to a young woman on building a career?

00:52:45:00

SHIRLEY TILGHMAN:
The advice that I would give to a young woman who was interested in building her career is to first be really clear about what it is you want to do, and then be very focused in going about trying to achieve it. And to

understand that there will be enormous rewards if you care about what you are doing, so follow your passion, and not much fun if you end up doing something you don't like.

00:53:16:00

NANCY ARMSTRONG:
And a piece of advice on the work-life balance that we talked about? One piece.

00:53:22:00

SHIRLEY TILGHMAN:
One piece of advice is resist guilt at all costs. You are only one person. There are only 24 hours in the day. You are going to do your best for both sides of your life. Stop feeling guilty about it.

00:53:42:00

NANCY ARMSTRONG:
A piece of advice on raising children?

00:53:45:00

SHIRLEY TILGHMAN:
My advice about raising children is don't miss their childhood. It only happens once and it goes very fast. Enjoy them and enjoy the great pleasure of being a parent.

00:54:03:00

NANCY ARMSTRONG:

What did you want to be when you grew up?

00:54:05:00

SHIRLEY TILGHMAN:

A scientist.

00:54:09:00

NANCY ARMSTRONG:

Accomplishment you're most proud of?

00:54:10:00

SHIRLEY TILGHMAN:

Raising my children well.

00:54:13:00

NANCY ARMSTRONG:

What was your very first paying job?

00:54:15:00

SHIRLEY TILGHMAN:

Selling sportswear in a department store.

00:54:20:00

NANCY ARMSTRONG:

What three adjectives best describe you?

00:54:24:00

SHIRLEY TILGHMAN:

I think empathetic, decisive, and optimistic.

00:54:32:00

NANCY ARMSTRONG:

What person that you've never met has had the biggest influence on your life?

00:54:36:00

SHIRLEY TILGHMAN:

Matt Meselson and Frank Stahl, so that takes more than- These were two scientists who wrote the paper—what turns out to be one of the greatest papers of the 20th century—on how DNA replicates. And I read that paper as a really bored chemistry student, who knew I couldn't be a chemist and I had to find something else to do scientifically.

00:55:07:00

And I read this paper in college, and I thought it was the most beautiful thing I had ever read in my whole life. And the next day I went over to the

biochemistry department and said, “How can I get in,” because that’s what I want to do with my life, and that’s what I did with my life.

END TC: 00:55:27:00