SCIENCE HISTORY INSTITUTE

PATSY STALLINGS CHAPPELEAR

Transcript of an Interview
Conducted by

Sarah Schneider and Gayle J. Gibson

at

Interviewee's home
Houston, Texas

on

24 and 25 January 2024

(With Subsequent Corrections and Additions)

Patsy Ann Stallings Chappelear

ACKNOWLEDGMENT

The Science History Institute initiated this oral history interview in partnership with the Fellows Council of the American Institute of Chemical Engineers (AIChE).

SCIENCE HISTORY INSTITUTE
Center for Oral History
FINAL RELEASE FORM

This document contains my understanding and agreement with the Science History Institute with respect to my participation in the audio- and/or video-recorded interview conducted by Sarah Schneider and Gayle J. Gibson on 24 and 25 January 2024. I have read the transcript supplied by the Science History Institute.

1. The recordings, transcripts, photographs, research materials, and memorabilia (collectively called the "Work") will be maintained by the Science History Institute and made available in accordance with general policies for research and other scholarly purposes.

2. I hereby grant, assign, and transfer to the Science History Institute all right, title, and interest in the Work, including the literary rights and the copyright, except that I shall retain the right to copy, use, and publish the Work in part or in full until my death.

3. The manuscript may be read and the recording(s) heard/viewed unless restrictions are placed on the transcript as listed below.

This constitutes my entire and complete understanding.

(Signature) Signed release form is on file at the Science History Institute
Patsy S. Chappelear

(Date) May 23, 2025

OPTIONAL: I wish to place the following restrictions on the use of this interview:

NONE

I understand that regardless of any restrictions that may be placed on the transcript of the interview, the Science History Institute retains the rights to all materials generated about my oral history interview.

Unless any restrictions state otherwise, the Science History Institute will:

- Make the title page, abstract, table of contents, chronology, et cetera (collectively called the "Front Matter") available on the Science History Institute's website.
- Make digital copies of the transcript and audio recording(s) available to people who submit a request online in lieu of (or in addition to) visiting the library in person (similar to an interlibrary loan). These digital copies are still protected under copyright law and individuals who receive the digital copies are not permitted to post them to the Internet. Should the Science History Institute wish to post to the Internet the content of the oral history interview, that is, the full transcript and/or recordings, direct quotations, audio clips, video clips, or other material from the oral history recordings or the transcription of the recordings, I will have the opportunity to permit or deny this posting.

I understand that the Science History Institute will enforce any restrictions until the time of my death, when any restrictions will be removed.

PERMISSION TO POST COMPLETED ORAL HISTORY TRANSCRIPT AND/OR INTERVIEW RECORDINGS ON THE INTERNET

The original release agreement that you signed with the Science History Institute, which governs researchers' access to your oral history, either made no mention of posting your entire transcript and/or interview recordings on our website or stipulated that we would seek your permission before posting the full interview. It is our goal to broaden individuals' access to the Science History Institute's oral histories generally, and your oral history specifically, so we are contacting you to request permission to post your entire completed transcript and interview recordings on our website, located at http://www.sciencehistory.org and on the Science History Institute's Digital Collections website, located at https://digital.sciencehistory.org/. To be clear, if you requested that certain sections of your interview be restricted or sealed, they will not be included in the material posted to the Internet and will remain restricted/sealed as outlined in the original release agreement.

Should you choose to grant us permission to post your entire completed transcript and interview recordings, the Science History Institute will not be able to limit anyone's access to or use of your oral history in any way outside the bounds of U.S. Copyright Law under title 17 of the United States Code.

If you have any questions about this form, or if you would like to review your original release agreement, please contact the Director of the Center for Oral History at oralhistory@sciencehistory.org; (215) 925-2222; or Director, Center for Oral History, Science History Institute, 315 Chestnut Street, Philadelphia, PA 19106.

PSC
Initials

I, Patsy S. Chappelear, GRANT exclusive permission to the Science History Institute to post my completed oral history transcript and interview recordings conducted on 24 and 25 January 2024 with Sarah Schneider and Gayle J. Gibson at Interviewee's home on the Science History Institute's website.

_____
Initials

I, Patsy S. Chappelear, DO NOT GRANT permission to the Science History Institute to post my completed oral history transcript and interview recordings conducted on 24 and 25 January 2024 with Sarah Schneider and Gayle J. Gibson at Interviewee's home on the Internet during my lifetime.

Signature: Signed release form is on file at the Science History Institute
Patsy S. Chappelear

May 23, 2025
Date

This oral history is designated **Free Access**.

Science History Institute

Chemistry • Engineering • Life Sciences

The Science History Institute collects and shares the stories of innovators and of discoveries that shape our lives. We preserve and interpret the history of chemistry, chemical engineering, and the life sciences. Headquartered in Philadelphia, with offices in California and Europe, the Institute houses an archive and a library for historians and researchers, a fellowship program for visiting scholars from around the globe, a community of researchers who examine historical and contemporary issues, and an acclaimed museum that is free and open to the public. For more information visit sciencehistory.org.

PATSY STALLINGS CHAPPELEAR

1931	Born in Burnet, Texas, on 23 October

Education

1953	Bachelor of Arts, The Rice Institute
1954	Bachelor of Science in Chemical Engineering, The Rice Institute

Professional Experience

	Shell Oil Company, Deer Park Refinery
1954-1955	Engineer
	Rice University, Department of Chemical Engineering
1955-1976	Senior Research Associate
	Hudson Engineering Corporation
1975-1986	Senior Project Engineer and Senior Process Engineer
	Self-Employed
1986-present	Consultant

Honors

April 1970	Member, Sigma Xi
July 1980	Fellow, American Institute of Chemical Engineers
1981	Recognition Award, Gas Processors Suppliers Association
March 1987	Citation for Service, Gas Processors Association
1998	Outstanding Engineering Alumna, Rice University

ABSTRACT

Patsy Stallings Chappelear was born in Burnet, Texas in 1931. She grew up during the Great Depression, moving often with her family as her parents sought work. She grew up with two brothers, one older and one younger. As a child, Chappelear enjoyed having tea parties, playing jacks, roller skating, reading, and being pushed on a swing by her father. She grew up going to Methodist churches, where she attended Sunday School and participated in the Methodist Youth Fellowship. She spent a lot of time with extended family, often at her grandmother's home in West Texas. Chappelear shares memories of Pearl Harbor and remembers saving foil, recycling rubber, and canning food during World War II.

Chappelear especially enjoyed studying math in school and planned to go into the sciences; she was interested in becoming a brain surgeon. In high school, she got involved in public speaking and speech activities and acted in plays. Chappelear excelled in her studies, becoming valedictorian of her high school class. She decided to apply to and then attend Rice Institute, which had no tuition and would be financially feasible for her to attend.

At Rice Institute, Chappelear started her undergraduate education in the science-engineering category. The coursework was challenging, and she worked hard at her studies. When it came time to decide on a major, she was considering chemistry or chemical engineering. The very different responses from those two department heads made the choice for her, and she decided to study chemical engineering. Chappelear's main extracurricular activity at Rice was participating in the newly formed Chaille Rice Literary Society. To earn some money during college and get experience in a plant environment, Chappelear worked at Champion Paper and Fibre Company. Chappelear also gained exposure to work environments during plant trips her senior year, which were led by Professor Arthur J. "Pappy" Hartsook.

The chemical engineering program was a five-year program, and her parents took pride in her graduation. Chappelear applied to jobs and was in demand as a woman engineer. She ultimately accepted a job offer from Shell Oil Company. At Shell, she worked in a research group on lubricating oils. Chappelear worked in a pilot plant and used a Podbielniak centrifugal extractor to carry out her research on extraction processes.

Chappelear met her husband, John Chappelear, through playing bridge. John also worked for Shell, but in a different office. Patsy and John quickly fell in love, started dating, and got engaged. Despite working in different parts of Shell, after their marriage, one of them was forced to resign in keeping with Shell's nepotism policy, and Patsy left her job. She sought advice about job opportunities from her former professor, Riki Kobayashi. Kobayashi invited Chappelear to work with him on *Handbook of Natural Gas Engineering*. Their work on this classic text included sections on physical properties, gas hydrates, and phase equilibria.

Early in her career, Chappelear joined the Society of Women Engineers (SWE). She later joined and became active in the American Institute of Chemical Engineers (AIChE). Chappelear helped form the Fuels and Petrochemicals Division of AIChE and eventually became chair of the division. She also became the first female fellow of AIChE. She regularly attended conferences in her field, including AIChE conferences. One notable conference that Chappelear attended was the 1973 Van der Waals Centennial Conference on Statistical Mechanics in Amsterdam, the Netherlands, for which Chappelear coauthored papers that her colleagues presented. She also helped host a Cryogenic Engineering Group conference at Rice.

Over the years that she had her first three children, she did some small consulting jobs with Kobayashi. After her third child was born, she was eager to get back to work, and Kobayashi and Thomas W. Leland, Jr. brought her on to work on their research team. Chappelear edited and reformatted research proposals, mentored PhD students and postdoctoral fellows, and programmed a computer in hexadecimal to run corresponding states calculations. Later, Chappelear used The Rice Computer in her work. Chappelear also worked with Norman Carnahan on a project focused on gas hydrates in the Alaska Pipeline. Chappelear balanced her career with getting involved in her children's schools and activities. During her pregnancy with her son and after he was born, Chappelear struggled with medical and mental health challenges. She remained at Rice during that time and her colleagues were supportive.

Chappelear's husband received an opportunity to work with Shell abroad, leading the family to temporarily relocate to The Netherlands. During the time abroad, Chappelear went on speaking tours, attended an AIChE meeting in Munich, Germany, did consulting work for companies in Europe, and received recognition from scholars and universities she visited. Chappelear visited Czechoslovakia and Poland, getting a glimpse of life behind the Iron Curtain.

After returning to the United States with her family, Chappelear resumed her work at Rice. She also began working part-time for Hudson Engineering Corporation, making a complete edit of the GPSA *Engineering Data Book* and serving as a resource for staff needing help with data. Feeling that she was not getting the recognition and respect she deserved at Rice, she decided to look for other work. Chappelear accepted an offer to work as a process engineer at Hudson. The first startup that she attended was in Louisiana, and Chappelear was then assigned to lead the design of the South Pass project. She went offshore for the project startup and went offshore several other times in her career.

Chappelear soon moved into project engineering, working from the States for a project based in Gulf Cabinda in Africa and traveling to Japan for another project. She led an intensive process to develop two bids for the Saudi Aramco Yanbu project. Chappelear was a project engineer for a government contract working on modifying a helium plant in Amarillo, Texas. For a time, she was charged with recruiting and mentoring interns who worked at Hudson. While working for Hudson, Chappelear became a registered professional engineer.

As economic challenges impacted engineers in the 1980s, Chappelear's husband decided to take an offer of early retirement from Shell, and Chappelear was laid off from Hudson. She was soon rehired and worked on writing a speech for an executive and critiquing a design for a government job. After retiring from Hudson, Chappelear did some consulting work.

Chappelear is active in her community. She has long been involved in her church, taking on leadership roles, sewing in the Sowing Seeds of Love program, and participating in mission trips. Chappelear plays and teaches bridge, conducts genealogical research, and spends time with her family. She has used her financial resources to create scholarships for students. She also judges engineering projects at Houston Community College and has participated in the Rice University Engineering Alumni organization. She was named Outstanding Engineering Alumna from Rice University in 1998.

During the interview, Chappelear reflects on the impact of her life and career, comments on ethics and encounters with professional plagiarism, shares her hopes for future innovations, and highlights the importance of safety in engineering work.

INTERVIEWERS

Sarah Schneider is a Program Associate in the Center for Oral History at the Science History Institute. She has an interest in preserving and sharing immigration stories in the oral history collection. Schneider holds a BA in American Studies from Brandeis University and an MA in History (Public History track) from the University of Central Florida. She serves as a board member of Oral History in the Mid-Atlantic Region (OHMAR) and was on the 2024 conference committee for the Oral History Association (OHA) annual meeting.

Gayle J. Gibson is a Senior Fellow with Mission Possible Partnership and formerly on the Board of Carbon Engineering. Gayle was head of Engineering at DuPont when she retired after 34 years where she held a variety of roles including Chief of Staff to the Chair of the Board & CEO where she drove improved leadership engagement across the top layers of leaders. Gayle has wide expertise in product & process development, scale-up and commercialization, revamping innovation practices, business strategy, supply chain improvement, lean manufacturing, process engineering, research & development and fostering inclusive workplaces. Gayle is a Fellow and Trustee of AIChE, and serves as Co-Chair of the Grants Committee of the Foundation. She is also a past Chair of the Management Division and a member of the LGBTQ+ & Allies Community. Gayle is one of AIChE's representatives on the Affiliates Council of the Science History Institute.

ABOUT THIS TRANSCRIPT

The Center for Oral History, Science History Institute, is committed both to preserving the recording of each oral history interview in our collection and to enhancing research use of the interviews by preparing carefully edited transcripts of those recordings. The preparation of interview transcripts begins with the creation of a verbatim typescript of the recording and proceeds through review and editing by staff of the Center; interviewees also review the typescript and can request additions, deletions, or that sections be sealed for specified periods of time. The Center keeps track of all changes that staff, interviewers, and interviewees make to the original typescript. Please contact us if you would like additional information about these materials. We have established guidelines to help us maintain fidelity to the language and meaning of each recorded interview while making minor editorial adjustments for clarity and readability. Wherever possible, we supply the full names of people, organizations, or geographical locations mentioned during the interview. We add footnotes to the transcript to provide full citations for any publications that are discussed, to point to extant oral history interviews, and to clear up misstatements or provide context for ambiguous references in the transcript. We use brackets to indicate the addition of material that was not in the audio, and bracketed ellipses to indicate the deletion of recorded material. The transcript also includes time stamps at the beginning of each paragraph. We omit without noting most instances of verbal crutches and all instances of nonlexical utterances. We also make small grammatical corrections where necessary to communicate interview participants' meaning. Finally, staff of the Center create the abstract, chronology, and table of contents. With the availability of online full-text

searching of our transcripts, the Center for Oral History opted to discontinue the practice of preparing a back-of-the-book index for each oral history transcript in 2020. **The Science History Institute is committed to the responsible presentation of the history of science by addressing evidence of inequality and oppression as well as the subsequent silences in our collections. To that end, we recognize there may be language in our oral history collection that is outdated, offensive, or harmful, such as, but not limited to, the following: racist, sexist, Eurocentric, ableist, and/or homophobic language or depictions.**

TABLE OF CONTENTS

INTERVIEWEE: **Patsy Stallings Chappelear**

INTERVIEWERS: **Sarah Schneider**
Gayle J. Gibson

LOCATION: **Interviewee's home**
Houston, Texas

DATE: **24 January 2024**

[00:00:04]
SCHNEIDER: Okay. So today is Wednesday, January 24, 2024. My name is Sarah Schneider and I am joined by Gayle J. Gibson. We are conducting the first session of an oral history interview with Patsy S. Chappelear at her home in Houston, Texas. Okay. So I know you were born in Burnet, Texas. Or [is it pronounced] Burnet, Texas?

[00:00:29]
CHAPPELEAR: Burnet.

[00:00:29]
SCHNEIDER: Burnet. And so I'm curious about your childhood, and to start off, if you could talk a little bit about your parents and what they were like, and maybe a little bit about their backgrounds.

[00:00:39]
CHAPPELEAR: Well, I was born in 1931 when the [Great] Depression was in the United States. My father [Raymond Dero Stallings] was working as a laborer on the dam for Buchanan Lake. When I was two weeks old, he lost his job, as so many people did. And they packed up everything they owned with me and my older half-brother, ten years older than I, in the sedan and went to my grandmother's [Serena "Rena" Adams Trainer] house in West Texas [Sonora, Texas]. So that was how we started. There were no jobs. So whenever there was a job opening any place at all in West Texas when I was a baby, my parents would load up and go and go there, and they might work a day or a week or two weeks and then be laid off, and they'd go back to my grandmother's. And this went on.

[00:01:31]
At one point when I was still a very small baby, they went to California and tried working there. My uncles of my mother's—through my mother's family—would hop freights there in Sonora, [Texas] and go out and try to work on the dams. You . . . Depression was really, really a hard,

hard time. My father had a seventh-grade education. My mother [Cora Burleson "Cody" Trainer Nicks Stallings] had quit in the eleventh grade because she didn't have shoes to wear to school. So they both valued education very, very much. My older brother [Sammie "Sam" Roy Nicks], during those very early years that I can't remember, checked in and out of the Sonora [Independent] School District in one year, seven times. That's what looking for a job during those years meant.

[00:02:28]
At any rate, we ended up—when I was starting school we were in Big Spring, Texas again, and I went to a private school. My birthday being in October, somehow or other, they got the money to send me to private school. I don't know how, but they did. And so I went first grade all to this private school, and I started second grade there in Big Spring. But from that point on, my father was a salesman, a really good one, and he did various things with insurance and other stuff, and we would move and back and forth. And eventually he went into construction business when I was ten years old. But moving around, I went to a total of about ten different elementary schools, so it was quite different. Fortunately, I am very bright, so I didn't have any problem making straight A's except for penmanship. Solid C's. I liked school very much. It was fun.

[00:03:34]
I loved going to my grandmother's in the summertime out in West Texas. The Johnson girls lived up behind her, and we played out under the mesquite trees and used rocks to make our house for our playhouse. And you, you cooked, "cooked" with quote marks around it, the mesquite beans as food for your dolls who lived there. Mesquite beans are very poisonous, so don't try this. [. . .] Everybody was poor. The story was that when I was the baby, that first year when I was, you know, November came it was Thanksgiving time, my dad took the car and went out to the Federal Reserve and killed two turkeys and tied them under the old car and brought them into town. And that's what they had for Thanksgiving dinner, wild turkeys. Illegal wild turkeys. I had a lot of cousins and we—had lots of fun with them.

[00:04:48]
In '41, first big event in my life was [the attack on] Pearl Harbor. And we—my family—my older brother and his wife [Wilma Jean Lakey Nicks] and son [Mike Murphy Nicks] and a couple of aunts and two or three uncles, all of these people did construction work, and we all went to Ohio to work on a defense plant. So we were all up there on December the seventh, 1941, Sunday, and my cousins and I and my brother—younger brother [Raymond Donald "Don" Stallings]—had all gone to the movies. In those days, you walked to the movies, and it was perfectly safe to do so any place in the United States.

[00:05:35]
As we were walking home, up came two cars with my dad and one of my uncles, and they had heard on the radio about the bombing of Pearl Harbor, and they came to get us. I finally found out what that meant on 9/11 [September 11, 2001]. You have this strong desire to get your progeny and gather them up to yourself and make sure they're okay. And we went to the house and we had—we were lucky. We had a radio. It was about the size of the placemat and sat on

the table, had an oval top like this. And you sat and you looked at the radio and you listened to President [Franklin D.] Roosevelt declare war on the United [States] on . . . .

[00:06:26]
I had a cousin [Howard Peters, Jr.] who was at Pearl Harbor, and he was almost like a brother because his mother had been mentally ill and my mother was his official guardian. So he was only sixteen when she signed the papers for him to join—or seventeen—so he was very, very young. His boat was shot out from under him at Pearl Harbor and we didn't know, you know, for a week or two whether he was all right. But he was. Later on in the war years he was torpedoed off of Africa and he was picked up and survived. The third time he was torpedoed in the Gulf of Mexico and picked up, came to New Orleans, [Louisiana], [got] on a bus and came. At that time we were living in Baytown, Goose Creek, [Texas]. And he got off the bus and got out to where we lived and came up to the door and knocked on the door. My dad went to the door, "Junior!" and fainted. This was the third time.

[00:07:27]
I had an aunt [Serena Elizabeth "Pena" Trainer McGuire Siverling] who was a nurse in the army. She was in the Blitz in London, [England]. I had an uncle [James Anderson Nunley] who was a fighter pilot over Germany. I had an uncle [John Allison "Aggie" Trainer] who was in the march through Africa. I had another uncle [James Beryl Shanks] who was a Seabee in the South Pacific and various and sundry others. I've forgotten all of them. Not a single one got a purl—a what is it that you get—a Purple Heart. Now one of them got a Silver Star [Medal] and all that kind of stuff. They all survived and came back, which was very unusual for that large a family.

[00:08:10]
So there we were in Big Spring when—well, we came back to Houston, [Texas], and I went to school in Goose Creek at that time. And that's when I was a Girl Scout. And I got to go to a camp—let's see, there's Agnes Arnold. I think I went to Agnes Arnold. It's still a camp here in Houston. We have Girl Scout camps, about three of them. And I got to go to Girl Scout camp one year. That was a highlight of my . . . . It really was something to get to go to camp.

[00:08:43]
SCHNEIDER: And what were some of the things that you did at camp?

[00:08:46]
CHAPPELEAR: Get bit by mosquitoes. [laughter] Well, we had mosquito nets over our [cots]. Just things that you did. Oh. This would be hard for you to understand, Sarah, but we were deathly afraid of polio. And so in the summers when we would have polio problems, they would close all the swimming pools. And as a result, I never learned to swim. Finally, when I got to be in high school and I was playing around in the public pool and all, I got trapped under an inner tube and almost drowned. And so I took then the Red Cross learn how to swim [American Red Cross Learn-to-Swim program], and I can now swim across a pool. And I'm not

sure if I can do the length, but I can get across a pool, let's say, you know, a little bit, but I'm still very much afraid of water. I'll jump around now.

[00:09:47]
So when I had my children, that's when . . . my youngest son was born in '62. My youngest, my son. That's when the polio vaccine came out, was that summer and he was premature. I'll tell that story later. The doctor said, "Don't take him any place." But he said, "Go and take that sugar cube." And I remember taking my children to get the sugar cube and protecting them from polio. I had a special dread of polio. My mother had a younger sister [Mercedes LaVina "Dee" Trainer Nevill] who had polio as a child, and she was left with one leg shorter than the other and walked with a limp all of her life. Brilliant woman. Absolutely brilliant. And during the big epidemic during the forties, I had a cousin [Victoria Frances "Vicky" McGuire Hughes] and an aunt [Mildred Louise "Millie" "Mimi" Trainer Nunley], they both became very, very ill with polio and had to be in an iron lung for one of them, and very . . . . So I really dreaded polio, so that's why it made so much of an impression on me.

[00:10:54]
But back to me and going to school. I went in and out of Pasadena, [Texas] schools. I was in Pasadena in the fourth grade, the sixth grade, seventh grade, and then nine through twelve. That was some of the moves that we were making during that time. In high school, I joined the organization of the [International] Order of the Rainbow for Girls, which is a Masonic-sponsored secret society for girls. And that had a very big impact on my life, the lessons of it. And active in—I was very, very active in that group. I was very active in high school in public speaking and drama. In fact, I first took it in . . . . Well, I went to the ninth grade twice. This is really jumping around.

[00:11:59]
When we went up to—in '44—or no—'40—would have been '40. I think the war ended in '44. So it was in '42, '43, sometime in that time. My grandfather Stallings [Lemuel "Lem" Uriah Stallings] had a Help-Ur-Self Laundry in Big Spring, Texas. And there was an Air Force base there. And a lot of their business was the Air Force guys bringing in their laundry, and they would [get full laundry service]. And he decided to retire, and my dad rented the business for him for . . . we were there about two years, I guess it was. Yeah, two years. And so I went to the Big Spring schools.

[00:12:42]
Well, they had changed from the eleven-year system to the twelve-year system just a year before. So when we got there, my brother and I were too advanced. So they promoted us a year. So I did my first year of the ninth grade there, and then we came back to Houston, back to Pasadena, and I went—wanted to be back with the same people that I had known back in the times we had lived here before. And so I went back and repeated the ninth grade and just—and because of that, I was able to take speech—principles of public speaking and speech—whatever there was—in the ninth grade, and typing that year, which I would not have been able to take otherwise because I was taking college prep type of courses.

[00:13:29]
And I repeated algebra because I liked it so much. I ended up teaching half the class. They would all come down to my house after school to get tutored on algebra, but I credit Mrs. [Florence] Horton [at Pasadena High School] with the training that she gave me in public speaking with a lot of my success as an engineer. [. . .] In those days, the junior high in ninth grade was in one school—physical building—and the senior high had [grades] ten, eleven, and twelve. You know, they keep changing that around, as to which grade is in which room of which building and that sort of thing.

[00:14:09]
But in the high school, I was very active then in the speech activities on a volunteer basis. Didn't take any more courses from it, but I started acting and I did the competition in extemporaneous speech. If one won the district or something, you know, some did pretty good in that. But I was in all sorts of plays. In addition to acting, I did backstage work and everything. I just really enjoyed it. And we were very strong—Pasadena was very strong—in our music department, our football team, and our drama department. And we put on plays all throughout the year, one-act plays and everything, and seniors did their senior play. Well we were so active in my particular class, we had two senior plays, and there were 126 people in my graduating class, so rather small class, but still very strong, very active. And the band was award-winning. I had no activity with them myself, but, you know, was very proud of them and everything.

[00:15:11]
SCHNEIDER: Do you remember any roles that you played in plays?

[00:15:15]
CHAPPELEAR: Oh, yes. In fact, I've got my scrapbook with all of my programs. *The Night of January 16th* was the senior play. That was a very interesting play, the one that I had the lead in. We did two and I can't remember what the other one was called. *Night of January 16th* was a trial, and the woman is accused of murdering, I guess the husband, or somebody. And you have all the testimony and everything, and they pull out an audience—from the audience—a jury that has to come up and sit on the stage and listen to all the testimony. And then at the end of it, the actors have to prepare for two different endings. You're declared guilty or not guilty. I was guilty, and the next night she was not guilty. So that was something.

[00:16:08]
GIBSON: If we could go back a little bit, I'm really struck by how many times you were moving and in and out of schools. How did that, like, mold you or shape you? Did it make you more independent or was it something you got tired of, or . . . ?

[00:16:27]
CHAPPELEAR: It was just the way that I—that we lived in order to survive. As a result, I didn't make lifelong friends, so to speak. I did have the one girl, Ernestine [Houston], that I had known since the fourth grade, and she ended up actually coming to Rice [University] for one semester. But she was madly in love with this guy in Florida, so she took off there. I've seen her once or twice since then.

[00:16:59]
GIBSON: Was it more challenging in any way or you just didn't know any different, I guess?

[00:17:05]
CHAPPELEAR: I was so much smarter than everybody else around. I didn't ever have any problems. I never took books home to study. I really had no challenge intellectually.

[00:17:18]
GIBSON: Do you think that—where did you get that from? Was that from your parents, or . . . ?

[00:17:23]
CHAPPELEAR: I was just blessed with a very brilliant mind. That's all I know. And no, my mother's family were very brilliant people; my father's were all very intelligent. My mother's family was extremely intelligent. My mother was the second of twelve children. Her husband [Mike Murphy Nicks]—my mother married when she was seventeen—she left home because—she had quit school at seventeen, because she didn't have shoes to wear. Okay? You heard that.

[00:17:55]
And then she got married and she had a son, my older brother, on October the twelfth [1921]. And on October the twenty-eighth, I think it was, my aunt Serena was born. Nine months later, when my brother is nine months old, her husband dies. And then two years—a year and a half or so later . . . a year later, [my mother's] father [Fred John Trainer] dies. [. . .] Two weeks after my mother's father died, number twelve was born. So my grandmother was left with eight children under the age of whatever it was. Small ones. And her brothers wanted to split up the family. And, you know, I'll take Joe and Jack and so on and so forth and separate them out. But she was determined not to do it, and she kept them all.

[00:18:53]
And so my mother moved back from the ranch where she had moved when she—my mother married into a very well-to-do family. But then she moved back to town to live with her mother to help raise these . . . menagerie of kids and my grandmother took in washing. This was in the 1920s. And that was how she managed to have money. And eventually they started the oil

exploration out there. And she cooked food and eventually had men who also lived there, as well as being boarders. And so that's how she raised the money for it.

[00:19:34]
And during the Depression years, when it was so—money was so very, very tight—the older children, who were all whenever they could get an extra dollar or two, they would put it in an envelope and mail it with a three cent stamp. And so one of my younger aunts said, "Whenever we needed something, Mama would say, 'Something will happen, it'll be all right.'" And sure enough, a letter would come and there would be a dollar that they would be able to have whatever they needed the dollar for. And that's how they survived. My grandmother was a very unusual woman. Very unusual.

[00:20:13]
SCHNEIDER: And was this the grandmother that you were talking about moving to West Texas to be with her?

[00:20:18]
CHAPPELEAR: Yes. My mother's mother. Yeah. But of that family of twelve . . . make sure I'm right about this. The two oldest boys were like my mother, they had left—they started working on ranches very early. They never finished high school. They both ended up millionaires, as one of them was a general superintendent in the construction business for companies like Stearns, [Stearns-Roger Engineering Corporation], and so on. The others all . . . there were six brothers and six sisters. Five of the six ended up in construction and they were every one of them foremen of—do you know what a rigger is?

[00:21:26]
SCHNEIDER: Mmm, I have a sense, but how would you describe it?

[00:21:29]
CHAPPELEAR: It's somebody that works with the steel on these . . . you see these gigantic structures going up and all the steel work going up? The riggers are the ones that go out and put that steel work up. It's downright scary. They built half of the stuff up and down the channel. They built half of it. One of my uncles [Joseph "Joe" Carter Trainer], the second oldest one, was general superintendent for one of the trains at Oak Ridge, Tennessee. You know what trains I'm talking about—the nuclear trains. He was general superintendent for that. So they were pretty smart people.

[00:22:10]
The women, the three youngest girls, they—needless to say, my grandmother was well-known throughout the town for what she did [keeping her family together]. And so some of the rich

ranchers around there sponsored them for additional schooling. The oldest one [Dee], the woman with the hip, the polio survivor, she decided to go to business school because she could go in a year and then be able to make a living. And so she did. She ended up being city manager and having her own flower company. She was a brilliant woman. Just all sorts of things.

[00:22:55]
The two younger sisters, one of them [Serena went to nursing school in Austin, Texas and graduated from there.] And again, one of the local ranchers paid her tuition for her to go to that nursing school. The youngest sister of all [Mildred "Millie" Nunley], see she didn't mature until the time that the war started. And she got married very young. And married one of the guys that was one of the fighter pilots, I think, was her husband. She's the one that ended up with polio. So it was a pretty amazing family all in all. [Older sister Frances Trainer Shanks went to Scott and White [School of Nursing] [in Temple, Texas] and graduated from there in 1934, I think it was.]

[00:23:38]
SCHNEIDER: And how much contact did you have with the extended family members? You know, you were talking about . . . .

[00:23:44]
CHAPPELEAR: Oh, we always—every Christmas anybody that could, went out to West Texas for Christmas. I mean, that was essential. And if you could . . . . In the summertime, I've got lots of different family pictures of different groups of kids. Well, who is that standing next to . . . ? And I've had to identify some of them all. And when did this happen? And when did that happen? But I can remember sleeping on . . . the kids all slept on pallets on the floor. A pallet is a pile of quilts. And you put your bedding down and you slept on the floor, and we all slept like that. One year—my grandmother's house was, sort of, on the edge of town. Sonora's not a very big town. And so she always had a cow and she had chickens and she had fruit trees and she canned and she had her garden. She was pretty fabulous.

[00:24:43]
She had this cow. When I was a little kid, I guess it must have been by the time I was in the first grade or something, I was afraid of the cow. And my brother told me—my younger brother—I have one brother who's fifteen months younger than I am. And so he told me, my mother tells the story, "You don't need to be afraid, Patsy. Big Mama keeps her cow in a cage." Well, that's the only thing that he had ever seen. Yes. Childhood memories. I guess my favorite memory is my daddy pushing me in the swing in the park. One of those great big—must have been twelve feet tall, you know, huge tall thing. And he would jump to—you have to jump to get the thing and push me, and I would go so high. Oh, that was so . . . that was such a thrill.

[00:25:33]
GIBSON: So you had a lot of these experiences through schooling and extended family, a lot

of role models, I guess. So you're in high school and you, you're basically tasting a lot of different things, right? Drama and algebra.

[00:25:47]
CHAPPELEAR: Oh, yeah.

[00:25:48]
GIBSON: Like, is there anything you didn't do well, I guess?

[00:25:52]
CHAPPELEAR: I was—I'm very klutzy. Yes. I could never do a backward roll.

[00:26:03]
GIBSON: Oh.

[00:26:04]
CHAPPELEAR: Luckily, I got sick in the ninth grade. I got very, very sick. That was just after the war and almost had pneumonia, and they had to give me penicillin. Have you ever had them stick a horse needle in your backside? That's what it felt like. I mean, I could . . . it was a gigantic needle. The more I tell it, the bigger it gets. Well, the doctor gave me that and said that they needed to move to—out west where I would have lots of sunlight. But instead of that, we bought a sun lamp and I came home after school every day and [. . .], you know, stripped off, sunned my front and sunned my back. I had a beautiful tan. Nobody could see it, of course.

[00:26:56]
And he wrote me an excuse to not do physical education that year. And I used that excuse all through high school because I was always the last one to be picked for whatever you picked somebody for. I am most uncoordinated, athletic person you have ever seen in your life. When I was chairman of the Fuels and Petrochemical Division [of the American Institute of Chemical Engineers], we had a meeting here in Houston, and we went out to one of the local, little rodeo things where they . . . . And so they had a cow chip pitching contest, and I had to go down and participate. And I threw my cow chip, and it went right straight up and then it came right, straight back down. I am not physically coordinated.

[00:27:45]
SCHNEIDER: And so when you were younger, you know, in elementary school, in the different elementary schools, what kinds of classes and things did you like at that point in time? Were there certain classes you gravitated towards as a young child?

[00:28:01]
CHAPPELEAR: I always liked the math. I always liked math, and I thought history was . . . . I liked everything. I mean, it was all very interesting. I knew very early on that I wanted to do something in a scientific area.

[00:28:17]
GIBSON: And why was that? Did you see someone else doing it or just . . . ?

[00:28:20]
CHAPPELEAR: I was going to save the world. I had this dream of saving the world. I mean, I really had a pretty big ego, I guess. And it was very important that I should do something that would really make a difference. In fact, there was a comic drawing in one of the high school papers. I told Wallace [Williams]—Wallace came to Rice [University] with me. He ended up a double E [electrical engineer]. And I apparently came out to him and said, "So and so was a better scientist than you and I will ever be." Or something like that. So they had a picture of me with the lightning rods coming out and the ideas were . . . a drawing, caricature saying I was going to be a great scientist.

[00:29:12]
GIBSON: You know, but you can save the world being a nurse. You can save the world through being a great actress. I mean, you had all these talents.

[00:29:19]
CHAPPELEAR: Oh, I was going to do brain surgery.

[00:29:20]
GIBSON: Okay, so medicine?

[00:29:21]
CHAPPELEAR: I was going to do brain surgery. In fact, I had an idea, you know this—what is this contest they have for the kids? The competition in . . . the science contest where they do things and they have a judging every year?

[00:29:38]
SCHNEIDER: Oh, like a science fair?

[00:29:39]
CHAPPELEAR: Science fair! That's it. Okay. They were just starting those things back then. And I had an idea, and my idea was that—I had just found out about the right and left sides of the brain and stuff—and my idea was that if you have an accident, you could train the other half of the brain to take place of that. Well, sure enough, it turns out that you can do that. But of course, I didn't know how to exhibit—do anything for an exhibit or a science fair to show that. So I didn't do anything with it, but that was my idea. Over the years, I've had a lot of different times I've had ideas and inspirations that have turned out to really be pretty good and pretty realistic as to what really happened.

[00:30:25]
GIBSON: But if I go back to my impression of this time in the twenties and thirties, and you're out in West Texas, wasn't there a place for women and they didn't do things like that? Or how did you feel about that? Did you see a lot of independent women and . . . ?

[00:30:42]
CHAPPELEAR: Well, I wasn't there in the twenties, remember, but the thirties. I don't think—when I was a kid, up until the time I'm ten years old, first ten years—I don't think I ever felt anything about that at all. Don't forget, my formative years of high school was wartime. Rosie the Riveter. Everybody . . . . That probably had a big—looking back, that probably had a bigger effect on me than anything else, that I didn't have—feel like I had—any limitations. And my dad never expressed any limitations on me. I think that was very, very important. I did get the feeling from some of my other relatives, other male relatives of . . . that I really shouldn't be doing what I was doing. Yeah.

[00:31:56]
SCHNEIDER: And you've talked about your dad. Did your mother do any work outside of the home? What was her experience like when you were growing up?

[00:32:06]
CHAPPELEAR: Well, of course, she was a widow by the time she was twenty years old. And so she had, during the twenties, she had her own business, a café. And then she worked with her sister in her business in Big Spring. And then when she married my father and there weren't any jobs she—essentially she . . . when I was a small child, she was a housewife. In the forties, when Daddy stopped [working for others] and started doing his own business with the laundry that we had in Big Spring, mother worked in the laundry right alongside him. And she did all the bookkeeping. And then Daddy—when we came back [to Pasadena], [. . .] he started selling automobiles and she did all of the book work. She did all the book work and everything for him.

[00:33:03]
My father died in 1960. So again, she was left a widow. And at that time she started working as a sales lady for one thing she did at Joske's in the Gulfgate [Shopping Center], the first shopping mall in Houston, Gulfgate. And she worked there. She worked as a night clerk at a local motel. And whatever, whatever she could do. No, she worked. Mother was a very, very sharp woman. Very sharp.

[00:33:45]
SCHNEIDER: And you said you had an older half-brother who was, I think, ten years older. Is that right?

[00:33:51]
CHAPPELEAR: Yes, yes.

[00:33:51]
SCHNEIDER: And then you had also a younger brother?

[00:33:53]
CHAPPELEAR: And one younger brother.

[00:33:54]
SCHNEIDER: Okay. And so it was the three of you?

[00:33:56]
CHAPPELEAR: Three of us in the house. Yeah.

[00:33:57]
SCHNEIDER: Okay.

[00:33:58]
CHAPPELEAR: My older brother, of course . . . well, he married very young. And Sam was . . . Sam was an alcoholic. He never went to college. My parents wanted him to very badly, but he wouldn't do it. Instead, he got married. [. . .] And he had three children, and he worked as a carpenter all of his life. And he thought he could beat the, beat the odds. And whenever he would get money, he would go to Las Vegas, [Nevada], and come back penniless. So that was

Sam. My younger brother [Don] ended up with his degree from [Texas] A&M [University]. And he was in the Corps [Reserve Officers' Training Corps, ROTC], so he was first in the service [US Army] for a while, and then he came back and he became an independent businessman, eventually became a builder. And he built our home in Meyerland, [Houston, Texas], for us.

[00:35:13]
SCHNEIDER: And what was his name?

[00:35:15]
CHAPPELEAR: Raymond Donald Stallings. Raymond. My father was Raymond Dero. Dad was called R.D. and Donald used R. Don Stallings as his preferred way of doing it. Don was quite successful financially.

[00:35:43]
SCHNEIDER: And when you were a child, [. . .] what were your interactions with your siblings like—your brothers?

[00:35:49]
CHAPPELEAR: Well, well, the older brother, of course, ten years is a huge difference. So you don't really have interactions with [a] ten year older [sibling]. The closest interaction I ever had to him was when I fell off the porch. I guess I was five years old and frightened his dog and his dog bit me. If you look very carefully, you can see a scar right here. Can you see it? It's very, very faint, a vertical scar. I think it's on this cheek. It may be on this cheek.

[00:36:18]
SCHNEIDER: It's hard to see.

[00:36:19]
CHAPPELEAR: Very, very hard to see. Well, the dog bit me. So, of course, they had to kill the dog and send the head to Austin to be tested to see if it was rabid. And that was probably the biggest interaction I had with my brother. But my younger brother and I, we shared a bedroom until after the war in 1944, after we came back and my parents were able, had finally had money accumulated and could finally build and have their first home. And that's when Don, my brother Donald and I, got [privacy]. I was going into the ninth grade, and that's when he had a bedroom and I had a bedroom. Some of my grandkids cannot believe these stories when I tell them to them. They just cannot comprehend. It was really that way.

[00:37:11]
GIBSON: So going from ninth grade into high school. So I heard you say you really like math. You always thought you'd do something with science.

[00:37:21]
CHAPPELEAR: Yeah.

[00:37:21]
GIBSON: But you had all these other talents and strengths, too, so . . . .

[00:37:24]
CHAPPELEAR: I didn't have a lot of other talents. The speaking, the acting. I didn't really consider that a profession, for me.

[00:37:32]
GIBSON: So you were thinking about a profession?

[00:37:35]
CHAPPELEAR: Well, yeah, a job, something that I would make money at that I would do something with. Yeah. No, at one time I did think I was going to be a brain surgeon. And I realized that that required going to medical school and a lot of things and I didn't think my parents could afford to back me for a medical career. Well, they couldn't, they couldn't. I was very lucky to get into Rice because when I went, I had no tuition. None.

[00:38:05]
GIBSON: So what were your other female classmates thinking about? Were they thinking about jobs or how to get married or what . . . ?

[00:38:14]
CHAPPELEAR: I don't know. Oh, one of them did get married. Two of them did. In my senior . . . . In my class, yeah, one girl hurried up and went to summer school and all, and she got married at the end of our junior year. One girl did that. [. . .] And Virginia Stahl, who was, of course, we sat next to—she was a very nice lady, but she had a job working on Saturdays for a dentist in Houston. She lived next to my aunt, Frances [Frances Armildred "Fanny" Trainer Foreman Shanks], out in Golden Acres, [Texas]. And Virginia worked for this doctor. And so as

soon as we finished high school, she married the doctor. And she was married to him her entire life and they had two daughters.

[00:39:03]
But we had been fairly close before that, but after that we were not close because I didn't—went off to college. And, you know, she instead, was a young housewife. And we had . . . . I guess this is something else that's a little strange. I did not consciously know that dope existed in high school. I guess it probably did, but I didn't know anything about it. It just wasn't—certainly, I think today every kid in high school knows about it. Every kid in elementary school knows about it. But, how much the people . . . . Did you know about dope when you were in high school, for instance?

[00:39:52]
GIBSON: Not really. Yeah, later in high school. Yeah.

[00:39:57]
CHAPPELEAR: Later.

[00:39:57]
GIBSON: Not first . . . .

[00:39:57]
CHAPPELEAR: I did not know about dope at all. In fact, I was just pretty innocent in a lot of ways, which is amazing. [. . .] We had a pretty interesting time. Pasadena was a blue-collar town at that time, and there were a number of us who went to college, but most of them were my friends and all. But we didn't have any special classes, no AP [Advanced Placement] classes or anything like that. We had . . . . Oh, gosh. Well, I was valedictorian, and this was announced before the senior events that I was valedictorian. We had a young teacher, it was his first year to teach. He taught Spanish. So the senior class went off for their picnic day or something like that. And this man was asked to go along as a chaperone because our Miss—what was her name—Miss Mayfield or Miss . . . ? Yeah, Miss Mayfield was one of these elderly ladies in the—she'd been teaching for 6,000 years or something, and she couldn't quite make the trip. So he went along to act as . . . . And he had the audacity to start saying that I shouldn't get to be valedictorian because I, quote, "wasn't popular."

[00:41:51]
And we had a girl in our class—her name was Cornelia McIlvane. Cornelia McIlvane. She was the class clown. And when he started talking like this, she stood up to him and told him he didn't have the right to say anything at all. He wasn't a member of the class. He was an official sponsor, and it was none of his business. And Patsy was the best in the class. And she let him

know. I had never expected that to happen. It hurt me greatly at the time. It really did. It had a very profound influence on me. It was really pretty, pretty bad of him to have done that. Looking back on it, I can see that. And I think it was because—and I think this is true of most of the problems I ran into as far as envy or conflict goes—it's personal insecurity on the part of the person pulling the action. And I was too young to recognize it at the time.

[00:43:06]
GIBSON: How did you feel about what Cornelia said?

[00:43:10]
CHAPPELEAR: I appreciated her very, very much. I was surprised she had the guts to do it. She's . . . it was amazing. But no, we had . . . those were the days. Nowadays, you have all of these psychological tests and everything, and what you can do. Well, they were just developing these at the University of Houston psychology department. And one of the things that they had was what they called the Kuder Preference Test. And they had some sort of an IQ test, too. And they came out and gave us the IQ test and the Kuder Preference Test. And then they were going to "be our advisors as to what we should do." So when I came up to get my results, I found out . . . my advisor says, "You can do whatever you want to. You'll be a success at it." Quite literally, that was the advice I was given. I mean, I was probably the brightest one in my class and had more ability than anybody else did, and so what else could they say?

[00:44:23]
GIBSON: Some would find that a burden in a way, like a lot of—did you put a lot of pressure on yourself, or was that kind of freeing that you could just try what you wanted to try, what you had interest in?

[00:44:34]
CHAPPELEAR: Well, I was actually hoping I would get some—because I really didn't know what I wanted to do at that point, and I was hoping I could get some guidance as to, "This is really the way, the track you should take." But I didn't, and I wasn't clever enough to try to find anybody that could help me. But I knew I wanted to do something in the, you know, the scientific, engineering field. And so I applied for, to go to Rice because it didn't have any tuition, and I would be able to be close to home, and we could minimize costs and everything that way. And probably I could be able to manage it. My family could be able to manage it.

[00:45:18]
And so they had, at that time, they took in 400 freshmen and they took in so many into the science-engineering and so many into architecture and so many into . . . whatever they called . . . academics, which included all the biology people and everything. Is that right, they put the biology people over there or were they in the sci—no, the biology people were with science at

that point. And so you didn't have to declare what your major was when you went in as a freshman. So I went in under the science-engineering category because I didn't really know what I wanted to do.

[00:45:58]
SCHNEIDER: And were you—did you have an awareness of engineering as a field at all? Had you been—did you know . . . ?

[00:46:03]
CHAPPELEAR: No. The only thing I knew about engineering was the construction aspect of it because, I mean, I'd grown up with that.

[00:46:11]
SCHNEIDER: So before we get to your college education, which we definitely want to hear about, I had a few more questions about, you know, your time growing up. And one of them was: what was your religious background growing up? And can you share a little bit about your family and their approach to religion?

[00:46:34]
CHAPPELEAR: Well, we always went to the Methodist Church when we were in Pasadena. I can remember that. My first real strong remembrance of when we lived in Big Spring, and the Help-Ur-Self Laundry was directly behind the Methodist Church, and my brother and I went around to the church for Sunday School there. And then we came back and we were in the ninth grade, and we started then in the Pasadena First Methodist Church and went there all through our high school years. I joined the church when I was twelve years old. Now, when—and I had to be baptized. Or maybe—how old was I when I joined? Was I twelve or fourteen? I can't remember. But I had to be baptized because I had not been baptized. I think I must have been twelve. I had not been baptized when I was a baby.

[00:47:42]
I was very active. Went to Sunday School—in the high school years—and went to the Methodist Youth Fellowship on Sunday night. Yeah, I guess it was. Let's see. I remember in high school being very frustrated with some of my Sunday School teachers because any time I would try to ask a pretty deep question, nobody would attempt to answer it or, kind of, push me off. So I kind of . . . when I got to college, then I kind of rebelled against it. But, no, the MYF [Methodist Youth Fellowship] was very important to me because it was a fun thing to do [with] other people. But I would ask questions that people wouldn't answer. I can remember that. Does that answer your question?

[00:48:38]
SCHNEIDER: Yes. And I was also wondering if—you mentioned spending time with your family on Christmas, were there any other big holidays that you celebrated together, or things that you remember related to your religious life growing up?

[00:48:55]
CHAPPELEAR: We always had a Christmas tree. No, Christmas was the only big—so far as being religious. The family had a lot of everybody getting together over the years of trying [times] . . . . My mother's was a very large family, of course. I didn't have so many with my father, his family, but with my mother's family, we definitely had a lot of times. And my mother's household was in Pasadena, was, sort of, the center of everybody gathering. She was a . . . well, her older sister [Edith Louisa "Icy" Trainer Peters] was a mental hospital patient for all those years. And so she was the oldest in the family and, sort of, the cohesion.

[00:49:43]
And living around Pasadena, I had—in Pasadena itself, there was my older brother Sam was living. And my brother Donald came back there after the war and after he got married and all. He came back and lived there. And my Uncle Joe lived there. My Uncle Fred [Trainer] lived there. My Aunt Frances lived in Golden Acres. My Uncle John [Trainer], Uncle Jack [Trainer], and Uncle Cliff [Trainer] all lived in Texas City, [Texas]. And Serena lived someplace around. Is that everybody? So there was a lot of people right around Pasadena, and it was nothing to be, you know, sitting at the breakfast table and knock, knock, knock, and my Uncle George [Trainer], well, "You got any coffee?" Mother always had the open door and everybody came here. But we had a lot of . . . .

[00:50:48]
During the war years, during the construction time when we were growing up, when we were working over in Baytown, Fred, my Uncle Fred, had the biggest house with the biggest thing. So on the weekends we would all go there because they had the biggest house. And we would have—we would make ice cream with a crank freezer. And Dad and all the men would play dominoes and we'd all have a big dinner together. That was a very common type of thing, that you work during the week and then on the weekend you get together. My cousins and I, we played *Monopoly*. I can remember many, many *Monopoly* games.

[00:51:31]
SCHNEIDER: And what other things did you like to do as a child? It sounds like you spent a lot of time with family, and you . . . you mentioned dolls at one point and . . . .

[00:51:39]
CHAPPELEAR: Well, yeah. My little brother and I, when we were real little, had tea parties. In fact, I've still got my doll dishes we had tea parties with. I played jacks. I wonder if

everybody knows what jacks is anymore. There's twelve different—if you do the whole thing, there's twelve of them, and I can't . . . I've been trying to remember all twelve of them. But there's "over the fence" and "in the pigpen" and "around the world" and "gathering," where you gather them all together. A whole lot of them that you do. [. . .]

[00:52:17]
The other thing we loved to do was to go roller skating. And it wasn't like the fancy roller skates they have now, the roller skates that you had had metal wheels and they had little clamps like this, and you had to have on a shoe like this Oxford that I have on so that you could clamp it into the sides and clamp it and hold it on tight. You're nodding your heads. [laughter] But we loved, we loved to do that. In fact, I don't remember going to a roller rink at all in high school. I think I went to a roller rink after my kids were grown. Did they have them back then? I can't remember. Maybe they had them someplace, but I just don't remember them.

[00:53:13]
What else did I like to do? I like to read. Oh, I love to read. The year we were—two years we were in Big Spring, I read more books than anyone else in the entire county. In those days, when you checked out a book, you had a card and they would stamp it. So the number of stamps you got in or the number of books that you had out. And so at the end and then you get a new book they would collect, staple the new card to it. So I had a stack of about four or five cards, all completely filled up for the two years we were there.

[00:53:48]
SCHNEIDER: And do you remember what kinds of books you were reading?

[00:53:51]
CHAPPELEAR: Oh, it was all the typical ten, twelve-year-old . . . . I read all the *Hardy Boys*, I read all the *Nancy Drew* books, all the *Bobbsey Twins* books, all the Robert Louis Stevenson books, whatever I could get my hands on. But I read them all. My children also loved to read because their father read to them. Very good. In fact, I'm going to tell a story which could have been told [about] me, I'm sure. He would take them to the library. I guess they only went once a week.

[00:54:30]
So he had the special day that he took them to the library, and the librarian wondered because—this was when they were, like, seven years old, eight years old—and they would check out a stack of eleven books or something like this. So she didn't think that she had—my daughter had—really read all of the books. [My daughter, Janice, would say,] "Oh, yes, I did." And so she quizzed her on her [books] and she told her, "That's the story, blah, blah, blah, blah, blah." And told her the story of every book in there. And so they didn't ask them anymore. They knew that when they said they'd read all the books, they had read all the books. They all went to the library and they all came back with big stacks of books and read them every week.

[00:55:15]
SCHNEIDER: And when you were a kid, were your parents . . . you said that education was important to them, though they didn't maybe have the opportunity themselves. Were they encouraging you to read and to get an education?

[00:55:28]
CHAPPELEAR: Okay. Money was very, very tight that I very vividly remember that when I was real little, we had something, a set of about eight books, and one of them was all of the fairy tales, and one was [. . .] it was a set of eight books of general knowledge of what you should read and all. Those just sort of disintegrated over the years from use. And then one of the first things they bought when they finally got their home was a set of encyclopedia. Yes, they valued education very, very much.

[00:56:14]
SCHNEIDER: And then I was also wondering, you talked about, you know, some of the classes you liked in school. Were there any other teachers—I know you mentioned Mrs. Horton. Were there any other teachers throughout your education before college who really made a big impact on you or who got you to think in a new way or that you remember from growing up?

[00:56:45]
CHAPPELEAR: Well, some of them you remember because they were so strict. Probably the one that had the biggest impact on me was the one I had in Big Spring, when I was—the first time I was in the ninth grade. And I had her [Miss Lillian Schick] for English, and she also taught Latin, and I learned English grammar from her. And she got up there and wrote on the board in beautiful penmanship, and you had to write it all down yourself. Noun is the name of a person, place or thing. *Doo doo doo doo doo doo doo*, a verb and all the parts of speech, and so on. And then the second semester she taught you how to diagram sentences. And that probably had a huge impact on my ability to understand the structure of our language and the structure of our sentences.

[00:57:47]
And I found—I did a lot of work during my career with people from other nations who do not have English as their primary language. And I found with an engineering mind, you can appreciate a structure shown in a diagram and understand that when you cannot understand seeing all the words strung together. And I use that many, many, many, many, many times. Did you ever use it in talking to somebody?

[00:58:18]
GIBSON: Not in that way. But I do understand what you're saying because languages have different structures, like different pronoun uses or conjugating verbs. You know, all those things so.

[00:58:30]
CHAPPELEAR: Well, you never probably—you've probably never tried to explain things like I did in my research years.

[00:58:36]
GIBSON: No. Probably not.

[00:58:37]
CHAPPELEAR: I had to explain a lot to a lot of—like I say, we had a lot of students and postdocs from all over the world, especially from the Oriental languages. Their structure is so different. But I found that that probably, over the years, has helped me very much. I remember my seventh grade, I had a Mrs. Lemon for history. And she was teaching world history and only had her for—I was only there half of the semester, for some reason, ins and out—one semester, whatever it was, but I really got a love for history from her. Ah, what else?

[00:59:33]
GIBSON: What about that? Was it the facts she was sharing or the way she shared it?

[00:59:40]
CHAPPELEAR: It was just such an interesting thing to know about all of these people that lived such a long time ago and how they lived and what they did and what was important for them. So she was a very good—she was just a very good teacher. I had wonderful teachers in [the oldest] elementary school there in Pasadena. The Smith sisters [Miss Mae, Miss Lillian, and Miss Sarah?]. There were three of them. One of them was the principal and two of them were the teachers. There was a Miss—in high school, my science teacher was a young woman, Miss Lam was her name. She was real sweet and everything. She made our biology and chemistry and I guess I had—I must've had physics, too. I don't remember whether I had her for that or not.

[01:00:32]
I remember one that made a very negative impression on me and that was the algebra teacher—no, he was teaching trig[onometry]. He was teaching trig. And he was a—really a former coach and everybody still called him "Coach." And we had to prove the—do the proof of—remember proving the sine law and that sort of thing? Well, Wallace and I—I mentioned Wallace before—

proved it. And we proved sine A over A equals sine B over B equals sine C over C. And he wanted it to be proven as A over sine A, B over sine B. Whichever way it was we did the reverse. And he said we were wrong. And I said, "No, we're not." Wallace said, "No, we're not." And we had to argue with him to convince him that they were the exact same thing. Because he really didn't believe they were and we finally were able to prove it to him, I guess. And that's when I got a very poor opinion of coaches teaching mathematics.

[01:01:56]
GIBSON: Who was Wallace again?

[01:01:58]
CHAPPELEAR: Wallace was one of my classmates. [Wallace] Williams. He was the salutatorian. And he and I both went to Rice and studied engineering. He became an electrical engineer.

[01:02:12]
SCHNEIDER: Were you friends with him at that time, or was it more just a classmate?

[01:02:14]
CHAPPELEAR: Oh, he was one of my boyfriends in high school. But not after we got to Rice. No, I had multiple boyfriends in high school, I had four of them. It was a lot.

[01:02:25]
SCHNEIDER: Can I ask what you would do? Would you go on dates or what kinds of dates would you go on in those days?

[01:02:32]
CHAPPELEAR: In high school?

[01:02:34]
SCHNEIDER: [Yes.]

[01:02:34]
CHAPPELEAR: You'd go to the movies. Maybe you might go to the beach occasionally. Except we didn't have a way to get there very often, so I doubt we did that. What else did we do? Or you might, you might get together and play games at somebody's house or something.

With Wallace, I'd go over to his house. His dad had a woodshop and I'd do—I made a lamp and stuff. Used to use the tools. I liked that, I remember that. The other guys, it was going to the movies.

[01:03:10]
I remember . . . a funny thing. The first guy that asked me for a date was when we were in Big Spring. You see, I would have been twelve, thirteen years old. And his name—you always remember these names—Vince Sims. Sims. He was real tall. Oh, man, that was so great. And he wanted to take me to the movies. My daddy wasn't going to have his little twelve-year-old, thirteen-year-old, [whatever] I was, go out with any guy and go. So, "No, you can't do it because we're going to go down to see Big Mama [my grandmother, Serena 'Rena' Adams Trainer] that weekend, so you can't do anything." I literally, we went to see my grandmother so that I couldn't have a date. [laughter] And of course, he never got his nerve up to ask me out again. Oh, lordy.

[01:04:03]
SCHNEIDER: And then one other piece of, you know, your experience growing up that I'm curious about is, you've talked a little bit about World War II and your family members who were involved in various ways in the war effort. But I'm wondering what it was like for you growing up. What were you hearing about what was happening? How did it affect you? What was your awareness of those events?

[01:04:25]
CHAPPELEAR: I had all of these relatives that were there, and they were going off, and you didn't know whether you'd ever see them again. And they would come home. And I would go to my grandmother's, and she had a coffee table that had the glass top on a solid wood . . . and she had pictures of all nine of them under there. So you saw that, and then you had your victory garden and you went out and you helped grow the crops. And what the kids did, we saved tin foil. Cigarettes came with tin foil wrapped around them, and sticks of gum had tin foil around the paper. And so you would peel that foil off and save it.

[01:05:05]
And then we had a rubber shortage. We lived, sort of, out in the country over there in Goose Creek. So when my brother and I, my younger brother and I, would get in from school and we were like fifth and sixth graders at that time, we would go out and walk up and down the highway and pick up all the scraps of rubber and recycle the rubber. And we all learned to sing every one of the, [sings] "Anchors Aweigh, my boy," "From the Halls of Montezuma," ["And the Army goes rolling along"]. We knew every one, every word of every military thing. And you went—when you went to the movies on Saturday, and everybody went to the Saturday afternoon movie, and you see the serial and you see the newsreel. And there was all of those pictures [newsreels], all of war. No, we were very conscious of the war. Very conscious. It was . . . . And you . . . .

[01:06:12]
Being in construction, we had B stickers on our car to get gasoline. To get gasoline, you had stickers on your car, A, B, and . . . A, B, and C, or something. At any rate, A is the absolute minimum thing. And then B was somebody that had to be able to do something. Maybe C was the doctors, whatever it was. And then you had to have ration books. So when you went to the store to buy sugar, you had to have your ration book to buy your sugar with. And of course, everybody participated in preserving the food and canning food. And this was when you used Mason jars and you had to wash the Mason jars in boiling, steaming hot water, and you had your sterilizer that you put them on the stove and sterilize them with. And you helped prepare the green beans or the beets or whatever you were putting up, or make preserves or make bread and butter pickles. I can remember doing all of that. You were very much aware that the war was going on. Very much.

[01:07:22]
GIBSON: How did it feel when the war ended then? So you were, what, in high school?

[01:07:27]
CHAPPELEAR: Yeah, I was in high school.

[01:07:28]
GIBSON: Did things change a lot or did a lot of that continue?

[01:07:33]
CHAPPELEAR: Everybody—we were so happy and people came home. And then it was a great period of financial expansion right after the war. And we had new cars again. Okay, a war story. Nylons. Ladies wore nylons. You know what those are? Hose. Made from silk or nylon. And they were in very—there was silk in those days, of course. Well, of course, there was a very great shortage of silk. Well, my grandmother Stallings [Mittie Ray Leverett], we were living in the help-[yourself]—the laundry—our living facilities was at the back of the laundry. Very, very small little area where we lived.

[01:08:31]
And my grandmother came to visit from California, and she went out and bought a pair of hose she found, and she hid them up in the top of the closet. And my older brother's little girl was, she was, you know, three or four years old, whatever she was at that age. Two years old, I guess. Maybe two. Maybe, she must have been two years old. But she was real curious. And she saw those hose up there and she went in. She wanted to know what they were. Because she saw grandmother hide them. And so sure enough, she got into them and put a run into them. And

that was a great tragedy. But yeah, we knew the war was going on. Some of the stories were like that.

[01:09:21]
SCHNEIDER: Well—

[01:09:22]
GIBSON: Could we take a break?

[01:09:23]
SCHNEIDER: Yes, yes, let's take a break.

[01:09:25]
CHAPPELEAR: Let's take a break. Break it up.

[END OF AUDIO, FILE 1.1]

[00:00:02]
SCHNEIDER: Okay, so we're back on after a short break. So you talked about going to Rice Institute and that there wasn't a fee for tuition. And I'm wondering, did you apply to other places as well when you were thinking about college? Did you apply to other schools?

[00:00:20]
CHAPPELEAR: I suppose in backup, I had the idea I would go to the University of Texas. When every Texas valedictorian has an automatic, in those days, fifty-dollar scholarship to a state university. So I thought I would go to "a state university" and girls didn't go to [Texas] A&M [University] in those days.

[00:00:47]
Oh, one thing we didn't cover that is really significant: at the time that I grew up, there were—and excuse the expressions, but I'm going to say—there were [n-word]. There were Mexicans. And I'm deliberately using those words because they were considered somewhat less than people. And that was the society that you grew up in. Now we had some Mexican girls in our classes. We didn't have any men. We had some of the girls, but they stayed off to their—in their side and they never interacted with anybody else. I don't know whether any of them ever graduated or not. Segregation existed. It was very, very strong. Jews were very much . . . although we ended up finding some very—there was one Jew in Pasadena, and he had the

jewelry store, and he was a well-respected man. There were no Negroes. None. That's what I grew up in. That was the society. It was . . . I'm not very proud of it, but it is what it was and that's just the way it was. And I have learned in my lifetime that prejudice is the worst evil of everything, and it's the root of—it's the root of all of our problems. Okay, enough philosophy.

[00:02:35]
GIBSON: That's a big thing to say, though. A lot of people wouldn't revisit their upbringing like that. So, thank you.

[00:02:40]
CHAPPELEAR: My best friend, I have two best friends now. One is, she's in the [90th birthday] picture book in there, Jackie [Jack Lynn Darden Rundstein]. She and I were classmates at Rice, and I introduced her on a blind date to her husband [Leo Rundstein], who was an ex-boyfriend of mine. And my other best friend forever [Yolanda Franklin] lives down the street here, and she's a woman in her forties. Black woman. And that we can be best friends after what I grew up in, that would just not have even been possible. But I think part of who I am is I have learned that I must not be prejudiced. And I think I am not prejudiced anymore, but I am well aware that prejudice exists and women face prejudice, too. And unfortunately, you may not have observed, but surely you have. I think that the prejudice against women has been increasing in our society, in the United States in the last ten or fifteen years, at a rate that terrifies me. It really does. I fear for the future of women.

[00:04:03]
GIBSON: What do you think that is?

[00:04:06]
CHAPPELEAR: Why do I think it happened? I don't know why it happened. I don't know why it's that way.

[00:04:23]
GIBSON: Can you say a little more how that might influence careers for women? If you see, sort of, this, I don't want to use the term backtracking, but sort of—

[00:04:34]
CHAPPELEAR: Oh, I think that's exactly what's happening is backtracking.

[00:04:37]
GIBSON: So what does that mean for women in careers now?

[00:04:40]
CHAPPELEAR: That means that they're going to have a much harder time. They're going to be held to double standards or triple standards. See, when I started my career, that was when, you know, everybody go out and hire women and make women and integrate women. That was when it started. So I was, kind of, lucky. But I still ran into problems. And I just really . . . I think that the prejudice that we face as women is as dangerous as the prejudice that we face because we are a Jew or a Black or a[n] Irish or whatever. Prejudice is wrong. Okay. Sorry. Got on my soapbox. Now, I, kind of, like so many people when I went to Rice, I felt like I was, sort of, free to be myself. I didn't have to . . . I didn't have to really follow the directions of my parents anymore. So many people do that when they leave home. And I finally found out there were other people that were as smart as I was.

[00:06:22]
GIBSON: Was there something in particular about the direction of your parents you were not wanting to follow, or it was just a sense of it's really your choice now?

[00:06:33]
CHAPPELEAR: I had a feeling of you had to be absolutely proper and prim in your behavior. When we went shopping in downtown Houston in the late forties, ladies wore hat and gloves and hosiery and high heels or heels. That was how you dressed to go shopping. Everybody did it.

[00:07:06]
GIBSON: When did that change?

[00:07:09]
CHAPPELEAR: Woooo. 1880—1980, I mean, pardon me, 1980. Maybe. A long time. For a long time we had this proper way to dress idea. We were talking about this at my stuffed animal project this morning on when we could wear—we couldn't wear jeans to school. In fact, you couldn't even wear pants. And this went on until it—well into 1970.

[00:07:51]
SCHNEIDER: And so thinking about starting in college, what kinds of things were you wearing on campus and to class?

[00:07:58]
CHAPPELEAR: You wore dresses—you wore skirts and blouses and shoes. And, oh, at Rice we had, on Friday, the men had to wear a dress shirt and a tie. Oh, first of all, as a freshman, you wore a beanie, which was a little round cap that had a little tiny, sort of, like a baseball cap, only it wasn't as big as a baseball cap.

[00:08:26]
GIBSON: Women wore it?

[00:08:27]
CHAPPELEAR: Men and women both wore the beanie. And you had to wear the beanie all the time. But on Friday, the girls had to wear a green dress with a white pinafore, and the boys had to wear a white shirt with a—some kind of tie, particular color or something. And you wear your beanie, of course. And you had to wear that all the first semester. Well, my mother made my pinafore. Well, she made it a very plain, apron-style pinafore. And the girls from River Oaks, [Houston, Texas], which is the hoity-toity part of town here, theirs was all frilly with multiple ruffles, and everything that their maid must have spent two hours ironing every week. Mine was very plain looking.

[00:09:20]
SCHNEIDER: And so, how was it transitioning . . . you talked a little bit about that freedom. How did it—what did you think of Rice as a school and the campus, and, you know, that transition to adjusting to coursework and making friends and everything like that? How did that go for you?

[00:09:42]
CHAPPELEAR: Well, it went very well, really. What's done today at Rice is not the same as what I went through. When I was a freshman, we had one morning or afternoon of orientation or something. And they broke us up in small groups and led us around the campus and told us that this is the chemistry building and this is this building and that building, and this is where you go and everything. There were no facilities for women to live on campus at all. There were facilities for men, North, South, East, and West Hall. And they all had a . . . they had one dining facility? I'm not real sure about that because I wasn't a man, so I don't know. But they did have those facilities.

[00:10:32]
Some of the professors lived in the—single professors—lived in the men's dormitories also. They had . . . . Rice is an absolutely beautiful campus. It was planned, from the very beginning, of what the layout would be, and they followed the plan and they had an excellent staff. Tony

[Martino] was the head gardener there from the time it [Rice] started through my years and he . . . perfection. If you want to see azaleas, that's the place to go to see azaleas. If you go in the main campus [entrance] at Rice, there's these hundred-year-old azalea bushes on both sides, and when they bloom in the spring, it's breathtaking. It's just gorgeous. It's just gorgeous, really it is.

[00:11:17]
Anyway, they took us around the campus and then they showed us . . . . And they built in, when they built it, some funny things. The campus was designed after the Italian style, to take advantage of the prevailing winds for coolness. This was before air conditioning because it was built in the early 1900s. And so it was built with respect to that, to try and use that. And you have a lot of colonnades around, carving. They brought over guys from Italy that were stone carvers to do the carvings and all. So there's some special carvings on the oldest building on campus. As you go through the main entrance, they call it Sallyport [archway]. And there's four big corners like this. On the top of them are these figures, and one is the freshman, one is a sophomore, one is a junior. And then there's the bewildered senior with his tassel and [cap]. You really, you have to go and see—that's exactly how they look.

[00:12:23]
And then on the front of the building in the quad, inside quadrangle, there's smaller columns that are just above walking height. And on top of each one of those, on the four sides, are carvings representing the Greek philosophers. I've forgotten who else. And there's an echo chamber in the physics building where you could crawl up [and whisper across to make an echo]. So they showed us all this, and then we ended up in the center of the academic quadrangle, where at that time, the statue of the founder, William Marsh Rice, was. And they seat you on this little, the statue's in the middle and then there's this bench seating thing around, and so you all sit down. And then they proceed to tell you the story of his murder. Have you heard of the murder?

[00:13:14]
SCHNEIDER: No.

[00:13:16]
CHAPPELEAR: Well, Mr. Rice had a lot of money, and they kept trying to get him to form a high school for the boys in Houston, and he wouldn't do it. And instead he wanted to form—he left word to form this Institute. And he went off at the end of his life to New York. And he had a lawyer up there and a butler, and the lawyer decided to make a false will to try to steal this money, and had the butler poison him. And Captain [James Addison] Baker here in Houston jumped on a steamboat and got up there real fast and was able to stop it and get the money and preserve the money so that they could form Rice. "And you're sitting on his tomb. He's buried here." "*Eeeek!*" Well, they no longer have the—in fact, they've just now had a big to-do at Rice, and they have moved the statue to a less prominent place because [Black people on campus . . .]

they apparently were disturbed by seeing him. They were reminded that he was a slave owner. Well, my ancestors were slave owners, too. It's a way of life. And it's . . . . But if it'll make them happy, that's all right. At any rate. So that was that part of getting oriented.

[00:14:48]
Then we started our classes. [. . .] As a science-engineering major, if you were a male, you had to take physical training. But they didn't have them for girls then, so I didn't have that. So I lucked out, I no longer had to take P.E. at any time after the ninth grade. But then all freshmen, regardless of your major, take Math 100, which was introduction to calculus. You take English 100, which is theme writing, make sure you knew how to write. You took math, you took English, and you took history. You could have your choice of whether you took American history or world history, and I took American history. And then everybody had to take a science. And if you were an academic major, you took biology. But if you were an engineering major, you took chemistry and physics.

[00:16:03]
So is that, that's—is that five solids? Yeah. So I took five solids. And then the guys who were in ROTC [Reserve Officers' Training Corps] also had to take ROTC. So they were really busy. We had classes six days a week that went on until noon. All the lectures were from 8:00 a.m. to twelve noon, and then any laboratories you had were in the afternoons. As a SE major, you had a lab for chemistry, you had a lab for physics. Oh, we had another course. I knew I had another course. That was our engineering drawing course. We had to take engineering drawing, which was just a one-hour lecture and a three hour, sitting down and drawing. I can do an ink drawing. Did you ever try them?

[00:17:00]
GIBSON: I took drawing—basically, yes—in high school.

[00:17:04]
CHAPPELEAR: But you took it in high school.

[00:17:06]
GIBSON: And then I also took it in college. Yes.

[00:17:08]
CHAPPELEAR: You did ink drawings?

[00:17:10]
GIBSON: Yes.

[00:17:11]
CHAPPELEAR: I got some stories on that.

[00:17:13]
GIBSON: Then computers came, so.

[00:17:14]
CHAPPELEAR: And then computers came. Yeah, well. Until you've dealt with doing a drawing in India ink where you hold the ink between your nibs and you put your ink on your little pens like this, and you push the pen down to get the width of line that you want, and then you draw it elevated like this so that you don't smear. It's real hard.

[00:17:36]
GIBSON: It is. So at Rice as a freshman, so you're coming in. You said you met people just as smart as you were. And freshmen, they're all mixed depending on the emphasis, it sounds like. So you're in classes with people with a lot of different interests.

[00:17:52]
CHAPPELEAR: Well, no, all of my classes were all science-engineering majors. Because we had our . . . . Our English classes, we were segregated. We weren't with the other people. That would have been the only one where we could have. Now the history class, we had other people in the history class. That was a mixed class of everybody. But our English, we were segregated.

[00:18:18]
GIBSON: So how many—

[00:18:18]
CHAPPELEAR: And our English professor was a young jerk, a young man, fresh out of the University of Chicago. And he held us personally responsible for all the horrors of the atom bomb. And we had to write a paper a week for, you know, thirty weeks or whatever it was and all. And at the . . . . Our grades were, one was an A and five was failure. And after like six weeks or so, we hadn't had a single one up here on anybody's writing in the whole class. My class was twenty people or so. Oh, the ratio at Rice was very small for—most of my classes were twenty people or less. Of the, of that type of class. Now the physics and the chemistry were large classes because all about everybody was in there and our math class.

[00:19:22]
But for math, I had Hubert Evelyn Bray. He was English ancestry, and he had come to Rice with whichever the first mathematician who came to Rice was, whatever his name was, and completed his doctorate there, and then became professor, and he spent his entire career there. That man was one of the most brilliant math instructors I have ever heard in my life. And he made [math] so easy and so beautiful. Of course, he'd probably done it at that point for thirty years, but he—nevertheless, I mean, he was fantastic. But as SE major, you had the three hours and then you had another hour lab immediately after, where the student advisors came in to help you do your problems if you needed help.

[00:20:17]
GIBSON: So how many other women were . . . ?

[00:20:20]
CHAPPELEAR: My freshman year, I think there were six women who were trying out the . . . .

[00:20:26]
GIBSON: In S&E.

[00:20:29]
CHAPPELEAR: In this SE program.

[00:20:33]
GIBSON: So where did everybody live if you're not on campus?

[00:20:36]
CHAPPELEAR: Well, there were a couple of women that had houses within a few blocks or something of the campus, and they had half a dozen people live with them. The girls that lived in Houston lived at home. Now, my saga, every year was different for me. But I started off, through the advisory women or something, we had discovered a family that lived within walking distance of the campus that had a bedroom that they would rent to two girls. And I had a girl, Ernestine, my very good friend from many years ago who also came to Rice as an academic major. And so we rented the bedroom together for that first semester. And that's where I lived. And other girls did the same thing throughout—wherever you could find a place to live, that's where you lived. Rice did not have and still does not have sororities or fraternities. At the time I went there, the big things were the Architecture Society and the Engineering Society, which were mainly all-male. Although there were girls in both disciplines.

[00:22:06]
GIBSON: So did these six women persevere or did some of . . . ?

[00:22:09]
CHAPPELEAR: No, I did.

[00:22:10]
GIBSON: One out of six.

[00:22:12]
CHAPPELEAR: [Yes].

[00:22:13]
GIBSON: Wow.

[00:22:13]
CHAPPELEAR: Most of them dropped out their first year.

[00:22:20]
SCHNEIDER: And when you were attending your classes, were you sitting in the same—like sitting with the men, or was the room split up? Or how did that work?

[00:22:29]
CHAPPELEAR: Oh, no, you just sat wherever you wanted to.

[00:22:32]
GIBSON: So how did the men treat you?

[00:22:35]
CHAPPELEAR: Well, they learned pretty soon that they treated me like a lady. I developed selective deafness. I never heard a bad word or anything like that. They respected me. They learned pretty quickly that I could do the work. So we just did it.

[00:23:01]
GIBSON: Selective deafness meaning they said something you just chose not to listen?

[00:23:06]
CHAPPELEAR: I just didn't hear it. And pretty soon they stopped saying anything. It didn't take very long.

[00:23:13]
GIBSON: Can you give an example of what they might have said, or . . . ?

[00:23:16]
CHAPPELEAR: Oh. "Bitch," for instance, or maybe, "Damn." Damn—whatever foul word you could think of, you know, they would say, and I just wouldn't hear it. And it wouldn't . . . . Maybe they would be maybe trying to be talking about me and knowing that I could overhear if I wanted to. But I just pretended it didn't even happen and pretty soon they just quit.

[00:23:45]
SCHNEIDER: And how did professors react to you as a woman and interact with you, and . . . ?

[00:23:51]
CHAPPELEAR: You were just one of their students. Generally speaking, that was it. Now this one guy, that English professor, this first guy, he was . . . well, he had a real problem with people. Because we had one or two guys in that class who could really write. I never was really good at writing at—well, I got better at things as years went by, but at that point in my life, I was not a terribly good writer, and I recognize that. But these people had, some people have the touch early. Well, they had the touch and their work was really 1-quality work or A-quality work, as most people would call it. But you normally, in a class like that, you'll have a range of grades. But to have as many on the very low [bad] marks as he had, just—it didn't do justice to the [essays].

[00:24:52]
No, as a part of the freshmen we were told to, the address by the president at those days. Look to the right, look to the left. This was at the matriculation address. One of you won't be here next week—next year. One of you won't be here next year. They still were flunking people out, even though they tried to make sure to get people to . . . . I guess, anyway . . . . No, we worked very hard.

[00:25:26]
We, everybody went to the football games on Saturdays. So you finished off class at noon, and then you would rush over to the stadium for the two o'clock kickoff if it was an afternoon game. And then you would go out on Saturday night if you had a date. And drink, or go to a honky-tonk and dance. [. . .] And then Sunday morning, if you could sleep in, you slept in. Now I never did, what I did on Sundays, I went out to Pasadena and washed my clothes. Got my clothes cleaned. And then you started studying again because you had—were back at the books. Now I had . . . so as a freshman, I had engineering drawing and physics and chemistry labs in the afternoons, plus the extra hour of math lab. So I had a pretty heavy load, and that was pretty similar to what I ended up with for five years.

[00:26:30]
GIBSON: So how did you find that versus your high school from an academic standpoint? Was this just another . . . ?

[00:26:38]
CHAPPELEAR: Oh, it was tremendously challenging.

[00:26:40]
GIBSON: Even for you?

[00:26:41]
CHAPPELEAR: Oh, yes. It was very hard. Yeah. I mean, well, I had to actually work for a change. And if you've never had to work and you have to work, all of a sudden that's a big change. And, math was . . . I really liked math and it was so easy. Physics I thought was extremely hard. One thing was—the reason physics was hard—we hadn't had the calculus that you needed to know in order to understand the physics. So we were taking calculus at the same time that we're trying to understand . . . so that's why it was so hard. Now, my husband went to a very . . . he went, in Tulsa, [to] a very large high school, and he had had calculus in high school. Did you have calculus in high school?

[00:27:31]
GIBSON: Yes, I did.

[00:27:31]
CHAPPELEAR: That makes a huge difference. Huge difference. And we had a mixture, you see, in my class. I mean, some of the people that had it, I didn't realize at the time that they'd had the advantage, but that was it. It was different. I remember the first test I ever had was in the

American history—oh, the American history professor, I guess the first week or the second week he has his weekly test—or maybe topic test every two weeks, whatever it was—and he had given us a map of whatever we were studying. And we had to be able to get [memorize] that map. [. . .] If he gave you ten things to draw on the map, you have to be able to draw it on the map real quick. And that was thirty points or something that you could get towards your grade. So everybody—you got that map down solid. Oh, solid. And then he would give you these essay-type questions. And people were just [natural writers]. I wasn't very . . . I've always . . . breaking it down to the essentials. I've been very, very . . . . So I didn't write reams and reams and reams. Well, I decided I really studied hard for that first test. And I remember sitting up and studying until like 3:00 a.m. or something, taking No-Doze to stay awake.

[00:28:53]
SCHNEIDER: Taking what?

[00:28:54]
CHAPPELEAR: No-Doze. It's a . . . .

[00:28:59]
GIBSON: It was a . . . yeah. I don't know if it was caffeine.

[00:29:01]
CHAPPELEAR: It was a stimulant of some sort to keep you awake.

[00:29:03]
GIBSON: It was like having a Monster [Energy] drink or something.

[00:29:05]
CHAPPELEAR: Yeah. And I stayed up and studied and then I went and took that test at 8:00 a.m., and I made a C on it, a three, which is a C, and I said, "Never again." And I never did again. And I did much better.

[00:29:20]
GIBSON: Never again staying up or . . . ?

[00:29:21]
CHAPPELEAR: I'm never again staying up all night and prepare for a test. If you don't know it, learn it as you go along. You can't cram it in at the last minute. That helped a lot.

[00:29:33]
GIBSON: So you were, kind of, challenged maybe for the first time academically. Did you have spare time to do any like extracurriculars?

[00:29:40]
CHAPPELEAR: Oh, yes. Yes. Somehow or other, the . . . . What we had instead of sororities and fraternities, I told you, the two big men's societies, the women had what were called literary societies. And this was essentially just a women's club, you know, you get together and chit chat and have a good time and drink coffee, whatever you want to do and talk about men, whatever you want to do as a group of women getting together. Well, unfortunately, with the total number of women on campus had increased over the years, but they started off with one literary society. And then they had two and then they had three and then they had four. Well, by the time I got there, that only took care of half of the women on campus.

[00:30:28]
And so, I guess the women's advisor, whatever she was called, decided the time had come that they should have more women's literary societies. First of all, we went through a pledge time where all of these literary societies had parties and invited all of the freshman girls to the parties, and some of them were in these River Oaks homes. These are the multimillion dollar places. Things like that. Well, I got invited to the first round, of course, along with everybody else, and I don't think I had a single invitation to any of the second rounds. They had series of two, and then they decided who they wanted to ask if, "Do you want to be a member of the society?" And well, I wasn't the only one like that. There were a lot of others.

[00:31:28]
So we ended up—so half the freshman girls get into the societies and half of them don't. So the other half of us, somehow or other, the advisor to women gathered them up and divided them into four groups and told us that we would form literary societies. And I can't remember exactly—this was a long time ago that this happened. I could ask my friend Jackie, she may remember. And we were told that, you know, you really need to have a group of women to enjoy the full college experience, yakety yak, yak. And so we formed our literary societies. And you had to [select] somebody to—okay, the names of the society were people famous in literature or in the history of Rice.

[00:32:10]
Elizabeth Baldwin was, I think, one of Rice's wives or something. We chose for ours Chaille Rice [Literary Society]. Sarah Lane was one of the first advisors to women. In fact, I think she was still there then. She was one. Let's see. Pallas Athene [Literary Society]. Elizabeth Baldwin

[Literary Society]. Sarah Lane [Literary Society]. Owen Wister [Literary Society]—that was one. That was the OWLS. So we were Chaille Rice and the other three new ones, I can't remember their names. Isn't that terrible? Whatever they were called. Anyway, we had to find a name and all, and we had to write our bylaws and stuff.

[00:32:56]
Oh, well, that was the other thing I had done. I took an early interest in constitutional law and bylaws, and so I was always the parliamentarian in whatever group I was in and modified the bylaws and wrote the bylaws or whatever it was. Anyway, we formed that group and it was a group of about thirty to thirty-five, I think, in each one of the groups, maybe thirty was it. We're a large group, but we found some time where we could get together on the campus one afternoon a week for two or—a couple of hours. We started doing things, like we would all go to the beach together or we would have a slumber party, or . . . you really didn't do anything, just get together and gossip.

[00:33:46]
GIBSON: But none of those women were in S&E, right?

[00:33:57]
CHAPPELEAR: The women in my group? Oh, yeah, there were some chemistry majors and stuff around.

[00:34:02]
GIBSON: There were. Okay.

[00:34:04]
CHAPPELEAR: Nobody else was in engineering, though. Nobody in engineering but me.

[00:34:11]
GIBSON: So it gave you a group where you, kind of, belonged.

[00:34:16]
CHAPPELEAR: Women . . . it's just more people, you know? It was different. It was nice. I mean, it gave—at least it gave you somebody to—where that you could talk a little bit and everything. I think it was good for me because about that time was the end of the semester, and my friend decided to leave and go to Florida for her heartthrob. So I was left with no roommate. So there I was, the middle of the year, and I can't afford to stay there and pay double rent. So I . . . I'm going to talk about money. So I went and talked to the advisor to women, and they had

just had a Jewish family come and asked if they had anybody who would—needed a place to live, and their house was . . . . Do you know where the . . . [US] Highway 59 leaves downtown and goes out towards Sugar Land, [Texas]?

[00:35:19]
GIBSON: [Yes].

[00:35:19]
CHAPPELEAR: It goes right through their house. At Shepherd [Drive]. And so that was—it was away from campus. So when—my daddy at that time had a used car business and so he was able to let me have a car to drive. And I could live there and not pay any room and board. The job that I had was to be with their daughter during the week, so that the man and his wife could go out and take clients out. He was a million-dollar life insurance salesman, and he would take them out and schmooze them Monday through Friday. So on the weekends I was free. And that's where I lived the rest of that year.

[00:36:02]
Now I said money. I got to talk about money. Remember I told you I had typing? Well, when I finished, graduated from high school, I was seventeen years old because my birthday was in October, and I had worked before that time to make money walking door to door selling Christmas cards. And I made good, quite a bit, a good amount of money doing that for several years. And I had worked one Christmas selling jewelry in a jewelry store. I had done babysitting to make money. So I had worked during my growing up years, but I wanted to see if I couldn't make more money because I knew typing and I wanted to get in a "plant," you know, a business type thing.

[00:36:57]
And so I applied at the Champion Paper [and Fibre] Company, which is right there in Pasadena, and it turned out that their engineering department, the woman who was the secretary for the department, was going to get married and their engineering department was situated way back in the back forty, away from everybody else. So there wasn't any other clerical person to take her place. And it was very specialized because she had to be able to run the blueprint machine. So I was going to Rice to study science-engineering and I could type. So they hired me and I spent two weeks learning her job. And she also—took her vacation, but she also took an extra two weeks off. So she was gone for four weeks. And then I worked for four weeks as the office person or secretary person in the engineering department of the company.

[00:37:57]
And of course I made a fabulous amount of money. I've forgotten how much it was. Thirty dollars a week or something. Some huge amount. [. . .] But I was home for two weeks and they called me to come back because they had—somebody else was going and they needed somebody for that office. So I went back and worked, and I ended up working most of the

summer, and I continued to work for them after my freshman, sophomore . . . . Okay, before my freshman, sophomore, junior, and senior years, so I worked there for four years. And the subsequent years I worked, just worked the entire summer. And I made enough money that I was able to pay for my books and my [student fees]. So I ended up the summer with a little over two hundred dollars. And that's because, basically, my books and [fees] cost . . . . [phone ringing] [. . .] Okay. So working for Champion Paper provided me with money so that I was able to pay for my books and my [fees] each of the five years with the money that I had earned. And so my parents just had my room and board—"just"—and transportation fees. So that helped tremendously.

[00:39:21]
SCHNEIDER: And now was there some kind of tuition fee as well? Because I think you'd said initially there wasn't tuition.

[00:39:26]
CHAPPELEAR: There is no tuition. My books were a little over a hundred dollars a year, a *year*. Like a hundred and twenty-five dollars or something on the big years. And the fees, there was a student activity fee that covered your admission to the ball games. There was a library fee? Anyway, the fees were like eighty-five or ninety dollars a year. And that was all. Now, of course, you had to buy blue books and stuff to take notes with. But basically, the equipment wasn't very much. It's truly amazing. Oh, I had lab fees. That's why. Because you have to have all the flasks and stuff for [holding] all the chemicals and stuff. But they weren't—it wasn't very much either. The total fees that I paid were under a hundred dollars a year for five years. And I made enough working for Champion to pay those, which was really good.

[00:40:35]
GIBSON: Were there other learnings you got from the work at Champion?

[00:40:39]
CHAPPELEAR: I learned how bigger companies—because I worked in every office in the facility, including the plant manager's office. I worked in the chemistry lab where they made milk carton stock. So they had biological controls and stuff like that. I worked in the engineering department. I worked in the pulp department. I worked in the shipping and receiving department. I worked in the purchasing department. I did—they bring in huge railcars of pine logs to use to make the paper from and I typed the names of those railcars [mimics a typing noise] over and over and over. Got very—I was pretty good at typing.

[00:41:25]
I worked for a personnel department where they did all of the personnel work. What do they call it? Human relations, nowadays. So, yes, I learned how a big company is organized. I learned

about reports. I had to—when I would work in the laboratory—I had to make the ditto copies. Ditto's that purple stuff we were talking about. Well, we didn't have a ditto machine. We had a jelly roll of . . . it was literally a gel on a roll that you could roll out, and you would make your master and type it so that the . . . well, we have the mirror image stuff. And then you would take the master and lay it on this jelly roll, and you put a little piece of paper under—on the corner, so that you could lay it down and pull it up without breaking the gel, and the ink would go onto the jelly roll. Then you'd take a piece of paper and roll it out on the same place, and that would make a copy. And you could, we could make about fifteen or twenty copies that would be legible in that fashion.

[00:42:38]
That's the kind of machine that I use to make—in later years in other facilities, I learned that there were machines that you could rotate and turn the crank, and it would pull the paper through, and it had a liquid thing that made the ink transfer to the paper. We used slide rules because we didn't have calculators in those days. And so all of our calculations were done—and the men used an actual stick—we called them a stick. Do you know what a slide rule is?

[00:43:19]
SCHNEIDER: I—vaguely.

[00:43:21]
CHAPPELEAR: Vaguely?

[00:43:21]
SCHNEIDER: Vaguely, yeah.

[00:43:22]
CHAPPELEAR: Oh, well. My daughter still has one. I don't have [mine]. But I had—instead of having a stick—I had a circular one. And the stick is—a stick is about this long. It has eight scales on it and there's a middle stick that rolls back and forth this way. And you can do multiplying and dividing and exponential and all kinds of calculations with this. I could do the same thing with my little circular thing where instead of moving the sticks, I move the indicators. There's also a round one that's this big, that's the equivalent of a twenty-four-inch [maybe thirty-six-inch?] rule. But anyway, that's what I did all of my calculations with when I was at Rice.

[00:44:06]
GIBSON: So you had to buy one.

[00:44:07]
CHAPPELEAR: Well, yeah. Yeah. I bought that. Yeah. You had to buy that your freshman year.

[00:44:11]
GIBSON: So why did you buy the circular and not the stick?

[00:44:12]
CHAPPELEAR: So it'd fit in my purse.

[00:44:13]
GIBSON: Ah, okay.

[00:44:15]
SCHNEIDER: And you had also mentioned a blueprint machine, I believe.

[00:44:19]
CHAPPELEAR: Oh that was at . . . yeah. And in the engineering department there, they had his gigantic machine where—the engineering drawings generally are big like this because you've got to make them big enough where you can write stuff on them, and you end up with [a big piece of paper about 3 ft x 6 ft]. You've got a lot of information on there. So in working with them, you make prints and then you mark up on the prints what you want to do, and then you put the stuff onto your drawing. That's just the way that—you don't actually work on your original vellum drawing. Okay. That was the olden way of doing it.

[00:44:56]
And you have to—when you make changes, you had to doc . . . . Well, you have your original drawing of whatever it is at the first stage, and you have the first stage of it and you sign off on the review, you've got a certain thing, you get it approved. And then as you go along and you make additional changes and stuff to it, any change you make, or addition, you put a little triangle with it, with a number in it, and then you have over here on the drawing, a log of the changes that are made to that drawing, so that people can tell what stage and what has happened and what's going on. And we have different kinds of engineering drawing depending upon what . . . . I ended up doing project engineering so I dealt with everything. The first concept may just be for . . . . Let's see. It's really hard to . . . . I'm trying to think of a good way to [describe] this.

[00:46:16]
GIBSON: You're talking like a process drawing.

[00:46:20]
CHAPPELEAR: Yeah. Even before a process—a project drawing.

[00:46:22]
GIBSON: A project drawing.

[00:46:24]
CHAPPELEAR: Okay. You're going to have . . . . Okay. You're planning a dinner party or something. Okay. And you've got your menu. So you've got meat, salad, so on, and so each one of these would be a box. And then you bring those boxes together and then you've got to have somebody bringing the flowers. But the whole idea is the dinner party. Now the dinner party is part of the celebration that's part of something else, you can—so you can do this in stages. And at each one of these you get more and more detail. And finally you've got to actually, if you've got the dinner party particular dessert to make, for instance, then you've got to have the recipe with all of the specifications for it, and you've got to go out and buy the equipment.

[00:47:10]
And so every one of these in engineering can be a drawing. For instance, piping. We could end up with what we call a spool drawing. A spool drawing is the actual drawing of the piping over there at the sink. You can see the piping and the piping underneath the sink. And we have drawings actually look like that because then you can take that and you can measure how long it is and what are the valves that you need. And the valve that you put on there, you end up on that valve. You have a little number by it. And that tells the people doing it that they need to buy a certain type of valve to put in that particular place, on that particular pipeline. Those are engineering drawings.

[00:47:50]
SCHNEIDER: And so was this something you were learning in your coursework and also had exposure to at this job, or was one place more . . . ?

[00:47:59]
CHAPPELEAR: It's . . . okay. The ones at the engineering company, it was an actually operating plant. So those drawings would be where they were doing some revisions to something, and it had all sorts of moving mechanical equipment that they had. And so theirs would be very detailed mechanical drawings. At the school, what you were learning in the school was the techniques of how do you make a drawing, how do you draw a line, and how do

you depict something, and how do you depict . . . how do you depict a pump? We have a symbol for a pump. It looks something like that.

[00:48:39]
GIBSON: So it's actually quite fortunate that you could apply and see it in action at the same time.

[00:48:45]
CHAPPELEAR: Yeah. I mean, I learned a lot of stuff about engineering by working at the company, as well as learning all about how a big company, a manufacturing facility, works. And it was really excellent experience for me.

[00:49:01]
GIBSON: Because you really had not been exposed to something like that prior, other than, you know, a laundry or other businesses.

[00:49:07]
CHAPPELEAR: No, just . . . . I hadn't had any experiences, anything like that.

[00:49:11]
GIBSON: Was it intimidating or did you . . . were you curious?

[00:49:15]
CHAPPELEAR: I was just curious. Oh, it's fascinating to find out all the things and the government regulations and the . . . with respect to the personnel work that we did. The fact that they made . . . and what the different kinds of materials, the calender side and the non-calender side. And they made material for *Time* magazine, so the material—the paper had to be finished on both sides. Calendered. That's the ironing process. And that's why—most paper you have has a side that has a finer finish than the other side. It's . . . paper is very interesting. In fact, most things are interesting.

[00:50:01]
SCHNEIDER: And I think you noted in some things you had written that you had some other jobs during the academic year as well?

[00:50:08]
CHAPPELEAR: Oh, yes. I didn't have any during my freshman year. But when I came to my sophomore year . . . I, what did I do? Oh, I worked . . . my sophomore year, I worked for the man [Edwin Mather Wyatt] who had taught us the engineering drawing the first year as one of his lab assistants. Now, you've got to remember that we took our drawing course in a Quonset hut. Do you know what a Quonset hut is?

[00:50:38]
SCHNEIDER: [No].

[00:50:39]
CHAPPELEAR: World War II. It has a round roof like this. And it's long and it's metal and it's hot in the summer and freezing in the winter and horrible. Anyway. So that's where we had it. And I was the student assistant to help these people try to pass engineering drawing. And this was when we had the guys coming back from being in the service. And we had one guy in my group, and he was a rather pudgy fellow, and he sweat and sweat and sweat like, I mean, it just, kind of, poured off of him. And we had to do these ink drawings. And I told you how it can be very difficult to do ink drawings. And in order for him to pass and do his ink drawing, I got a huge . . . towels or a bunch of rags or something, I've forgotten what. And I stood over him and kept wiping his forehead while he did his drawing, and he passed.

[00:51:43]
And that's what I remember about that year, was—I can't remember his name, but I wanted everybody in my group to be able to pass. You know, I had to help a lot of others . . . but he was the one that took the most help. And it was trying to stay dry so that you didn't sweat. Oh, you drop one drop of sweat in there and that ink just goes *pssssh*, you have to start over. Only somebody who has made . . . if you ever try to make something and just have it go *pssssh*, all over the place, that was doing ink drawings. It was something. Let's see, I did that my sophomore year.

[00:52:30]
My junior year, what did I do? I don't remember what my job was. Oh, that may have been the year that I came to Pasadena and . . . . Well, one year, I got a job babysitting in a church in Pasadena on Sundays. And that's how I made money during the school year. One year, I guess it must have been my senior year—you take your first chemical engineering course in your junior year. Before then, you were just taking the introductory things. And after I took the introduction course to chemical engineering, I graded the papers for that the following year. What else did I do? I can't remember what else. But if I could get a little job, I got little jobs.

[00:53:35]
SCHNEIDER: And how were you balancing those jobs with your schoolwork? Because I

know you said, especially in that first either semester or year, I can't remember, you were talking about, you know, taking a lot of courses, so how did—

[00:53:46]
CHAPPELEAR: Well I took a lot of courses every year. Every year we took at least five solids. And our drawing courses were extras. So your freshman and sophomore year you took five courses, strict academic, which had two labs, at least two labs. And then you had the drawing course in addition to that. And then our last three years, you just took five solids.

[00:54:15]
GIBSON: Looking back on all those courses, what was the hardest one for you?

[00:54:27]
CHAPPELEAR: Probably thermodynamics. What I ended up doing.

[00:54:32]
GIBSON: I was going to say. What was the easiest?

[00:54:38]
CHAPPELEAR: The straight math courses. What was the most interesting? The plant trips.

[00:54:56]
GIBSON: Why were those interesting?

[00:54:58]
CHAPPELEAR: To actually see things and to see what there was. And of course, the final plant design course. The ultimate capstone course of chemical engineers.

[00:55:08]
GIBSON: Can we talk a little more about those plant trips? Because to me that's a helpful eye into things in practice right in the real world, which you got at the paper company.

[00:55:24]
CHAPPELEAR: Okay. We took our plant trips . . . let's see . . . it was the year that I voted for [Dwight D.] Eisenhower. So I was twenty-one years old that fall, and I got to vote. So

whichever year I was . . . . Seventeen, eighteen, nineteen, twenty. So it would have been my senior year. It was during our fourth year. And Professor [Arthur J. "Pappy"] Hartsook was the one that did the plant trips. And of course, he had been doing it for a thousand years and everything. And what he did—

[00:56:10]
GIBSON: Was he the head of the department?

[00:56:11]
CHAPPELEAR: He was head of the department. Yeah. "Pappy" Hartsook. Great guy. More about him later. He would—we'd have a meeting and he would tell us where we were going and what we were going to see, and then we would go out and go through the plant tour, and it would be about three hours or so. And living in Houston, being in Houston, we could go and just do one a week. People who—the students . . . probably you went on a trip where you did a whole lot of visits, right? One after the other? See, so I had a real advantage in only doing one a week, and then we had to write a report on what we had seen and everything, and everybody had to write their own reports. You didn't do this as a group effort.

[00:56:58]
So I think I had really good plant trip experiences. I can remember the first thing that we went to was a sewage treatment plant. Chemical engineers work in sewage treatment plants. Okay. So you did all of that. Then we went to a place that made the tiles for the flooring. Not the vinyl tile, but the other kind. The asphalt tiles that people made. Okay. That was something. Then we went to a steel mill. You can see there's a wide variety of things that we're seeing. We went to the Imperial Sugar [Company] factory out in Sugar Land. We went to the Coca-Cola Bottling Company. We went to the Nabisco [National Biscuit Company] cracker manufacturing facility. Okay. Okay. Then we went to Dow Chemical [Company] down in Freeport, [Texas], and then we went to Shell Oil [Company] refinery. And then the final one that we went to was the Pabst [Brewing Company] blue ribbon beer.

[00:58:33]
GIBSON: Which was a wonderful variety, right, of different processes, different industries.

[00:58:36]
CHAPPELEAR: Yes. I mean, it's a huge, huge variety of . . . and it showed to me what a wide—made me very glad I was going into chemical engineering because there's such a wide variety of what people can do.

[00:58:53]
SCHNEIDER: And what kinds of things were you seeing? What were you learning? Was Professor Hartsook like, you know, telling you things as . . . ?

[00:59:03]
CHAPPELEAR: Oh, he told you what the process was that we'd be seeing, and we would see that. And we would actually get to see the equipment and to see what a pump looked like, and to see these big valves. And the beer thing, the great big thing that has to be kept so very clean where they are processing the hops and stuff and the brewmaster has—he was huge, but they had this, he had to go inside and make sure it was clean enough and everything. It's seeing all this and just . . . . And then you got to see the mechanics of the filling of the bottles and all and the things they had to do to keep it especially clean for the food processing industries and the . . . . Well, it was just . . . you just saw so much and you were up close.

[00:59:54]
GIBSON: So how did you, kind of . . . there weren't a lot of women working in these fields then. So what did you do for like, PPE, personal protective equipment?

[01:00:04]
CHAPPELEAR: Well, I wore pants when we did—went on these trips. We didn't wear hard hats, as I recall. If we did, the companies gave us hard hats when we got there and took them back up when we left. [. . .] We had to wear closed shoes like this, but we didn't wear steel toed.

[01:00:31]
GIBSON: Were there safety glasses or not always?

[01:00:35]
CHAPPELEAR: I never remember wearing any safety glasses.

[01:00:39]
GIBSON: Were you ever feeling a little, like, in danger walking through any of these plants?

[01:00:44]
CHAPPELEAR: No.

[01:00:44]
GIBSON: Sometimes they're quite intimidating. Large equipment and things like that.

[01:00:48]
CHAPPELEAR: No, that didn't bother me.

[01:00:50]
GIBSON: Did you ever see any women at these places?

[01:00:54]
CHAPPELEAR: No. I don't recall any operators or anything. It's what you're talking about—operating the . . . . Trying to remember [who] the steelworkers were. No, I don't remember any women at all. But that didn't register on me.

[01:01:24]
GIBSON: Right. So you're seeing this huge variety. Was there some that really piqued your interest more than others? Or it was just like a candy store?

[01:01:30]
CHAPPELEAR: I know I didn't want to work in a sewage plant. [laughter]

[01:01:33]
GIBSON: Ah, okay.

[01:01:36]
CHAPPELEAR: No. No, it wasn't any particular one. They were all interesting.

[01:01:44]
GIBSON: Your class colleagues, did they end up working in some of these industries, or how did they respond to some of this?

[01:01:52]
CHAPPELEAR: Well, I'm not sure where everybody ended up. I think most of us went to work for oil and chemical companies. One guy I know went into nuclear. Hard to remember. We had one person in the class, while I was working at Champion Paper, he worked for some

chemical or oil company—I don't remember which one—for four summers, and he went to work when we finished our fifth year. Oh, when we finished our fifth year, we got—the degree was called a Bachelor of Science in chemical engineering. And I went to work for Shell. And there was a guy there who had a so-called Master of Science, and I discovered that my bachelor's was better than his master's.

[01:02:58]
GIBSON: Better in what way?

[01:03:02]
CHAPPELEAR: I had a better grasp of the fundamentals than he did. Rice taught the fundamentals. And that course, it was better than a master's course. Yeah. It was very good. And later on, they did change the name to the degree, to a master's degree.

[01:03:20]
GIBSON: So here you are—

[01:03:21]
CHAPPELEAR: The guy I was telling you about that worked for the company, he went to work for four hundred and fifty dollars a month. And I went to work for four hundred and nine dollars a month with Shell. Looking for a job was an interesting experience. They came to the campus and interviewed and all this kind of stuff, all the big companies and everything did. And I was interested in Mallinckrodt Chemicals in Saint Louis, [Missouri], and they invited me to come up there for an interview. And so I went, I got on the airplane and flew for the first time in my life. It was quite interesting. And I got up there and went out and interviewed, but I didn't like it because it was out in a not very nice part of town, and I didn't . . . *ehh* . . . I didn't get good vibes.

[01:04:15]
GIBSON: Why did you—why were you interested in them in the first place?

[01:04:19]
CHAPPELEAR: I thought it'd be very interesting to work in chemicals. See, at that point, you know, I didn't know anything. I'd just been going to school. I didn't know anything about what it really meant to be working in a chemical company or an oil company or any . . . . You really don't know anything when you get out of school. Okay. If that makes any sense.

[01:04:38]
GIBSON: Can you repeat that one? [laughter]

[01:04:40]
CHAPPELEAR: You really don't know anything when you get out of school. You think you do, but you really don't. So I went there and then I went down to Dow Chemical. Oh, I was going to go to Dow, but then I decided, no, I won't go there because I found out from some of my colleagues who had gone down there that they—when they went down to interview, they proceeded to give them a psychological test. And that made me decide I didn't want to work for a company that was going to base hiring me on some psychological test, not on my engineering ability.

[01:05:15]
GIBSON: So it was a psychological test, not for chemical plant operators?

[01:05:18]
CHAPPELEAR: No.

[01:05:20]
GIBSON: It was for the engineers.

[01:05:20]
CHAPPELEAR: This was for engineers.

[01:05:21]
GIBSON: Wow.

[01:05:22]
CHAPPELEAR: And I . . . it didn't sit well with me at all. And then I interviewed at Shell, and they made me the offer to work in the refinery in the . . . . The way Shell did it in those days, they had a lot of engineers in the refinery, mostly chemical engineers that were in their research lab. It really wasn't a research lab. What you were there for was to learn how you solved any operating problems that you had going on. There was another group of people that actually ran the refinery operators and did the real work, and there was the administrative group that were also—some of them who were engineers, the managers and stuff. But the people in the research lab were really backups for when there were strikes. Then you had to go out and operate the refinery. That was what the real purpose was of them. Well, then this, as I said

before, this was at the time when they were starting the push that everybody has to have equal opportunity and everything. So as a woman, I was in real demand.

[01:06:35]
GIBSON: Was it *really* a push, though, for equal opportunity?

[01:06:38]
CHAPPELEAR: Oh, yes my dear. Yes, it was. Yes, it was. They were very proud to have a woman engineer.

[01:06:43]
GIBSON: Shell was?

[01:06:44]
CHAPPELEAR: Oh, yeah.

[01:06:46]
GIBSON: What about the others?

[01:06:48]
CHAPPELEAR: Oh, well, the other companies? When they got a woman, they were very proud to get a woman. Yeah. That's the kind of jobs that they would give you [a job that was for publicity purposes]. But I got a real job. Shell was very good about that. Like I say, there was another young engineer who was hired at the same time, and we were each given a specific problem child that they had. Mine was in the lube oils plant, and they were—I had to try out a new piece of equipment to be used for extraction. And it was a Podbielniak extractor. It was a rotating drum. It went very fast. And so you had the gravity effect [for] separation, and it had multiple stages inside, like a rotating fractionating tower. She's [Gayle Gibson's] nodding her head. She knows what I'm talking about.

[01:07:40]
But at any rate, when we put the crude oil in there and did it, the asphalts fell out and blocked all the openings and blocked it. So then I had to have the machinists come over and take—the first time he comes to do it, and he sees a *woman*? I mean, it was literally the reaction that I got, you know, he was really shocked. But he was happy to do what he needed. And he took it apart and we found all the asphalt in it and everything. Well, anyway, I was not very successful in getting that to work, and I knew that it wouldn't work even on a—I had an experimental pilot plant size.

What you do in engineering is you start with small if you can, and you scale up from there, generally speaking.

[01:08:19]
SCHNEIDER: Now, I'm sorry, I think I missed this. Is this part of your interview or is this when you were actually working there?

[01:08:25]
CHAPPELEAR: No, it was when I was actually working for Shell. Oh, no, the interview with Shell, I don't remember much about. But they made me the offer and I took it. I made a fairly early decision.

[01:08:35]
SCHNEIDER: Okay. And so I want to go back for a moment to your college years. And I was wondering if there were any other influential professors or classes or mentors in your undergraduate years?

[01:08:48]
CHAPPELEAR: Let me tell you the biggest influence I had. At the end of the sophomore year, the program was you had to decide what you would . . . actually, you have to make a decision at the end of the freshman year whether you're going into civil engineering or not. And at that point, I decided I did not want to go into civil engineering according to what you'd be taking the following year. So then at the end of the sophomore year, you have your final decision, what are you going to major in. And at that point, I decided mathematics was too easy, physics was too hard, and I'd already ruled out [civil], and electrical just really didn't appeal to me. It was just . . . I just didn't feel like an electrical . . . . So that left chemistry or chemical engineering.

[01:09:40]
So I decided to go talk to the department and see what . . . . So I went to the head of the chemistry department, and George Holmes Richter was his name, and he was a very large man, and he was over six feet tall and very large as well. And I was five foot five. And I told him I was trying to decide between chemistry and chemical engineering. And he looked down at me and I can remember his words, "Miss Stallings, it doesn't make any difference what you major in. You're just going to get married and have a family." And so I left him and went down and found Professor Hartsook. And he was a much shorter man, and also a little round, rounded. And he said, "Miss Stallings, I would love to have you in my classes. I haven't had a young lady in my classes for" I don't know how many years, "ten years now" or something, whatever it was that it had been, "And yes, I would very much like to have you in our class." So that's why I became an engineer instead of a chemist. And it turned out to be ideal for me.

[01:10:55]
SCHNEIDER: And, you know, in some questions earlier, Gayle was asking about, you know, how did it feel when people said things like that? How did it feel to you when you—when the professor said that and . . . ?

[01:11:07]
CHAPPELEAR: It made me very angry. Very, very angry.

[01:11:11]
GIBSON: Why?

[01:11:11]
CHAPPELEAR: He was belittling my ability to function as a human being. To fully function, and I felt very insulted at that. I had seen my grandmother and my mother as women who had had very difficult things to overcome and had overcome them in their lives and had reared their families. I mean, that was their job, what they did and provided for them financially because my mother was a major portion of the financial income of our family, as well as my father, that became very obvious in my high school and college years. And my grandmother, she had spent her whole entire life, practically. So, I mean, I was pretty well, I was insulted.

[01:12:16]
GIBSON: It's interesting. You know, sometimes people that are very capable and smart, can do a lot of things, we almost go through a process of deciding, "Well, I don't want this. I don't want that." So you said you didn't want to go civil and you learned you didn't want to go electrical. What if Professor Hartsook had said, "Well, you know, maybe this isn't a good fit for you either." Do you have any idea what you might have done?

[01:12:40]
CHAPPELEAR: Probably I'd have gone into medicine, of some sort. I doubt I would have gone for an MD at that point. I really have no idea. I have no idea. Maybe I'd have gone into business. Who knows?

[01:12:57]
GIBSON: Well, it's interesting how pivotal that became to you, his welcoming into the field at that point in time, you know. Sometimes we don't realize the effect we have on other people.

[01:13:10]
CHAPPELEAR: No, that's true.

[01:13:11]
GIBSON: Did you ever tell him how pivotal that was?

[01:13:15]
CHAPPELEAR: I think so, yeah. [. . .] Hartsook had a tremendous influence on me. He did on all the people that he taught. In the later years when I was working at the university, Rice had their first ever fundraising effort where they really went out and tried to raise money from the graduates. [Riki] Kobayashi, the man that I worked with, had funding for a chair in chemical engineering, the Louis Calder chair, and he was appointed to the chair. So as soon as he was appointed, he said, "I want to raise money for a Hartsook chair."

[01:13:58]
And so we got a list of all of the people who had engineering degrees under Professor Hartsook. There were about 900 of them. And we had to raise a half a million. I don't have this down right. Whatever it was, it was a lot of money. A lot of money. [It was four hundred thousand dollars.] And all of the big donors had already been contacted at this point. And so we got this list, and Riki wrote letters and made phone calls. And we went to see people and we made trips, and we would knock on the door of the refinery or the chemical plant and find all of these people. And we raised the money and established the [A.J.] Hartsook Chair in Chemical Engineering.

[01:14:43]
And I wrote letters and he wrote letters. And one letter I remember so well. This is part of why I'm so adamant about the prejudice thing. The one letter that we had that influenced me a lot was from a man who was a Jew, and he wrote back that when he had finished his degree in 1939, that Professor Hartsook advised him, "Don't bother trying to get a job on the [Houston ship] channel. Nobody will hire you, you're a Jew. Go back up East and get a job." Well, the man resented that he had gotten this advice. But, you see, Professor Hartsook was very practical. He knew that that's what he had to do to get a job.

[01:15:40]
We raised all the money and we found chemical engineers. One was the Vice Governor of Oregon. A man and woman who finished classmates in the mid-forties [were the owners] of a shrimp boat fleet out of Corpus [Christi], [Texas]. One man [was] a bishop in the Episcopal Church. And then every major oil and gas company in the United States had at least one chemical engineer in the upper echelon of the company. And every time we went out and we would know that somebody worked at the plant, and we would knock on the plant door and the

person who would come out would be the manager of the plant. It happened over and over and over again. It was truly amazing.

[01:16:42]
So we had a special night [to found the Hartsook chair]. [See images in Appendix 1] And everybody and everybody came. The man had—everybody respected him so highly. [phone rings] Oh, gosh. Excuse me. [recording paused and begins again] No, Professor Hartsook was really a very fine person. And he was really interested—he knew all of his students. He kept everybody's names and where they were, what they were doing. Very, very caring person. He's an interesting part of the history of science. Hartsook got his first degree in mathematics and was a mathematics teacher. Then he went back to MIT [Massachusetts Institute of Technology] and studied with the big names, [Warren Kendall] Lewis, and, you know, the ones that we have, those antique books from the antique professors.

[01:17:32]
GIBSON: Yes, yes.

[01:17:32]
CHAPPELEAR: I'm sure you'd know the names if I could think of them. Anyway, he studied with them, got mimeographed copies of their books. See, this would have been in the 1920s. And then he came back and he started the chemical engineering department at Rice. So he had a master's in chemical engineering and yet he started and grew the department to what it was. He was tremendous. He was tremendous. Fascinating person.

[01:18:02]
SCHNEIDER: And was it also during this time that you met Riki Kobayashi?

[01:18:06]
CHAPPELEAR: Yes, Kobayashi. Yes. I had Riki as an instructor for my phase behavior course. Respected him very highly and he became very ill with a brain tumor while I was a student, during . . . I guess it was the end of my junior year or something like that. And they treated it with radiation and put a shunt down the back of his neck to equalize the pressure between the—what was in his head and what was in the spinal column. And he had this place on each side of his head where the radiation had been done, where the hair went down. He was a genius before. Afterwards, he was just a very, very brilliant man. He ended up a member of the National Academy [of Engineering].

[01:19:00]
GIBSON: I mean, that was . . . . Was that unusual then to have a professor that . . . he was first-generation Japanese American?

[01:19:08]
CHAPPELEAR: [Yes]. I think it's pretty unusual, don't you?

[01:19:10]
GIBSON: Yeah.

[01:19:12]
CHAPPELEAR: His father was an engineer, but when he came here, he couldn't work as an engineer. And that's when he became a truck farmer.

[01:19:20]
SCHNEIDER: His father was the truck farmer?

[01:19:21]
CHAPPELEAR: His father, his father. His father had returned to Japan and gotten a Japanese bride and brought her back. Riki was quite a character. I could tell Riki stories all night. He was riding on a train in Japan, and so he ordered eggs. He thought he ordered [two three-minute eggs]. He got three two-minute eggs. He and Tom [Leland] were sitting one time talking something at a hotel—at the Philadelphia airport or some such place, and they called the plane and everything. The plane took off and they just kept talking.

[01:20:11]
And when I went to work for them at the end of my career, when I was working for the engineering company, Riki was a consultant there, and we had this one brilliant guy, absolute genius, doing, designing sweetening plants. Amine plants. He would [keep] working away. All of a sudden, he hears this voice talking. And this guy, when he worked—many engineers do this—when you work, they kind of go down in this little hole, and you start talking to them and they, "What's going on?" Riki had come in, did what he usually did, resumed the conversation they'd been having two weeks before, the exact point where they'd stopped off. He was a character.

[01:20:57]
GIBSON: So was it—you said you enjoyed the class—was it the topic?

[01:21:03]
CHAPPELEAR: I found the topic, phase behavior, very fascinating.

[01:21:06]
GIBSON: What fascinated you?

[01:21:09]
CHAPPELEAR: We'd all work together. That was the part—I ended up doing a lot of work in that field when I was working with him, of course. And we made a wonderful discovery, double retrograde condensation. It was fascinating.

[01:21:22]
You know where the K values ended. That was one of my highlights. Riki called me one night. The binary-K system. Think. Vapor liquid equilibrium is expressed in terms of K, the ratio of the vapor to the liquid. And we have drawings of what the curves look [like]. And if you have a binary system, Riki called me one night and said that the high pressure end was the [critical] pressure of the lowest [heavier component]. It wasn't known until Riki did that. And when he called me that night, I said immediately that the other end was the low pressure point of the two components that was there. That . . . before everybody's charts of this binary system looked like this. And when we were through, you could do it like this and like this. And we knew which way they went. We discovered that. In one night. That was one of the highlights of my career, that night. I knew it immediately, that it had to be that way.

[01:22:28]
GIBSON: Was he even—he wasn't going to say that, he was going to say something else?

[01:22:31]
CHAPPELEAR: No, he was talking about the high pressure. I know what the low pressure end was. Once he said the high pressure, I knew immediately what the low pressure was. Now, I had "aha!" moments in my research. Not everybody does this, but that was one of them. And the other one was with the Burnett experiment. [. . .] Mr. [E.S.] Burnett was [in] New Hampshire [or another New England state], I think. At any rate, he developed a way of measuring the density at various pressures and temperature. And from this, we can develop how a particular gas—I'll use the term gas—behaves and what its density is and everything. And then from that you go back to your basic physical chemistry and we have a thing called virial coefficients. The second virial coefficient is one of the first things that you derive from information like this.

[01:23:42]
Well if you have sufficient information, and it's good information—it has to be high-quality

data—not, “This is six inches” type of data where you just hold up your hands and say, “That’s six inches between it.” You’ve got to really know that that is 6.0000 inches, type of stuff. Well, with the Burnett experiment, you could get data [with that significance]. And I went in one day and Gary Pope was doing his things, and he said he had figured out that the particular apparatus that we had developed, that if he would charge it up to the exact same conditions and change it, that they would be connected, the two points, and then the two expansions would be connected. And when he did this, I told him, “If you do that, the entire matrix is connected.” And he spent the weekend working on the equations. And I came in and this was a major breakthrough because then we could measure third virial coefficients, which heretofore had been measured with the, like, plus or minus 400, 500 percent. And it was down, like, I don’t know, 2 or 3 percent. It was a huge, huge improvement. And I can remember both instances and how . . . well, it was just exciting.

[01:25:08]
GIBSON: Well, I mean, those are, kind of, contributions may be taken for granted now because it’s interesting to hear your side, to hear the story from you.

[01:25:20]
CHAPPELEAR: What do you mean they’re taken for granted?

[01:25:21]
GIBSON: Well, it’s what we’re taught, right?

[01:25:25]
CHAPPELEAR: Oh, you mean it’s being taught now?

[01:25:26]
GIBSON: It’s what you helped create.

[01:25:29]
CHAPPELEAR: Yeah, yeah.

[01:25:29]
GIBSON: But now it’s just taught.

[01:25:30]
CHAPPELEAR: Oh, you were just taught it. Oh, I'm sorry.

[01:25:36]
GIBSON: That's what I mean.

[01:25:37]
CHAPPELEAR: That's what's even more amazing is we did a lot of work with Riki and gas hydrates and the crystallography. Do you know that crystallographers used to just sit and think to try to figure out what the configuration . . . ? Nowadays, they have all this X-ray technology and everything, and they can get actual pictures. And used to they'd just have to sit and think. And the hydrate lattice is very complex. It's a . . . involves dodecahedra and hexadecimal. Sorry, it's very complex. And the guys that figured it out, one of the early workers was a man—and that's the thing about it, these breakthroughs can come in weird places—he was a man with the Illinois Water Authority [Association], and he figured out the most complex structure. Yes. And one of—a Nobel Prize winner—went and tried to steal his work. That's something . . . that's one of my other pieces of information.

[01:26:44]
GIBSON: I think we do want to dive into those, maybe tomorrow.

[01:26:49]
CHAPPELEAR: Let's see. What else do you want to know about Rice?

[01:26:53]
GIBSON: So when you—you finished Rice and you talked a little bit about getting, kind of, the job at Shell. So was that a validation of, yeah, chemical engineering was the right thing for you, or . . . ?

[01:27:07]
CHAPPELEAR: When I started, yeah. Yeah, I was really interested in what I was doing, and I was learning a lot about how the refinery worked, of course, and everything about that. Learning a lot. And my colleagues were all very helpful to me and very interested in treating me equally. It was really good.

[01:27:26]
GIBSON: So looking back, you feel it was the right pick?

[01:27:29]
CHAPPELEAR: Oh, yes. It was definitely the right pick for me. I like doing puzzles, I like making things and integrating things. I like managing things. I like new ideas. I like new challenges.

[01:27:46]
GIBSON: Was chemical engineering what you thought it was? Like if you go back to that freshman at Rice going, "What am I doing with my future?"

[01:27:53]
CHAPPELEAR: I didn't know what it was. Was it . . . ? Yes, I think what I learned what chemical engineering is. It's about taking matter and making it useful for humanity. And that's pretty important. It's pretty important. And it can be everything from making a piece of paper to treating garbage, to making rocket fuel. It's a very, very wide field. I learned . . . . Well, I worked for so many different people of different backgrounds over the years, and then working in the engineering company itself and actually working with the different disciplines. And seeing how . . . I think a chemical engineer appreciates more the integration of the need for all specialties than the other engineers. That's why chemical engineers make good project managers; make good managers. General managers. You know, you have to . . . you have to be aware of everything that's going on. I used to tell our graduate students and postdocs that they needed to record the phases of the moon when they're taking their data, because they'll never know when they go back to analyze it, what influenced them to do that, and maybe it was the phase of the moon. Figuratively speaking, of course.

[01:29:34]
GIBSON: So why did you not go—stay in academia, and kind of . . . . You got the BA, and then there was a BS, I guess, [due to] the change at Rice.

[01:29:43]
CHAPPELEAR: Well, I do not have an advanced degree.

[01:29:46]
GIBSON: Did you ever think about it?

[01:29:48]
CHAPPELEAR: Oh yes, I did. But I was very busy with—I had a mental illness when I

was—with my last pregnancy, I had a grand mal seizure, and that led to severe depression. They didn't know what caused it. I had to have a hysterectomy and I had depression off and on for five years. And after that it just really wasn't practical. And I was doing something I really enjoyed and doing things.

[01:30:22]
Why did I leave academia? I finally realized that because I did not have a doctorate, that I would never be accepted as a full faculty member. I was never on the faculty, see. I never had a faculty position. [. . .] We went abroad for a year with my husband's work, and I found out during that year that I was regarded worldwide as preeminent in my profession, and yet I wasn't recognized on campus. And I came back and had an incident with Riki that made me realize that, you know, I would never receive recognition on campus, and so I decided to leave.

[01:31:18]
SCHNEIDER: So going back to your scientific experience at Rice, well, were you—did you have lab experience of any kind in your high school science education? And then what was it like when you were at Rice in terms of, sort of, hands-on lab experience?

[01:31:38]
CHAPPELEAR: Well, I'm sure we did some sort of lab in high school, but I don't remember. It was very inadequate. At Rice, we did—the science courses that I took, I'm sure were standard for the university. I mean, you get a sample and you have to analyze it, and you have to go out and you have to measure—balance your . . . . You remember weighing all those things for analytical chemistry, and you have to balance all the little weights and all the . . . you learn all the techniques and everything. But that's—it's learning to do the drawings and all. Yeah, we learned to use a drawing, but that's . . . . What you have to learn is how to think and how to analyze and how to integrate a lot of different information into a . . . . I had to be very, very good at that. [. . .] Look, you take Home Ec [Home Economics] and you do some sewing and you learn how to sew, but you really don't know how to sew. And you learn how to cook something, and maybe you can cook one thing, but you really don't know until you really get out and you do a lot of this. Does that make any sense?

[01:33:08]
SCHNEIDER: [Yes].

[01:33:10]
CHAPPELEAR: I think that my education at Rice was so based on learning the fundamentals. More so than actually . . . . Although we had in our Chem-E labs, I mean, we ran a filter press and we had a tower that we had to do and all of this stuff, but you really . . . . When you learn to

drive . . . you know how to drive, right? But when do you really know? After you've been driving about five years.

[01:33:51]
GIBSON: I don't know how much you're in touch with . . . I know you've been involved with Rice throughout the years.

[01:33:57]
CHAPPELEAR: Oh, yes.

[01:33:57]
GIBSON: And you have a daughter that's in a different part of engineering and involved in teaching. But do you have any advice for what's going on today in terms of, kind of, that rigor or academia period for students and what they should really be focused on?

[01:34:18]
CHAPPELEAR: I don't know whether [the rigor] is still emphasized or not. I hope it is. The emphasis in chemical engineering now, of course, is going into the bio or nano. Tremendous pressure there to the point that, [at Rice], they've changed the name to—you're no longer the chemical engineering—chemical and bioengineering department, which is ridiculous when you realize that chemical engineering is the father of bioengineering, is the father of environmental engineering, is the father of ocean engineering, my daughter's specialty. Chemical engineering is the back of all of those.

[01:34:58]
And I firmly believe that your first engineering degree should be in the basic electrical, mechanical, civil, chemical engineering. I think it's a mistake—I think my daughter made a mistake to major in environmental—ocean—astronomical—space [specialty fields of engineering]. Paper. I mean, paper is another subset. Any of these, the basic information that you need for engineering is to learn how to think and how to integrate and how to bring things together. And that's common in the field. And if you're taking one of these specialties, you're going to miss out on some of the basics of whatever you need. And I advise people when I'm trying to advise them, get your basic degree in that. And you say you want to be a . . . go into space. First, get your degree in mechanical engineering, or whatever, and then go into . . . get an advanced degree. That's my philosophy.

[01:36:05]
GIBSON: It's a little bit about how physics is challenging if you don't have the calculus ahead of time.

[01:36:10]
CHAPPELEAR: Yeah, exactly. Well, yes, I guess it is somewhat like that. I don't know. Of course, my daughter didn't pay attention to anything I had to say.

[01:36:20]
GIBSON: So at your period at Rice, were there women on the faculty?

[01:36:26]
CHAPPELEAR: Yes. We had some in the math department, colleagues of my husband. There were none in the engineering department. There are now. Math is where they first broke in. We had Katherine Fischer Drew in the history department. She was a very prominent historian.

[01:36:55]
SCHNEIDER: And did you have any of these professors who were women? Did you have any professors who were women during your . . . ?

[01:36:59]
CHAPPELEAR: No. No, I didn't take any history courses beyond that one course I had to take. I didn't have any women instructors.

[01:37:07]
GIBSON: Did you have any role models as you got through your, you know, primary, secondary education?

[01:37:15]
CHAPPELEAR: I can't think of anybody.

[01:37:18]
GIBSON: In a way, you were your own role model.

[01:37:21]
CHAPPELEAR: I don't know, it's . . . . There weren't that many people. I guess the most outstanding role model I ever had I met after I got married and when I started working for

Kobayashi. It was in ’58—I guess it would be four years after I graduated—when I met Lillian [Moller] Gilbreth.

[01:37:49]
GIBSON: Oh.

[01:37:49]
CHAPPELEAR: Do you know who Lillian Gilbreth is?

[01:37:51]
SCHNEIDER: No.

[01:37:54]
CHAPPELEAR: She is—are you familiar with the movie *Cheaper by the Dozen*?

[01:37:58]
SCHNEIDER: [Yes].

[01:37:59]
CHAPPELEAR: She’s the mother in *Cheaper by the Dozen*. She also had her doctorate in psychology. And her husband was, and well, along with her, were the founders of industrial engineering. Industrial engineering is time and motion study. When he died, she took over the business and continued it and [lectured]. And when we formed the Society of Women Engineers shortly after I graduated here in Texas, and we had a chapter, I think we had nine or ten people, I don’t remember exactly. And she came to Houston to talk to our very small group of people, and she stayed at the Plaza Hotel. And I remember when we met her, we were surprised that she didn’t have a traveling companion with her because she was elderly at that time. I guess she must have been in her eighties. Well, you’d be surprised to see me traveling by myself, right? But she was. And she was getting ready to go on a six-week lecture tour of Europe. When she left us, she was flying directly to Europe. Her luggage was an over-the-shoulder bag for a six-week tour. Most efficient person I’ve ever known.

[01:39:30]
GIBSON: I was going to say, practice what she creates, right?

[01:39:32]
CHAPPELEAR: Exactly, exactly. And really, you should, if you haven't read, she wrote a book that you really ought to get it, if you haven't read it. It's on how to—designing of kitchens for the handicapped people, which is, of course, you bring the material down to their level where they can reach to and every . . . . To me, it made me understand the importance of industrial engineering more than anything. But she had a tremendous—meeting her was a tremendous impact on me. Now I just knew her, you know, that one time. And I think then I saw her when we had the national convention of SWE [Society of Women Engineers] here in '59, and she came and spoke at that, so I met her then.

[01:40:21]
SCHNEIDER: Yeah. And I was wondering about—you had, when you were in high school, you know, you were really involved in acting and things related to theater. Did you do anything related to that at Rice, or was that something you, sort of, left behind?

[01:40:34]
CHAPPELEAR: My only extracurricular activity at Rice was my—the literary society that I would go to. And occasionally, I would have a date. Well, I did, I went to the football games. You didn't have to have a date for that, of course. I didn't do a lot of dating at Rice. I was too busy. And you go to school five and a half days a week, and you have to start studying again on Sunday afternoon.

[01:41:03]
GIBSON: So you talked about getting a job out of Rice, but talk about graduation. Like, how did that feel or what was graduation? Did your family come?

[01:41:12]
CHAPPELEAR: Oh, yes. Yes, of course. Well, when I got my engineering degree. They came both years. But my engineering degree, there was another young lady on campus who was in the Navy ROTC. Very unusual. So when they have graduation, they always like to write special—these special people—you know, the guy that's the old grandmother or the old grandfather that's gone back at seventy-five to get his degree and this sort of thing. Well, she and I were the unusual items that year. And so there's a picture of me and her with Willy's statue on the front page of the *Houston Chronicle* because I got the engineering degree and she got the naval commissioning degree.

[01:42:01]
GIBSON: Did you like that attention, or was it just, kind of . . . ?

[01:42:04]
CHAPPELEAR: Yeah, I mean, it's, kind of, fun. I've got the one there, my picture, that's the McDermott publication. When I was working for them, they publicized that they had me working for them. Got another picture in there. The first year after I graduated, it was Engineers Week, and so, Shell—this is where Shell exploited me being a woman—and I've got a picture of me using my high heel to tack up a notice of Engineers Week, you know, publicity. They use it. Because that was used. And then the year after me, we had a girl get her engineering degree in mechanical engineering. She was the first one in mechanical engineering. And she got a job with Hudson—with Humble [Oil and Refining Company], I'll say it right. Humble in oil. I guess that's what they were called there. But they strictly hired her to be, "Look, we've got a woman." And she realized it after about a year and a half and left them. Now, I think Shell was giving me a fair chance to be what I wanted to be.

[01:43:18]
SCHNEIDER: And how was your family reacting to your, you know, getting your degree and to this next step in your educa[tion]—or in your career? How were they responding?

[01:43:34]
CHAPPELEAR: Who do you mean by family? You mean my mother and father?

[01:43:36]
SCHNEIDER: Yeah. Or whoever you want to . . . .

[01:43:37]
CHAPPELEAR: When I got my engineering degree—remember I told you about my father? And then money was tight. And I was living in a boarding house at that time. And he called. [My parents] called and said [they] wanted to come and see me. This was before graduation. And they came in and he gave me a diamond wristwatch. He was very, very proud of me.

[01:44:04]
GIBSON: Wow.

[01:44:06]
CHAPPELEAR: Yeah.

[01:44:06]
GIBSON: That's almost making me cry.

[01:44:08]
CHAPPELEAR: Well, it . . . . Daddy was . . . I had a wonderful father, and he backed me up all the way. He died when he was sixty years old. He smoked. Cancer. No, that was, when he died, I had three little girls. But I wanted, you know. Well, in January, he had a medical checkup. He was okay. In February, he lost weight. Went back to the doctor in March. On San Jacinto Day they operated and found liver cancer. Patched him up and sent him home. On Mother's Day, my aunt calls me, "Patsy, if you want to be with your dad, you need to come now." And in less than an hour, I left my three little girls with my two best friends that were in this book here. They came to my party. And one of them took the little baby and one took the two old[er] ones. And I went out there on Monday and he died on Friday. If you have two friends like that, I am rich. My daddy never got to see what happened in my lifetime. My mother did, and I'm glad she did. She was very proud of me, too. Very, very proud of me.

[01:45:56]
GIBSON: Did they understand what your work was?

[01:46:03]
CHAPPELEAR: I don't know if . . . . Does anybody understand what your work was? Yeah, I think as much as you can understand what somebody else's work is, yes, they did.

[01:46:18]
GIBSON: I'm sure they saw you working hard.

[01:46:20]
CHAPPELEAR: Yeah, they saw me working very hard and doing things and getting things done. Anyway. It is good. It's a good life.

[01:46:35]
GIBSON: And since then, or maybe it was while you were at Rice, I thought I saw that there was some emphasis on STEM [Science, Technology, Engineering, and Mathematics]. Were they trying to attract new people?

[01:46:43]
CHAPPELEAR: Oh, now?

[01:46:46]
GIBSON: Years ago.

[01:46:46]
SCHNEIDER: I think there was a Rice open house.

[01:46:47]
CHAPPELEAR: Okay. When I was a student at Rice, we had an annual science fair type of thing where we tried to promote science and engineering to the community. And one of the things we did—I remember one year, maybe we just did that one year I was there, or two years, I can't remember for sure—but we did have a STEM activity where we invited the people to come in. And in chemical engineering, we had a machine, a pressure machine, that took resin and molded it into an ashtray. And we made these ashtrays and gave them. And, of course, it was a very simple thing to use and they taught all of us undergrads how to do it pretty quick. It wasn't that hard to learn. And so we were there, and we were passing out these ashtrays to the kids that came along. That was the STEM activity that we did.

[01:47:47]
Personally, I started very early. The earliest I remember doing any . . . that type of encouraging activity was . . . let's see . . . must've been '57 or '58 when I participated in a junior [Student Chapter] engineering society, the women in the [engineering group] at [Lamar University in Beaumont]. [. . .] Anyway, I remember driving over there and one time I went over to talk to them and all, and I came back and I almost ran out of gas on the highway. Oh, that was funny. But that was my first participation in trying to encourage—and over the years I've encouraged, as I could, different things.

[01:48:45]
GIBSON: Do you remember seeing girls in some of these?

[01:48:47]
CHAPPELEAR: Oh, yeah, I saw a few girls and I'd talk to them. And later on, I've had two or three occasions that I've, out of the blue, I'll get an email or something, a note saying, "Thank you for saying whatever you did to me, so and so," and I don't even know what they're talking about, but I did that. Since my daughter is, you know, decided to go into education, very shortly after she did, I started going and judging for her there.

[01:49:13]
One of the things they teach at the junior college is an introductory course on how to pass in

college. But they make everybody do this nowadays. I didn't know that, but apparently it's essential. And the ones for the people who are going into science and engineering is taught by the engineering department. And they—part of it that they do is they're given a project of some sort to do, and then they have to make a written report, if they can make a model they make a model, and then they have to go up and give an oral report. And the oral report, she started the practice of bringing in real people to critique them. And I was—so I've been doing that now for a number of years. And it's quite interesting, quite interesting.

[01:50:03]
SCHNEIDER: So I'm wondering if now would be a good time to take a break or chat off camera for a moment.

[01:50:10]
CHAPPELEAR: Sure.

[01:50:10]
SCHNEIDER: Off recorder.

[END OF AUDIO, FILE 1.2]

[END OF INTERVIEW]

INTERVIEWEE: **Patsy Stallings Chappelear**

INTERVIEWERS: **Sarah Schneider**
Gayle J. Gibson

LOCATION: **Interviewee's home**
Houston, Texas

DATE: **25 January 2024**

[00:00:03]
SCHNEIDER: All right. Today is Thursday, January 25, 2024. My name is Sarah Schneider and I am joined by Gayle J. Gibson. We are conducting the second session of an oral history interview with Patsy S. Chappelear at her home in Houston, Texas. So we're looking forward to continuing the conversation again today. And, Gayle, I think you had a question about Rice. So if you want to start off with that, that would be great.

[00:00:28]
GIBSON: So your time at Rice University, you graduated with a BA in chemical engineering, but then later—

[00:00:34]
CHAPPELEAR: And then a BS.

[00:00:35]
GIBSON: Can you talk a little more about what that difference was and what was going on?

[00:00:39]
CHAPPELEAR: So the name of the degree? The study plan at that time at a lot of the major universities was either four years in the summer or a five-year program. That in other words, it was thought that it took that much time to prepare somebody for a career in chemical engineering. Of course, what we had to study was based on what people were learning in a regular high school in the United States, which I went to a so-called "regular" high school. So you did not know anything about calculus. That was the vast majority of the high school graduates at the time that I graduated. And to do engineering, you have to be able to handle a lot of higher mathematics. That was the biggest influence on why it took so long.

[00:01:27]
The other thing is the curriculum, for engineering, there's two philosophies. One is you cram people as full as you can of theory, and the other one is you cram them as full as you can of hands-on experience. Rice was a Cramming-Full-of-Theory Institute and it was . . . that's . . . it was their philosophy. So they were cramming us as full as they could of theory. And I found out that our program was equivalent to a master's at many other universities. Is that what you wanted to know?

[00:02:02]
GIBSON: Yeah. And was there additional coursework then to get a BS?

[00:02:06]
CHAPPELEAR: Oh, I went through five years of taking four or five major—you know, four is considered a full curriculum. I had four, I had five for five years. So I took three years of chemistry. I took two years of physics. I took three years of mathematics. I took a year of . . . . In five years, I had two semesters that I could make a free elective. Okay? And if you look at your curriculum for almost every other [major], you have a lot more choice than that. Does that . . . ?

[00:02:56]
GIBSON: Yeah. Yeah. So typically, when universities today would offer a BS, that's more of the cram full of experience plus some theory in your view, or . . . ?

[00:03:09]
CHAPPELEAR: It depends on the university. I think universities have personalities and there's a great deal of difference in a research university and a . . . . Seeing my daughter working at a community college and [the community college] philosophy is quite different. They are trying to bring people who are not—from a non-university background in their families. Many, many of her students, they are the first people in their family to graduate from high school. Many of her students have English as a second language. Many of them are already parents and have small children to take care of. Many of them have full-time, forty-hour-a-week jobs. So it's different from your, "I'm straight out of high school, I'm seventeen or eighteen years old and I go to college and I was always expected to go to college" background. So the different people, you have to tailor your education for that group of people.

[00:04:20]
GIBSON: Now, you've talked before about, sort of, I guess some would call the capstone, sort of, that design class where you bring it all together. Was that as part of the BS, that last year?

[00:04:31]
CHAPPELEAR: That's the last year. The capstone course. And you finally are able to . . . . Well, and I think I showed you my first consulting job that I did with Professor Kobayashi when I was . . . remember, I had just graduated in June—first of June—and I did this the following . . . let's see, I think I met John, I got married, so I was . . . . We did that. I was barely—I only had one year out since I'd earned my degree. And yet that's a very complete design and I did most of the actual work.

[00:05:11]
GIBSON: Oh, yeah. It's a good way to culminate all those theoretical learnings.

[00:05:15]
CHAPPELEAR: Yes. And this is . . . the work that we did for our design course wasn't nearly as complete as this in school, but I had had that experience. I had, you know, been around for a year now working in the . . . at Shell first and then I was able to integrate it and do this.

[00:05:35]
GIBSON: Were a lot of your fellow students ending their studies with the BA or did many . . . ?

[00:05:43]
CHAPPELEAR: Oh, no. Nobody ended with the BA. No. The ones . . . once we got past that, entered into our junior year, there were about twenty-four or twenty-five of us, and we all made it through. The ones who were weeded out were weeded out in the freshman and sophomore years.

[00:06:06]
SCHNEIDER: Okay. So you graduated with this degree and you had talked, I think, yesterday about applying to positions. And I was wondering . . . . I think you talked about this a little bit yesterday, but if you could refresh my memory, were you considering graduate school right after graduation at all, or . . . ?

[00:06:30]
CHAPPELEAR: No, not at all. I did not consider [graduate school] at all. It had really . . . I had the brother fifteen months younger than I, and it had really . . . I knew how hard a strain it had been on my parents to have two children in college at the same time. My brother also

worked. You know, we worked as much as we could to help pay for our things. When he was a student at [Texas] A&M [University], he had a paper route, for instance.

[00:06:59]
SCHNEIDER: What does that refer to?

[00:07:00]
CHAPPELEAR: Oh, you don't know what a paper route is.

[00:07:02]
SCHNEIDER: Oh, a paper route.

[00:07:03]
CHAPPELEAR: A paper route.

[00:07:03]
SCHNEIDER: Oh, I'm sorry, I misheard you.

[00:07:05]
CHAPPELEAR: Oh, yes. Yes.

[00:07:06]
So he got up and he was in the Corps [ROTC]. It's a funny story. I love funny stories. But he got—he had a very heavy . . . he was very dark haired and a very heavy beard. And so he got up and shaved and ran his paper route and then had to stand inspection at 8:00 a.m. like all the guys in the Corps had to. Some mornings they would send him back home to shave again because his beard had grown so fast. [laughter] Poor Don. In some ways, we ladies have advantages.

[00:07:42]
GIBSON: On that.

[00:07:43]
SCHNEIDER: Okay, so you knew you were applying to positions and you talked a little bit about that yesterday, the process of, you know, deciding where you wanted to be. And so when you started at Shell, how was that initial transition? Do you remember anything about those first

days of working there, and how did you adapt to the new environment? What were your thoughts about the work, you know, when you . . . just at the very beginning?

[00:08:08]
CHAPPELEAR: Well, the first thing, in Houston, transportation is a real thing. Now, I actually had a car, but of course I wanted to get away from my parents as soon as possible and have my own . . . so I rented a very small apartment, and of course, I wanted to be where everything was going on. So I got it down close to the university in the center of Houston. I had a garage apartment behind somebody's house. And so the first thing I did was find somebody who was also commuting from central Houston and get in a carpool, and that was very important.

[00:08:43]
Let's see, the first days. Just like everybody else, we had to go through and take out a time card and punch the time card, although we were salaried people, so we didn't get paid overtime. But we had to do [time cards] to control the number of people so they knew . . . this is a safety . . . common safety. How many people are here when so we know what to do because a refinery is a dangerous place. Incidentally, and I may say this several times, every time I speak to a group of people who are attempting to go into science and engineering, I tell them the most important part of their job is safety. I have yet to meet an engineer who doesn't nod their heads when I say that. If you see a pen, a writing pen on the floor, pick it up. Somebody might trip over it. Okay. That's the beginning of safety.

[00:09:45]
GIBSON: Can I ask a little bit on that? Did you learn some of that in university or was that really instilled in you later?

[00:09:56]
CHAPPELEAR: No, I did not get that at the university, looking back. Not in a direct sense of somebody coming out and saying it, you know? I'm sure that there were certain things that you did unconsciously. But none of the professors ever brought this out, as far as I can remember.

[00:10:18]
SCHNEIDER: And what kinds of safety measures did you have at the Deer Park refinery, and did you . . . was that part of your initial training?

[00:10:27]
CHAPPELEAR: I really don't remember. Part of initial training. Well, oh, I guess yes, it is. Smoking. I smoked at that time, which most people . . . if you didn't smoke when you went to

college, you took it up when you were in college because it was how we rebelled. So you couldn't smoke in just any place in the refinery because of the danger, so you had specific spots to go if you wanted to smoke and you had to go to that location to smoke. That's one reason I quit smoking because it was too difficult to smoke at the [refinery]. For a while there. I went off and on with my smoking.

[00:11:10]
SCHNEIDER: So aside from the safety, did you have other kinds of training that you received at the beginning of your position?

[00:11:22]
CHAPPELEAR: I don't remember any formal training program that Shell had at that time. They did have some sort of a program in mind, looking back on what our assignments were, and I can tell that they did. But, you know, when you're being the victim of the training and they're trying to train you without [. . .] you knowing that you're being trained, it's hard to recognize what's happening. I spent a lot of . . . somehow or other, I had a lot of time to talk with the guys that had been there and doing things for . . . and finding out what they were doing and what . . . . It's like being a graduate student, and talking to all the other graduate students about, "What are you doing? What are you investigating?" If that's a training program, that's the training program I had.

[00:12:15]
GIBSON: Were they encouraged to spend time with new hires?

[00:12:18]
CHAPPELEAR: Oh. Yes, I think so. It was . . . . We didn't have to account—it's pretty strange looking back at it—I didn't have to account for my time on an hourly basis, like a new lawyer has to do. I had a specific project I was assigned to and I worked on that project.

[00:12:43]
GIBSON: Can you talk a little about your supervisor?

[00:12:47]
CHAPPELEAR: His name was Stan [Stanley] Marple, and in later years he said that when I married my husband, a Shell man, and one of us had to quit, he said the wrong one quit. So I think he liked me. That's all I remember about him. I remember he was very . . . I had the impression he was very helpful and very glad to know me and he thought I—and he apparently thought I did a good job. I was getting good . . . I got a good review, whatever review I had after

a few months. And he was sorry to see me leave, so. But I wasn't, see I was only with Shell [eight] months. So that's the short period.

[00:13:32]
GIBSON: And in that six months, was there things that really, kind of, turned you on or that you really didn't like?

[00:13:40]
CHAPPELEAR: No, it was all new and exciting and interesting and everything. I was in . . . I think I tried to describe the situation at Shell. The group that I was in was called the research group. And we had a . . . let's see . . . we had a large pilot plant building, and I was in the pilot plant building, which was in charge of the lubricating oils and the heavy [hydrocarbons] processing portion. And then there was another, larger laboratory with a reception area where we could go to smoke. [The office of] the head of the lab and the other areas investigating other parts of the [refinery process].

[00:14:26]
To refine petroleum, you come in and there's a lot of different blocks, like we were talking about yesterday. And so you have to have all of the different blocks, have all of their different specialties. You have a lot of products that you make. So you've got some people that their job is that end product, and they've got all of these pieces that they've got to take care of, manage their shipment out and handling them. That is a specialty area. The petroleum comes in, it's all mixed up together. So the first thing you get to do is separate into a lot of things. And then each one of these things you have to make into something useful, and one of them ends up being jet fuel. One ends up being automobile fuel, one ends up as lubricating oils, one ends up as tar to put on your road. So every one of these is a subspecialty of the refining process. And in the research group we had people that were specialists in all of these subgroups. And I was assigned to the lube oils section.

[00:15:32]
SCHNEIDER: And so what—could you describe, sort of, a day doing that, doing your work at Shell? What was it like? What were you doing throughout the day?

[00:15:47]
CHAPPELEAR: Well, the first thing I did was a lot of reading because I had to find out exactly what the details were about how you process the lubricating oils and the heavy fractions. And then I had to study about the particular treatment thing that I was investigating in the Podbielniak extraction. That is a particular chemical process, extraction. And it has all of its own nuances. Like catalysis is a specialty area. There's a whole field of interest in catalysis. And if you study that, you know that. I didn't study it. So I don't know very much about it.

[00:16:46]
But you have to really . . . when you have a new assignment in any aspect of chemistry or chemical engineering, you have to, first of all, find out what is known about this subject. And then I had to find out about the particular piece of equipment that I was charged with and learning it. And then I actually designed and got the, you know, figured out, well, we're going to try this experiment to find out if . . . so on, and had to plan. So you have to do a lot of planning. I did that. And then we would have coffee hour. That was important.

[00:17:21]
SCHNEIDER: What would you talk about during coffee hour?

[00:17:24]
CHAPPELEAR: [laughter] Oh, all sorts of things. How the Astros are—oh, no they weren't—the Buffaloes in those days. That's the baseball team. And that sort of thing. And I was the only woman, of course, in the group. So they were very interested in me. And of course, I was, you know, fresh out. Bright young thing. All men around, I guess their testosterone was really hitting the ceiling, but I was, sort of, oblivious to it. So they, of course, got very interested.

[00:17:52]
And after I'd been there about three months, they got brave and said, "What do you want in a husband?" So I thought about it, and one of them wrote down my requirements. And I ended up with about thirty items. Everything from I wanted him to be . . . yeah, from maybe one year younger to maybe four or five years older than me, or two years. I wanted him to be taller than me. I wanted him to be in an engineering, scientific training. I wanted him to like to play bridge. I wanted [him] to like going to the live theater and live symphony. I didn't want him to be a Yankee. Remember, I'm from Texas. Let's see, what were the . . . . I wanted him to be close to my religion that I had grown up in and on and on and on. Anyway, I had this long list of things.

[00:19:11]
Well, my husband . . . of course, everybody's got to tell their story, but this is . . . . John had finished his doctorate at Indiana University in theoretical physics. And he had taken a job with Shell, but he was with Shell Development Company, and he was working in Houston. And their laboratory was on Holcombe Boulevard or Bellaire Boulevard. It had two names, and it was right next to Southside Place, which is a very small city enclosed in Houston. But I think it was actually in Houston, and it was before you got to Bellaire. That's where the laboratory was.

[00:19:57]
So I worked for Shell Refinery Company in Deer Park. And Deer Park is a suburb, separate city from Houston. And it's ten miles from the center of the city, roughly. And then his office was maybe four—two or three miles from the center of the city to the east and Deer Park was to the south. So we were physically really far away from each other. But we both played bridge. We

had both learned to play and enjoyed playing bridge. I learned it in college, and he had learned it when he was younger, playing with his aunt. But during his university years he started playing duplicate bridge, which is the competition bridge. Have you heard of duplicate?

[00:20:57]
SCHNEIDER: No.

[00:20:57]
CHAPPELEAR: Well, it's competition bridge for people that like to play it. To play duplicates, you have to study all the different systems. It's very complicated and very competitive. Well, I had liked it and so I had done, but I had not studied as much as my husband had. John ended up—when he came to Houston—you get a . . . when you participate in the competitions and you win, you get points. And some of them are called red points when they're very high level. That was the system at that time. And if you had so-called 300 points, you were a "life master." John had 290 and I had about eighteen or so. So he was very close to being a life master.

[00:21:48]
And he comes in and he starts playing duplicate bridge. And I was playing duplicate bridge. So people started introducing us and then we had a national tournament here. And in came all the big names like Charles [H.] Goren. You've heard that name, I'm sure. He's number one in the bridge world. And [Oswald] Jacoby, who's another one. And they knew John from previous competitions. They knew me because I'd show up. There weren't that many young women interested in playing duplicate bridge. And so they knew me. And so they kept introducing us and saying, "You two should . . . . " Well, he wouldn't ask me to play, and I would—certainly didn't ask him. You didn't ask guys to do things in those days. Any way that could be considered asking for a date, that just really wasn't done.

[00:22:42]
So finally, John decided to ask me to play bridge in November. He was playing with a lady, Stephanie Martin, an older woman. She was all of, like, maybe fifty years old or something, but she was playing with him because she was trying to get her life master. John was a real good player. So what you do is you get somebody, you play with them a lot so that then when you play in the big competitions, you have a better chance of winning the competition. And she was trying to . . . . And John was playing four or five times a week. He would play a lot. I would play one time a week. I mean, that was the, sort of, to give you the difference, the importance of bridge to us at that time.

[00:23:26]
But he finally asked me for a bridge date on Saturday night at the club. But he had bridge date that morning with Stephanie, and he was—or that afternoon. And so she learned that he had a date with me. "You've got a date with Patsy?" And she told him he had to go home and get

dressed up to play bridge with me. It was very important how you dressed. And I was pretty special, apparently. So he went home and he got dressed up and we played bridge. And then after we drove out to Prince's Drive-In and had hamburgers and stuff, and we talked until 4:00 a.m.

[00:24:08]
SCHNEIDER: Wow.

[00:24:08]
CHAPPELEAR: Yeah. Okay. So Sunday, he already had a bridge date to play something or other, but he asked if he could come and, you know, take me out to coffee afterwards or something. And then Monday, and then Tuesday, and then Wednesday. So finally on Thursday or Friday, my colleagues pulled out the list. I must have been a little star-struck by that time. And he met every qualification on the list. So he proposed on Friday night, and I had my selective hearing on and pretended I didn't hear him. So he repeated the proposal on Saturday night and I said yes. And on Sunday morning we called my parents and said, "We're coming out to go to church with you."

[00:24:54]
And we went to church, and then we came home and we're sitting there talking, and mother is finishing up the roast and stuff. My dad and I and John we were [talking together], [. . .] and I said, "Daddy, I'm going to marry John." My daddy jumped up, rushed across the room, and shook his hand vigorously and said he would be delighted to have him as a son-in-law. I think my daddy thought maybe I'd never get married. And my mother came out, you know, and everything. So here we are eating and I told you how it was—my mother's home was—there was Grand Central. In comes uncle somebody or other, I've forgotten which one. First thing my daddy does is tell, "Patsy is going to marry him!" Well, my mother, I could see, like all good mothers, was planning an announcement party and everything in her head. I know she was. She never told me she was, but I know she was.

[00:25:47]
Well. So then we had to go and introduce John to all of my family, my two brothers and their wives and all of their children and my two aunts that lived here, and I think I had four uncles. And each one of these has a wife or husband and two or three kids, or four more. And on the way back into town, John knew everybody's name and what the relationship was. He was an unusual person. But that was . . . so that was a lot of my . . . . What did I do? I continued to work and he continued to work.

[00:26:28]
His parents were . . . we were planning our marriage, and his parents were coming down for his birthday on February the thirteenth. And we decided shortly after the first of the year that we wanted to go ahead and get married as soon as we could. And since they were already coming

down, traveling was . . . in the 1950s, just to travel from Oklahoma to Texas was . . . it's quite a journey. Well, we'll just go ahead and get married while they're here. And so we went ahead and planned. I had . . . got my dress. I actually ended up wearing my sister-in-law's dress, wedding dress, but had the dresses made for my two attendants and got everything ready and got the invitations out. And I had a very, very nice, formal wedding, and the reception was at my mother's and father's home. It was very nice. And it rained.

[00:27:26]
And so then, Shell had a nepotism ruling, so you could not have husband and wife, father and son, father and daughter, brothers, whatever it was, both working for the company, even though we were in two very separate companies and at a very great distance. So one of us needed to resign. Well, I could get another job, but John didn't think he could get—and then John was making more money than I was because he had a doctorate. So he was making like—I was making 409, so he was making 500 or something like that, a little more. But at any rate. So I had to resign and because I was forced to resign by company policy, I was eligible to sign up for unemployment benefits. So I did. And I went down and, well, you know, the unemployment office didn't have any jobs for chemical engineers hardly, because we were in high, very high demand at that time. But I still—I did the form and I collected that for a while.

[00:28:33]
And then I started, I was looking around, "What do I want to do? Where can I go?" and everything. And I went out and talked to Professor Kobayashi. [. . .] We didn't have a [facility] at Rice [for job seekers at that time]. So talking to the professors was the best way to get it. And so when I talked to him, he told me that he had a plan with Professor [Donald L.] Katz of University of Michigan, who had been his—where he had done his doctorate—for the book there on the table, [*Handbook of*] *Natural Gas Engineering*.[1] And he was to do a certain portion of it, along with other people who had done their doctorates with Professor Katz. And he wanted me to help him do this because it was a real major [event]—he was a very young professor at that time, of course, and so he needed help to do his portions because it involved a tremendous amount of legwork and picking up all of the references and all.

[00:29:48]
If you look at the book, you can see that each chapter and section has thirty to one hundred references in the back, and each reference is cited in full. It is a complete reference of the journal name, the volume, the page numbers, the years, all of the authors, and the title of the . . . . That's called a complete citation. You can have a citation that simply says it's in *Life* magazine and the year, but that's not a complete citation. A complete citation is *Life* magazine, volume so and so, issue so and so, and then maybe even July 8, 2012 or whatever the date may have been, and then the title of the article and then the names of the authors, and sometimes you even put their affiliation and the specific pages of the journal. And if it's a newspaper citation, you put the page and the column number because there may be eight columns on a page. Well, getting

[1] Donald L. Katz et al., *Handbook of Natural Gas Engineering* (McGraw-Hill Book Company, Inc., 1959).

all of that detail for every little thing that you have in the book, every little piece of data, was a lot of work.

[00:31:10]
And that was the work that I did, as well as getting the raw information for any particular physical property that we did or whatever the information was, and taking that information and plotting it on . . . engineers in those days used graph paper. And it can be either a simple XY graph where equal increments in each direction, or it can be a logarithmic graph, or it can be a log-log graph, which is logarithmic in both directions. And you plot the information and then you have to decide what is the common . . . . This is nowadays done with computers. But back when I did it, you plotted it, and then you looked at it and you drew the lines.

[00:32:00]
I remember in . . . just a few years later when I was, well, many years later, when I was working with Hudson, when even at that point and some of the particular information we had, and I had some of the interns and I showed them how I was plotting, and I would lay it down, and then you would get back and lay it on a table and look at it from the side and decide whether that looked like it was behaving in a continuous fashion. Because the idea of a correlation is that things, chemicals, whatever they are, or properties, behave continuously. This is a basic principle of developing a correlation. And you have to do this.

[00:32:44]
And so we have things called standard dev—mathematically, this is all now understood in terms of standard deviations and everything. We didn't have that to apply. And that's the reason—you've got all this raw data. And it all looks—there's this one point that's way off someplace. So you have to find out what's wrong with that one point. And that's why I told the graduate students to record the phase of the moon. You've got to be able to go back and find out what's wrong with that one point so you're justified in ignoring it. You'll find the same thing in doing genealogical research. It's just a basic interest. Did I wander off from where I was?

[00:33:28]
SCHNEIDER: Yeah. So I want to hear more about that. But let's go back to Shell for a little bit and then come back to your work with Riki Kobayashi. So back at Shell, what—you referenced something about learning equipment. What kinds of equipment were you using?

[00:33:43]
CHAPPELEAR: I was in a pilot plant. A pilot plant is . . . . Well, everybody has visions of a chemical laboratory, and the chemical desk with the Erlenmeyer flask and the glass things, and all. That's a lab style. Okay, the next step up is a pilot plant where you have a bigger scale, usually made of metal, for most of the things that we work with. It's a bigger, larger physical scale of a piece of equipment that you investigate to see if it would work. And then you actually, after that, you build your first trial plant, which is actually full operating size. Envision the

Tonka truck, the little toy truck. That's the one on the lab. And then you see the little cars that the little kids are driving up and down the street. That's the next one. And then there's the final car. It's the same thing in chemical engineering. I'm pretty good at analogies.

[00:34:48]
SCHNEIDER: Yeah, that's helpful for, I think, people who aren't familiar with it, like me. And so were you . . . was it, sort of, like a team collaborative effort to, to do this or . . . ?

[00:35:03]
CHAPPELEAR: No, this equipment had actually already been purchased and had been installed in the laboratory and put together when I came in on the project. You have . . . and again, you have to, if you're doing this sort of work, you have to have it planned so that if somebody drops out or is not able to do it, that somebody else can come in and take over it. That's an essential part of . . . always have somebody [as your backup] to take over what you're doing. It's part of being an engineer. Backup.

[00:35:34]
GIBSON: So this was a separation for purification?

[00:35:38]
CHAPPELEAR: It was extraction.

[00:35:39]
GIBSON: Extraction.

[00:35:40]
CHAPPELEAR: Extraction, yeah.

[00:35:40]
GIBSON: And yesterday, you were describing working with a machinist and some—

[00:35:46]
CHAPPELEAR: Podbielniak extractors. Centrifugal . . . Podbielniak centrifugal extractor. I think it was used in drug preparations more than what we were trying to use it for. My Pod extractor was about this big [holding hands apart] and the full-size operating equipment, of course, would have been a ten or sixteen-foot diameter.

[00:36:10]
GIBSON: And what was the objective?

[00:36:14]
CHAPPELEAR: This goes . . . we're going back. I'm trying to remember the details . . . you took the lubricating oil and you—that fraction that had that in it—and you contacted it with another chemical that then extracted the lighter ends from the oil. I think that's what it did.

[00:36:35]
GIBSON: And were you trying to get higher efficiency or was this a new installation?

[00:36:40]
CHAPPELEAR: Oh, well, no. It was . . . . I'm trying to describe extraction in words. You have the chemical reaction going on between the components. If you do it in stages, you . . . this stage purifies it this much. This one does it this much, this one and so on. And that's the principle of the extraction stages, just like in distillation. Does that help?

[00:37:13]
GIBSON: Yeah. So you were trying to . . . ?

[00:37:15]
CHAPPELEAR: You were trying to get the multiple-stage extraction going on. It's like a filter press where you have multiple-stage filtration. Generally speaking, when you're purifying something, you've got to . . . . Okay. Imagine a big mess of rocks. They're multiple sizes. So you put them into a great big sieve that has great big holes in it. The great—the great, great rocks are going to be caught on the great holes. Okay. Then you still got a mixture down here. The next mixture you put on one, instead of having a great hole, you have a large hole. So all the great rocks go into that one. And then you go into the large, all the remainder. And then you put the larger one where you have a medium-large, and then you have—filter that—and you separate [the rocks] by stages and you end up finally with a fine sand, and then dust at the very end. But at the very top you've got great big things.

[00:38:16]
So what you're doing, essentially, in all of the separation processes that we have, is you're doing something to make them separate. And to make them separate, you either use their physical size, their physical density, their physical affinity for another compound. And that's

what separation processes are, and that's a basic . . . . In fact, that's one of the courses that we probably take is separation processes. I vaguely remember something called that.

[00:38:48]
GIBSON: Was the intent that someone once thought this could be commercialized as a more efficient, or . . . ?

[00:38:54]
CHAPPELEAR: Yeah. Shell at that time, the particular extraction process that you use . . . well, there's a lot of considerations. Some of them are patented so that you have a—you must have run into this in your work, also—you may have a patent for a particular process so that every time somebody uses it, you've got to pay them a fee. So perhaps it was that. I don't know the motivation behind this particular investigation.

[00:39:25]
I do know that different people have different—well, I'm going to use an example. There was a man in my group who had . . . his specialty was the waxes, which is another piece of the heavies and sits in the lubricating oil. And he worked on waxes, and had been working on it for thirty years. And he had an idea of something to do in treating the waxes, which I don't remember at all. And somehow or other, he got a break in his assigned duties and he could go off and do what he wanted to do. And he went off and investigated this at the company, on company time. But, you know, he really wasn't officially assigned to do this. And he developed something that saved the company thousands and thousands of dollars in doing this research of his own, his own volition, using what he had learned and known through the . . . . So if you, kind of, leave people alone a while, they sometimes can produce some very amazing things.

[00:40:29]
GIBSON: So I'm reflecting on a newly graduated engineer starting this job, probably younger than a lot of people.

[00:40:38]
CHAPPELEAR: Well, that really impressed me. It really did. [. . .] In those few months I was there, I think that was the most significant thing that happened, was this man being able to go off and work on his own and come up with something that was so tremendously beneficial to the company. I mean, what he did essentially paid for the operation of the group that I was with for years. It was truly amazing.

[00:41:07]
GIBSON: So as a woman, what were you wearing in this workplace?

[00:41:14]
CHAPPELEAR: I wore pants. Pantsuits, I think mainly, is what I wore in the . . . because I wasn't, you know, we did have ladders that we went up and down because you went on other people's equipment and stuff, and you had to be prepared to go out if something happened. So I wore pants.

[00:41:32]
SCHNEIDER: And were you wearing, like, closed-toed shoes, I imagine?

[00:41:35]
CHAPPELEAR: Oh, yes. Always closed. Yes. Yeah. I did not wear steel toed. But I did wear closed shoes and pants.

[00:41:50]
GIBSON: So talk a little bit about—you called it—Shell had this nepotism rule that sounded like it was related to any family members.

[00:41:59]
CHAPPELEAR: Yes, that's correct.

[00:41:59]
GIBSON: Was this a known thing or how did that make you feel?

[00:42:05]
CHAPPELEAR: Well, I guess I wasn't even aware of it until I got married. I think the reason Shell had it—they weren't the only company to have it—many, many companies had that, thinking that if you've got your relative, you're going to favor them. And it's probably true. I mean, I can see it happening. Or maybe you disfavor them. It could work both ways. There are some companies that actively promoted having family members work for them. And this was just the way . . . today we have our OSHA [Occupational Safety and Health Administration] rules and things. Historically, if you go through—that's another whole field for you to look into as a historian—the history of workforce . . . of the . . . we've all heard about the people in the sewing industry where they worked and worked until they ruined their eyes and stuff. Employment conditions change with society. That's all I can say. It's just another interesting aspect of our history.

[00:43:31]
SCHNEIDER: And you mentioned being the only woman in this engineering group. How did that—how did that go? Were there other women in other parts of the company that you interacted with? So two questions: what were your interactions like as a woman with the men around you? And then also, were you interacting with women in other parts of the company?

[00:43:52]
CHAPPELEAR: Not really. I mean, there were the . . . most of the secretarial positions were held by women, if not all. The librarian type of thing. And so much of a refinery is physical that they're mostly women—they're mostly women in the nonphysical things. So most of this stuff is physical, so most of them are men. I don't really recall any other particular women interactions that I had. Which is quite interesting. I have a first cousin, she's about ten years younger than I am. And just a few years later, like twenty years later, maybe, fifteen years later, she went to work for Exxon as an operator in their refinery in Baytown. Ended up being head operator. She actually, you know, was the one that went out and operated the equipment. But when I started in the fifties, that was not possible.

[00:45:20]
SCHNEIDER: And had, you know, I know you ended up leaving, but did you—could you see like a future, long-term ways in which you could advance in Shell as a woman?

[00:45:31]
CHAPPELEAR: Oh, I think I would have advanced very well in Shell. Shell had—Shell is an international company and the prejudice against women was not nearly as strong in Europe as it was in the United States. That was my experience. And I had no doubt that I could, you know, advance with Shell. And would have.

[00:45:51]
SCHNEIDER: Did you ever travel while working at Shell?

[00:45:54]
CHAPPELEAR: No, not in that six-month period.

[00:45:57]
SCHNEIDER: Okay. And then I was also wondering, I think you had said that there may have been somebody else or multiple people from Rice who went to Shell. Did you know other people who also were working there?

[00:46:11]
CHAPPELEAR: No, not at Shell. A lot of people went to work for the engineering company that I ended up with. That's where you got the idea.

[00:46:21]
SCHNEIDER: Okay, that makes sense.

[00:46:23]
GIBSON: So you talked about meeting John, which is fascinating, but the timeline, so it was just a matter of a week or two? Is that what I . . . ?

[00:46:30]
CHAPPELEAR: We dated one week before we were engaged, and that was in early December. And then we were married on Valentine's Day. And we were married sixty-three years.

[00:46:41]
GIBSON: So was this a love at first sight, practically?

[00:46:45]
CHAPPELEAR: Well, we talked till 4:00 a.m., I guess so. I mean, it was pretty obvious that he was the one for me and I was the one for him. We blended together very, very well.

[00:46:58]
GIBSON: Did you realize he met those thirty criteria that . . . ?

[00:47:01]
CHAPPELEAR: Oh, yes. They had pulled the list out on Thursday. My colleagues had, because I was pretty starry-eyed that week. And he arranged—he had a bunch of bridge dates already [set up], and he speedily rearranged all of them so that he could see me every day that week. I mean, we really fell pretty hard for each other. It was pretty obvious, I think. It does happen. When you finally find somebody that's your real soulmate. Whatever the attraction is, it's, you know it. It's what I had. I was very fortunate.

[00:47:47]
GIBSON: Sometimes they would say for technical people, you know, get with someone non-technical, but sometimes they say they understand you better if you get with someone technical.

[00:47:55]
CHAPPELEAR: Well, no. No, we, John and I complemented each other. He was a very brilliant theoretical physicist. His thesis, I can show it to you, the "Photoproduction of Mesons in Deuterium." It's about a quarter of an inch thick. It reads, "If" then he had to write in his equations, by hand in those days, "then" and then there's another squiggle, squiggle, squiggle. "It is obvious that" squiggle, squiggle, squiggle. And it goes through maybe twenty pages of this. And that's the thesis. You would be able to look and literally, you know, you can read the words, but all of the rest of it is in very high mathematical formulations. And it looks like squiggle, squiggle, squiggle to most people. And it was verified experimentally some ten years after he did this theoretical investigation.

[00:49:01]
He then went to work for Shell at Shell Development. I got to talk about my husband. His first assignment was in the field of catalysis. And what he did, like most—I guess they did it with everybody. They give you some sort of a little project to do to see if you can really work. That's what mine was. Looking back, I can realize that. They knew it wasn't going to work, well, let's see if she can find out.

[00:49:27]
Well, he was assigned something in catalysis, and it wasn't particularly a lot of money for the company, so he got to publish it. So his first technical publication that was not based on his thesis—he had one on that, of course—was in the field of catalysis in a chemical engineering journal. Then he was assigned to work on offshore waves and their force. And if you will Google the Chappelear theory, you will find that John E. Chappelear was the one who developed the Chappelear theory.

[00:50:04]
And then more interesting . . . many years later, we have our daughter who goes off to Texas A&M University and decides to study ocean engineering. And she gets in one of her advanced classes and the professor, first day of class, is calling the roll to see who's in his class. That's what they usually did just to learn [the students' names]. And he gets to Chappelear, June and calls her name and looks at her and says, "Chappelear. Do you know John E. Chappelear, by any chance?" "He's my father." "I did my thesis on the Chappelear theory." This really happened. And of course, she got . . . he wanted to get . . . and so John went up and gave a talk to the class. And I didn't know about this until my husband died. I did not know that John had developed the Chappelear wave theory until he died. He never—

[00:51:04]
GIBSON: So you found a document, or your daughter . . . ?

[00:51:07]
CHAPPELEAR: I found out about it after—well, June told me that, told me this. And I found out about it after he died. Yeah.

[00:51:15]
GIBSON: Wow.

[00:51:16]
CHAPPELEAR: [. . .] But working together, we talked about . . . . Ours was an unusual marriage. It really was, because, I mean, don't forget, John grew up in the same area that I did where the women didn't . . . . He had all the same influences. Except his family—he was an only child. They were buying their own home during the Depression. His father sold insurance. So they had a very small but steady income. Unlike what I had. So he never had a lot of the insecurity that I had, which I didn't know I had, growing up. But nevertheless, he had a lot of the same influences social-wise. Yet, he always accepted me as an equal. He always . . . he always had something, advice for people. He said that a good marriage is based on mutual respect. And he respected me and I respected him.

[00:52:19]
And we did technical things together, too, during the years. He would come up . . . when I was working at Rice with Kobayashi, the subsequent year, I would take my lunch with me because to go to eat, I would have had to go across campus and I really didn't want to spend the money. You know, we had three, four little kids at home that we needed to have the money for. Four children take a lot of money. And I didn't want to pay to . . . when I could make my lunch and eat for 20 percent of what I would have to pay for buying it at the Faculty Club. So I would have that.

[00:53:02]
And then also, Rice and John's laboratory were very close to each other. So you could drive from one to the other in about five to ten minutes, depending on the traffic. And so John would come over, I would pack lunch for both of us, and he would come over and we would eat lunch in my office—I had a small office there—and we would eat lunch together and talk about, you know, we could have adult talk instead of children talk. Because when you went home, you had this little mob of little ones around until you could get them fed and into bed, and then by that time, you were too tired to talk. So that's when . . . .

[00:53:42]
And then we would talk about what we were doing. And at times I would have something that

we were doing in research that I didn't understand or couldn't . . . and I would talk to him about it, and he would have the ideas and he would talk to me about his work. I think I told you this last night, but one day we had some sort of a problem, and he sat down and did the mathematics for it on the piece of paper for me. Because his math was a lot better than mine as far as proving if this, then that. So he helped me.

[00:54:15]
And then when he went from the wave theory, he went into reservoir simulation, where they made the computer models of how the oil is, the crude petroleum is behaving down in the ground, and that's called a reservoir. They have modeled—mathematical models—nowadays of what that is and how it behaves. And that's what they use to plan all of their production with. And John was—worked on that for the majority of his career with Shell. He was in reservoir modeling. Well, they started off, they only considered one phase. A phase is a vapor or gas or liquid or solid or a colloidal solution. And they considered it was just one homogeneous phase, that they really didn't know what it was. And they finally realized that they had to consider the fact that it did have these different phases existing in the reservoir, and they had to consider that.

[00:55:19]
And so I introduced him to—in chemical engineering we call it Gibbs phase rule. Depending upon how many components you have and what the pressures and temperatures are, will determine how many phases you have. In that bottle of my first production crude oil there, you see, there is a lot of liquid, but above that liquid trapped underneath that cap is a gas phase. And depending upon the pressure and temperature, is what that will be. That's the simplest expression I can give of what phase behavior is. But then I spent a lot of my career working on phase behavior. I came off topic now?

[00:56:05]
SCHNEIDER: Well, this is—it's all really interesting, so it's good to cover. I had another question about Rice, which related to something you said yesterday—or, sorry, I'm sorry, not Rice, Shell Oil. I believe you said . . . I know you talked about newspaper coverage when you were using your high heel to nail something in. Was that at Shell? And if so—

[00:56:29]
CHAPPELEAR: That was at Shell. Yeah.

[00:56:29]
SCHNEIDER: Okay. Could you talk a little bit more about that?

[00:56:32]
CHAPPELEAR: Oh, I didn't realize what was going on at the time, frankly. That they were

exploiting me for being a woman. Like I say, I was pretty naïve. Looking back, most women at age twenty or twenty-one are pretty naïve. It's . . . well . . . . They were using me to promote . . . . Then . . . but don't forget, there was tremendous government pressure starting at that time to integrate women into the workforce in all directions. So that was going on. So it was a product of the . . . what you do and see . . . you are a product of what's going on at the time in all of society. And it affects what you're doing. And you're nodding your heads. Yes, yes, yes. That's what it was.

[00:57:25]
SCHNEIDER: And as a point of clarification, you weren't wearing high heeled shoes during the workday, right?

[00:57:32]
CHAPPELEAR: Oh, no, of course not.

[00:57:33]
SCHNEIDER: Okay. Just to check.

[00:57:34]
CHAPPELEAR: Oh, Lord, no. No, but when I went to the—okay. No. But when I went to the—AIChE is American Institute of Chemical Engineers, and that's our professional society. If I went to a meeting of that, I would dress in heels and hose and . . . maybe not high heels, but I mean heels of some sort and hose. I don't think I wore a hat and gloves, as I recall ever at AIChE meetings. No, I don't think I ever did that. I'm quite sure that Dr. Gilbreth, when she first started participating, did. But of course, her career was twenty years prior to mine.

[00:58:18]
GIBSON: It was the accepted dress of the day.

[00:58:20]
CHAPPELEAR: It was the accepted dress of the day. My mother would no more have thought in the 1940s of attending church without wearing a hat and gloves. I mean that just wasn't done, for a lady to do that. In fact, we still have a little bit of that on Easter Sunday when people dress up their little girls and they put a hat and a purse on them. There's still a little residual things about that.

[00:58:57]
GIBSON: So when did you first get involved with AIChE?

[00:59:00]
CHAPPELEAR: Well, the first thing I did as far as professional involvement goes was, joined the Society of Women Engineers [SWE]. And I did that immediately after we got married, or when we got married, right around that same time. And I was active in SWE through about 1960, I think it was, when I joined AIChE. I decided at that time that I could further my own career better if I stayed in my particular profession, rather than the general idea of approaching it as a woman in a man's profession. To approach it as an engineer in an engineering profession, specifically chemical engineering. And that was my main motivation for changing.

[00:59:54]
And I was very, very active in AIChE. Well, for a long time. Not so terribly when my . . . . Well. I attended the local section meetings for many, many years. At that time we had . . . oh, gosh. I was working at Rice. I didn't hold any local section offices. I guess I was a judge for the science fair participants. Some of the early activities in AIChE. We had one meeting that alternated, the spring meeting alternated, and I can't put exact dates on this—between New Orleans and Houston. And that must have been in the sixties. And one . . . . And I went—oh, okay, so because of doing the research that I was doing in the field of thermodynamics, there was always a session on thermodynamics. And I always attended those sessions at those meetings. And it was the same people every time. Oh, I mean, that's . . . all the black cats get together and all the white cats get together, that sort of thing.

[01:01:48]
One time we had a meeting and we were down at the Rice Hotel at one of the cocktail receptions. And we got out on the balcony talking and decided that the programming of AIChE wasn't really meeting our needs for doing the fundamental research and basic thermodynamics that needed to be done in order to develop better handling of gas and oil production and processing. So we decided to form a division and it was called the Fuels and Petrochemicals Division. And that was the first division of the American Institute of Chemical Engineers. This is part of the history of the Institute that may not be well known.

[01:02:40]
And then we started putting a lot of pressure on the programming and changed the programming quite a bit by that. Subsequent to that time in the history of the Institute, we have developed several other divisions, and we now have about nine or so. One is safety and one is . . . oh, gosh, I can't even remember all of the different names. It's on our dues list each time. But, you know, you can . . . whatever particular aspect, you can be active in that one. One is in the biomedical field, I think. Do you remember any others?

[01:03:17]
GIBSON: There was management division as well.

[01:03:19]
CHAPPELEAR: Management, that's one. Yes.

[01:03:20]
GIBSON: But there's catalysis.

[01:03:22]
CHAPPELEAR: And catalysis, yes.

[01:03:23]
GIBSON: So that's pretty groundbreaking to . . . .

[01:03:26]
CHAPPELEAR: We were the first. I've been in a lot of firsts in my life. No, that was the first. I was the first [female fellow].

[01:03:38]
GIBSON: I think it's one of the largest divisions.

[01:03:41]
CHAPPELEAR: It and safety, I think, is the other big one, safety something or other. I can't even remember what their proper title is. Again, it's . . . chemical engineering is very . . . it encompasses so large an amount of interest and abilities, and new ones spring up all the time. So it's not surprising that it came up.

[01:04:14]
But anyway, I became active in forming this division. I was one of the founding officers. I think I was first. We started off having a secretary-treasurer as one office, and we split that off. I always helped write all the constitution and bylaws. Remember, I told you I did that for Chaille Rice Literary Society. I've done a lot of that in my life. And then after being secretary-treasurer, then I became vice—a director, and then I became vice president—vice chairman—and then I became chairman of the division. And I've got various and sundry pictures and stuff and a big plaque. I'll have to show you my brag wall.

[01:05:01]
And then after that—this is many, many—this is over many, many years. After I was working with the engineering company, I was asked to run for director, and first, I couldn't get permission from the company to pay for me to be a director. Because to be a—even as the head of a major division, I had to do traveling for that particular purpose. But not nearly as involved as if you are a national officer. Most of my activity had been locally here in Houston for the local . . . for the annual meeting that we held—pardon me, the meeting that we held of the national society here.

[01:05:52]
The national society holds four meetings a year, one of which is the annual meeting, but the other three are in different geographic locations. And where they're held is . . . well, there's a whole litany of reasons as to why they're held at the same place for . . . or in alternate places, like I said, Houston and New Orleans. Houston and New Orleans was the—to the oil and gas industry—and it was big enough in chemical engineering that it deserved one meeting a year. But it was not the national meeting. The national meeting goes for more of a resort-type location, resort being New York City for one, or California or Philadelphia. That's places where the national meetings are held and those are held in November, I think it is.

[01:06:46]
GIBSON: So it sounded like . . . did you—you got support from Rice, and . . . ?

[01:06:49]
CHAPPELEAR: Well, at first. No. Oh, to go to the . . . when I was the director? I, we could do all, we . . . because of having our meetings in Houston and New Orleans, I went to the—at Rice, I attended the AIChE meetings with Kobayashi because we would give papers or chair sessions or manage registration or something for those. And then . . . so those meetings were, New Orleans is, kind of, local. I mean, you get in a car and you drive over there, it's . . . . But then I was very, very active while I was at the university, working at the university, in the natural gas processors efforts, which is headed out of Tulsa. And that's specifically with processing of natural gas, which much of our work with Kobayashi and Leland was associated with that particular type of processing. That was a major portion of my career. This is all, kind of, jumbled together. It's hard to understand. Try to keep it straight.

[01:08:04]
SCHNEIDER: And so, as . . . in your leadership of AIChE, what were some of your—I know you talked about the goals of creating that fuels and petrochemicals division, but what were some of your goals in your leadership roles? What were you trying to do and how were you trying to influence or change or run the organization?

[01:08:23]
CHAPPELEAR: The biggest thing we were concerned with was programming. And programming, getting space on your program. Because you're competing with somebody else that wants to go over here and talk about catalysis or wants to talk about safety, and you're all competing for so many meeting . . . each specific meeting room . . . place has so many meeting rooms, and they can only handle so much. There's limitations. It's competition. And we were competing for meetings and meeting spaces and programming. Because to develop any particular program . . . and all of this is done by professionals. You don't do it during work time. It's additional time that you spend doing this type of thing. It's very time-consuming to be active in a professional organization. It's time-consuming to be active in any organization.

[01:09:39]
GIBSON: So what was the kind of inherent benefit, I guess, you felt from putting in all that extra time?

[01:09:49]
CHAPPELEAR: It made you able to spend time with people doing similar research. And to see what they're doing and to get a report of what they're doing. And you get an idea of a new way to look at your own research. I found that very true. I'm going back to genealogy again. Any time I go to a genealogy meeting and hear a speaker on whatever topic it may be, I will get an idea of a new way of looking for information of . . . because you're trying to dig up ancient history and dig up knowledge that isn't . . . it's out there, but you don't know where to go to look for it. And I get an idea of where to look for it. And in doing basic research, which is what I was doing, a lot of that same thing happens. And the actual, just sitting down and chewing the fat, so to speak. One night, Riki was sitting down at a Gordon [Research] Conference.[2] A Gordon Conference . . . . Do you know what a Gordon Conference is?

[01:10:59]
SCHNEIDER: I've heard of them, but feel free to explain for . . . .

[01:11:01]
CHAPPELEAR: Well, you can define . . . put a definition in there of what they are. At any rate, Riki was sitting and talking with Linus Pauling, and they were talking about the gas hydrate lattice and what it was. Well, in doing the work I'd done with Kobayashi, I had actually made a model. He had made the molecular models you've all seen, I'm sure, where you have little balls and sticks and stuff that they . . . . Well, Riki came, took the little ball and drilled the

[2] According to the Gordon Research Conferences website (www.grc.org), "The Gordon Research Conferences provide an international forum for the presentation and discussion of frontier research in the biological, chemical, physical and engineering sciences and their interfaces."

little angles and sawed all the little sticks, and I measured them very carefully and marked them off and glued them together and made these models. And the models are, oh, two feet by two feet by two feet. Had to show the way that the structure exists, which is a very complex structure.

[01:11:52]
And I actually used fingernail polish to mark the packing points on the . . . . One of them, I went in with string and did the cubic . . . defined what the cubic repeating block was of the structure, and the other one is on a packing point thing. And so I did the . . . painted the packing points with red nail polish so that they showed up so that you could see them in this maze of balls. Very interesting. But the angle is, the tetrahedral angle that occurs in there is 106.5 degrees. And they wanted to know what this number was. And Riki calls me in the middle of the night and asked me what it was, and fortunately, I did remember it. But that sort of thing, the Gordon Conference, promoted people getting together and sitting and talking like that, and that promotes the knowledge of science. And the same thing is beneficial in participation in a professional society. I see Gayle is nodding her head vigorously at this.

[01:12:58]
GIBSON: Yes. I have a similar experience. So did you find some of those dialogs, those serendipitous conversations, harder as a woman, or people . . . ? You just found the right technical language with everybody?

[01:13:08]
CHAPPELEAR: I never had any problems at all as a woman. Never. In those types of situations. No.

[01:13:18]
GIBSON: Did you hear of any others that did?

[01:13:31]
CHAPPELEAR: No, I can't say that I did. Not in those situations. Again, it's a matter of respect. If you're dealing with something and you have proven that you have the respect for your ability, and you're dealing with people who have respect for their own ability and respect for yours, there's not any problems. The problems come when there's not respect and there's not ability.

[01:14:15]
SCHNEIDER: In your involvement in the AIChE over time, did you feel that you became . . . .

Did you get to know people in the field? Did you feel part of the field? How did you feel in terms of . . . ?

[01:14:28]
CHAPPELEAR: Oh, yes. I knew everybody who was anybody in the field of thermodynamics in the United States and worldwide. And they knew who I was. I wasn't aware of that until we spent the year abroad. I knew everybody who was anybody. Yes.

[01:14:50]
GIBSON: I mean, how . . . was that validating for you at that point in time in Europe to, sort of, go, okay, I really am preeminent here in terms of connections?

[01:15:00]
CHAPPELEAR: I had—going to Europe was a major change in my life, yes. And I—it was part of why I left the university.

[01:15:11]
SCHNEIDER: Okay. So I think . . . . Yeah. Why don't we take a break at this point?

[01:15:16]
CHAPPELEAR: Okay, good.

[END OF AUDIO, FILE 2.1]

[00:00:01]
SCHNEIDER: Okay, we're on after a short break. I would like to hear about the beginnings of your work with Riki Kobayashi at Rice. You talked a little bit about going to him for advice about what to do next after Shell. And he said he had a position, and so could . . . ?

[00:00:23]
CHAPPELEAR: Okay. I'm not exactly sure what we've covered because . . . I'll try to be concise. Kobayashi was a brilliant man, and I was very glad that he wanted me to work with him. And it sounded like it would be interesting and it would give me freedom as a young bride to do whatever young brides do to establish my life and all. So the first thing we did was to do a consulting job because he was a young professor and didn't have any money. And so we did a consulting job and designed a styrene plant that I've shown to my interrogators [Gayle and

Sarah]. [. . .] At any rate, we did this design, and then he had enough money to pay me to work for him.

[00:01:14]
And we did a book called *Handbook of Natural Gas Engineering*. Donald L. Katz is the principal author. He was a professor at the University of Michigan and had done a lot of investigation into natural gas engineering of all aspects and had a number of former PhD students. I think there's about six, five or six of them, who are coauthors on the book. And Kobayashi and I were responsible for three particular sections, and I've forgotten exactly which they were. But one of them was the gas hydrates, which is what Riki had done his doctoral work on.

[00:01:51]
And I think separation, distillation was one. I've forgotten. I've got it written down in my bio, official bio. But at any rate, I went and worked in the library, had a library carrel assigned to me where I could accumulate [library materials]. And at that time, all of Rice's material was in the library. Rice had a very large central library called the Fondren Library at that time. And I would . . . whatever the particular topic was that we would have, I would go and use the *Chemical Abstracts* index, which every chemist and chemical engineer is familiar with, and find all of the articles back to the creation year on that particular subject, and developed the complete bibliography for the topic that we were doing. Kobayashi would write the material for the section, and I would review his writing to make sure I understood it and to make sure that I thought other people could understand it. And he would revise according to my comments.

[00:03:07]
This particular aspect of my career continued for many, many years, where I would review primary writings by other people and point out places where it could be improved from the standpoint of understanding the material. The raw material that I gathered in some cases had to be developed into a chart or graph where the information could be presented in a very concise form. And I did this and this particular aspect, again, prevailed throughout my career and subsequent life. I have the ability to gather a set of data or facts or information and to distill it down into a format that can be easily understood—more easily understood—by others. Anyway, I continued to work with Kobayashi on this book until it was completed. And in the meantime, I became pregnant with my first child, and we bought our first home and moved into our first home.

[00:04:16]
GIBSON: So this work on the book took about how long?

[00:04:21]
CHAPPELEAR: Let's see, I left Shell in February and I went to work for Riki in May. Then June was born . . . . So then I went to work for Riki for May, and I worked for him through the

following May. So it took, including writing, doing the styrene—that styrene thing must have taken four to six weeks—so his work on that book with me was ten and a half months, I would say. I spent ten and a half months working on it. Riki had to do the final proofs and everything, and he had to get—all of the stuff that I did in drawings had to be made into a formal drawing to go into the book.

[00:05:07]
GIBSON: Was this full-time or part-time?

[00:05:14]
CHAPPELEAR: I was working full-time, I think, during that time, but I could take off if I wanted to. It wasn't, like, a nine-to-five, punch the [time card]. But John was working full-time in his research at that time and working very hard too, so we were both . . . we'd both get up and leave the house at the same time. John had a car and I had a car when we got married, and we kept both cars so we could move about independently. First thing we did when we each got married—each finished school—was to buy a car. I got a Pontiac . . . what was it? It had some initials or something. You know, they have names. My great, big Pontiac. Oh, man, I loved that car. And John got a little Chevrolet coupe with no air conditioning. I had air conditioning in mine, but, of course, he came here from having been at Indiana, and I was here in Houston, I knew you needed air conditioning. That was funny. But we both had the same philosophy about cars. You buy a car and you buy it to be a car, not to be a status symbol. And then you use it as long as you can before you buy another car.

[00:06:32]
GIBSON: So what was rewarding about this work? I heard you, prior, describe this as one of the highlights, doing this.

[00:06:39]
CHAPPELEAR: Oh, working on that book? It was more—the highlight was more the subsequent data on the other book. But this was particularly gratifying to me. I learned a tremendous amount in doing basic library research into what other people had done, and then correlating that information into new ways to present the information as a summary. Information is no use if it's just sitting in a desk drawer someplace. You have to have it out in a form where it can be used. I was really, I really liked being able . . . . And I was . . . . It was a pretty big ego trip, really, to be able to do it, I mean.

[00:07:33]
GIBSON: To achieve it or to be entrusted with it, or what was gratifying?

[00:07:43]
CHAPPELEAR: That I could grasp the information so quickly. I mean, I was really amazed at what I could do. It was very gratifying. It was very gratifying to be a very young engineer—one year experience—and to be participating in something that has turned out . . . . The book is still in print, is still being sold, and is now, of course, available in electronic form. And it's still being used worldwide because you can design a complete gas plant using the information in that book. But it's much better if you have it supplemented with the other engineering data book that I worked with later in my career.

[00:08:23]
GIBSON: I'm trying to recall what the gas industry was like then, but is this, sort of, that seminal work for the industry that helped enable things, or do you know what kind of impact it had beyond the longevity?

[00:08:45]
CHAPPELEAR: It probably had an impact on the industry in that the GPSA [Gas Processors Suppliers Association], which are the service industry to the people who went out and produced it, developed from it the GPSA *Engineering Data Book*. It already existed in a pamphlet form. Which had nothing but the graphs in it, no directions on how to use it. This book tells how to use it and how to do all the steps. But the GPSA book at that time was a pamphlet of about twenty pages of graphs. And had to know how to use it before you could use it. And probably this book led to that. I do not know that particular history, but it led to the development of the first . . . it's about the eighth edition or so of the GPSA *Engineering Data Book*. It went through a lot of editions, and I've forgotten what the numbers were when I finally ended up working on it many years later.

[00:10:01]
SCHNEIDER: It sounds like you were mainly working with Riki on this.

[00:10:04]
CHAPPELEAR: I only worked with Riki on this particular . . . . Yes. It was a strictly a one-on-one relationship. I had no interaction with the other members of the faculty at all. This was his private endeavor as a young professor trying to establish himself. Gas hydrates are very important. They were . . . . What happens if you have water with natural gas? Natural gas is methane and ethane and propane. It's essentially, it's what you burn in your stove if you have a gas stove. Mostly methane.

[00:10:48]
And if you have this in a pipeline and it's just a little bit of water in it, and you have certain

pressures, you can form an ice-like thing called a hydrate, which is a crystalline-form solid, like ice. Only it's not your normal thirty-two degrees Fahrenheit. This is at sixty degrees Fahrenheit in the pipeline. And if you get, you have a pipeline and you're trying to flow something through it, and it suddenly decides to turn into "ice," or really hydrate is what it is, at sixty degrees Fahrenheit, you can imagine, *mmmfff* and it won't go no more. So it was very important when they finally [were able to figure out what the gas hydrates] were.

[00:11:37]
[E.G.] Hammerschmidt is one of the great names in that research. I remember that one. And they had just in the '53, '54 was when they finally were figuring out what the actual structure was. And I mentioned this before, before computers, crystallographers would be trying to think about what it looked like, and they literally had to sit and think and imagine these things. They didn't have . . . maybe some of them did make some sort of very crude modeling, but they had no computers to model things. Today we can have the computer and give them something, and the computer can take it and rotate it and show us it from all sorts of different angles and directions. How they did what they did, because these structures were very complex. The papers were published . . . when was that? I don't remember whether that was 1960 when I went back? That must have been after I went back that that happened. Yes. But the whole thing is . . . getting information to where people can see and understand and use it is really very important. And I didn't realize how important it was while I was doing it.

[00:12:55]
GIBSON: Well, it broke new ground understanding gas hydrates. And maybe—

[00:12:59]
CHAPPELEAR: Oh, yes. And understanding . . . and the gas to reduce outages on a natural gas system of all aspects of it, like this book did, because it covers production as well.

[00:13:10]
GIBSON: Can you talk a little more about why . . . gas hydrates in terms of out in a pipeline and such, why it's an issue? Is this an efficiency, or safety, or . . . ?

[00:13:23]
CHAPPELEAR: If you've got a line that you're trying to push a product through and it stops working, it gets plugged, would you be very happy if that was your business? That's why it's important. It plugs the line.

[00:13:43]
GIBSON: So I'm imagining, years later there's something called the Trans-Alaska Pipeline. Was this thought of in that installation, or . . . ?

[00:13:52]
CHAPPELEAR: I personally participated in a consulting job that resulted in the defining conditions for hydrate formation in two fields [MacKenzie and Prudhoe Bay] in Alaska. And from that I developed a generalized correlation that was subsequently put into the Natural Gas Processors official water content chart, and that served as the design guidance for many, many years. And it has subsequently been verified experimentally that my line was conservative. So it's the kind of line that an engineer likes to have. Yes, it had a definite impact.

[00:14:32]
GIBSON: And I had done a little looking at, sort of, natural gas and how much the US uses. But over these years, I guess in a way, you've enabled this lower price, more . . . almost ubiquitous natural gas through all this work.

[00:14:49]
CHAPPELEAR: The economic analysis I've never participated in. But I can tell you, first of all, by using cryogenic gas processing, you get a cleaner natural gas product in that it has more methane in it, and you have, at the same time, retrieve the ethane and propane and butanes, which [are the] feedstocks for, ethylene, propylene and polybutane and polybutylene and all of the other plastics. So, I mean, it had a tremendous impact on . . . not only the gas industry, but on the plastics. And I am not an economist, but I can easily visualize the . . . it must have had a tremendous economic impact. The hydrates things is just another aspect, as I mentioned before, there are so many different parts of it and transport of product, it does me no good to have gas that I could burn in my stove if that gas is sitting on a platform in offshore California and I'm in Texas. It's got to get from California to me in Texas for me to burn. I mean, it's pretty obvious. Is that what you were trying to get at? Okay.

[00:16:11]
SCHNEIDER: All right. So I think then, at this point, you talked about you got your first home and you started to have children. So can you talk a little bit about those years of, you know, beginning a family?

[00:16:24]
CHAPPELEAR: Well, I call it my production years. I had three daughters. There was twenty months and . . . let's see, is that right? Well, June was born July, Janice was born in February, and Juliet then was born in August, so that was '56, '58, and '59. And during that period of

time, I did do one or two very small consulting jobs with Kobayashi that he would call me in to work on, which I liked. I mean, it, kind of, kept me alive. And after my third daughter was born, frankly, I was bored with talking about the best way to wash diapers and how to take kids to the doctor. You know, all of the things—I was bored with child raising. It was not challenging to me. I really didn't like—I didn't like sitting down and reading books to little kids. My husband did that. He read to them from the time that they could crawl up in his lap, hardly. I love to read and I loved my children. I liked them very much, and I took good care of them, but I really didn't like doing it.

[00:17:55]
And I wanted the intellectual challenge that I had, because I . . . preparing that Handbook of Natural Gas Engineering had been very intellectually challenging, and I didn't have that anymore. And so I wanted to go back to work. And my mother-in-law objected strenuously to this. She did not think it was the thing to do, but I wanted to do it very badly. And John, "Yeah, so talk to Riki again." And Riki said, "Yeah, come and work for me and Tom and we'll find some way to pay you." Tom being Professor Thomas W. Leland, Jr., who was a brilliant theoretician. I mean, we have them in chemical engineering, too. And Riki was a very brilliant experimentalist. So together they made a very powerful team, and they both had a very strong interest in the basic thermodynamics of the light hydrocarbons, which was the field that they did their work in for many, many years. That laboratory of . . . worked together and produced tremendously, tremendously influenced on gas processing during the sixties and seventies when I was associated with them.

[00:19:16]
And so I became part of their research team. And what did I do? Whatever needed to be done. When you're doing university research, you have to get . . . if you're doing it in a scientific or engineering field, you have to get financial support for equipment. And equipment can be anything from a pencil and pen and a calculator to do calculations on, to a Van de Graaf generator, as an extreme example. I think that Rice at that time had, built a special building for a Van de Graaf generator in the physics department. And so, you know, I mean, that's—I'm just trying to show that—so as a young professor in a university and you want to get something done, you've got to go out and raise money. You've got to raise money. You do this by writing a proposal to two types of things. One is government institutions and one is private companies. The other is private companies or private institutes who gather money to be spent on research or have money to be spent on research. And you have to convince them that your idea is worthwhile to investigation and support.

[00:20:54]
And so your proposal has to say what you're going to do, what you're going to hope to accomplish, and you have to have a budget with it. And that's—90 percent of it is wishing. You've got to ask for enough. You've got to be reasonable enough in asking, but you've got to ask for enough. And then you have to ask a little bit more than that because you know they're not going to give you all of it. And so maybe you make the same proposal to two or three different entities. So you get 20 percent of your support from this one and 80 percent from that

one. And therefore you have the 100 percent that you need. But you start off asking both of them for the 100 percent. It's . . . there's all sorts of . . . but you have to write these things. And that takes a big chunk of research time. It's one of the things that is very wasteful, in my opinion.

[00:21:39]
GIBSON: But you were involved in writing some of those proposals?

[00:21:42]
CHAPPELEAR: I was involved in editing. I did not write the proposals. I did not go out and seek the places. The professors did. But then they would make their draft and maybe I would have to do some [adding of details], we need this, this, and this type of thing. But then I would read it and see if it really had completeness. And then the other thing is, everybody has a different format that they want it to be in. I am an expert on format. I can do anything, and you have to take this one in this format and change it to this format. And I'm twisting my arms to show that, I mean, one is completely opposite of the other and backwards and forwards, and it's . . . . This is true of writing papers and everything. And I am very, very good at that. I can manipulate any sort of format, and I have rough drafts in there that I could show you where you've gone from one to the other. So I spent a lot of time working on proposals. And you have to make sure you've got it exactly right and all this sort of thing.

[00:22:49]
Okay. The other thing that I did then was helping the . . . . This program was a big program. We had a lot of PhD students and a smaller number of postdoctoral fellows who would be there for one to two years. These people come in and they're in a new situation. They need guidance on everything from where to live, where to buy, where to go shopping, whatever. They need a lot of hands-on help, and I provided that. One thing I told them was, you know, I took them around and showed them where our facilities were. Okay. And this is the secretary of the department. She's the most important one. She knows where to get your paycheck for your stipend that's your support. Okay. And then we would go down to the machine shop and I would introduce them to Ray—what was Ray's last name—Wilson? [His last name was Martin.] At any rate, he was our machine genius, and he could build anything. Okay. That's the second most important person because he's going to keep your equipment running. And then the third one, of course, you've already met, Kobayashi. He's the one that's in charge.

[00:24:14]
And it was this sort of thing that . . . and different ones, so that they knew where things were. And they knew that they could come to me if they had a question of . . . you know, to find out things. So many of these, it . . . . And then I would, as I became more and more experienced and knew more about what was going on and everything, every day I would walk through the laboratories, sort of, like a doctor making the rounds type of things, and see and talk to them about what they were doing and offer suggestions or ideas or ways of interpretation.

[00:24:51]
I remember the day . . . we had a man who was measuring vapor pressures [of all the paraffin hydrocarbons with very, very high precision], and trying to make a correlation of his results. And in trying to develop, trying to think, and I spoke to him about how to feel like a molecule. And this led to—eventually—to the correlation. But the idea is that in methane, if you double up your fist and that's the methane, it's just a single piece, then that's the carbon in the methane. Okay. But then if you have ethane, ethane is composed of two carbons hooked together. So you imagine your elbow being the next ball. And that's that. And then the third one becomes . . . the third . . . when you add your third carbon onto it, it's called propane. And they are hooked together by the intermolecular forces, like your arm is from your shoulder and your arm to your shoulder. And that's fixed and solid. But then you get, when you put that fourth compound on it, look what happens. You can swing the others around it and you have another degree of freedom going on. And from that, we eventually ended up with a generalized equation for the vapor pressure of hydrocarbon mixtures.

[00:26:17]
So but going and that type of idea and intera[ction]—that's what I'm talking about why it's important to talk to people. You . . . I mean I provided certain ideas. They provided—interaction. You know where it first comes from, but you've got to have that stimulus. But going around was very important to see everybody and talk to everybody. And when eventually they would get to the point of writing their thesis, I would review the thesis before it ever went to their committee and make suggestions on trying to make it more acceptable.

[00:26:52]
GIBSON: I mean, in some ways, this seems like a dream job. You get to, kind of, engage with lots of different people and different things.

[00:26:57]
CHAPPELEAR: Oh, it was. It was very, very . . . it was very interesting. And at the same time, especially when I started out, when I first started, we had this computer, the Royal McBee LGP-30 and [. . .] hexadecimal language at 16K of memory, 1960. And the first thing I did was to program this computer to do what we called corresponding states calculations, in those days. And corresponding states calculations involve double sums multiplied by double sums divided by double sums. And then finally you apply an equation of state, and the equation of state equation is such that when it goes and it hits the phase envelope, and then it flops over to the other side of the phase envelope, and in between it does a double turn. So if you're using what's called the Newton-Raphson technique to try to converge on your solution, you can get three solutions.

[00:28:12]
And so my early attempts at programming using this, before we finally figured out what to do, I

would put it in to operate and go home, and I would come back the next morning. The output was in paper tape and would be this huge pile of paper tape where it had flopped from one solution to the other solution and back again all night long, and we finally figured out what was going in. We managed to modify it and get it to working, but it's . . . it was amazing that I had no training in how to do the programming. But you just learned by doing it.

[00:28:53]
In later years, we developed at Rice in the electrical department, The Rice Computer. My office was on the . . . we were in the . . . what was called the Abercrombie [Engineering Laboratory]. That's recently been torn down, the Abercrombie Laboratory [it no longer exists]. And on the opposite end of—the chemical engineering department was at one end—the opposite end was where the electrical people were, and on the third floor they put in The Rice Computer.

[00:29:23]
The Rice Computer room was approximately the size of my house here. It had an elevated flooring with all of the cabling running underneath it. And it had these racks and racks and racks of cabinets with all of these tubes in it. The old-fashioned radio tubes is the only way I know to describe it. And then there was the control console. Well, everybody has seen Star Trek or Star Wars and you've seen the control. It looked *exactly* like that. And you had all your little switches that you could switch, and you had your cabinet here, again with the lights and all, that showed your fast register, so you could look there and see what they were and read the lights and know what it was. And then your fast printer over here that printed a whole line of output. Oh, it first of all just printed out one letter at a time. Then we got one that was a fast printer, it printed a whole line at a time.

[00:30:22]
And so I had to then convert my program to the language. And, of course, they had their own compiler language called Genie. Wasn't a genie at all. And so I had converted to that. And so I very carefully wrote up the entire program, which was pretty complex, in this new language. And I went in and they had input as paper tape. Now, remember, this is an experimental computer. So they were experimenting on the computer part of it, both the hardware and the software. So I get it all typed up and ready to go. Go in, and I've learned how to—you actually had to operate it yourself—and I learned how to put the bootstrap in and to get it to start operating, how to read all the little lights and everything.

[00:31:13]
And it would not compile. It would not compile. And in the meantime, the period between I had done this original thing until I wrote this particular program, they had changed the software and they had a comment in the original software, they had a final . . . you did a line of code, and at the end of the line you had a place to put a note to say what you were doing, and I'd use that copiously so I could keep track of what I was doing. They had eliminated the comment line, so my program would not compile. So I had to go back and edit my tape and take out all of the comments before it would compile. So that was that aspect of computing.

[00:31:56]
SCHNEIDER: And how did you share use of the computer? Like were there certain hours when you were able to use it?

[00:32:03]
CHAPPELEAR: Oh, it depended . . . computers . . . it depended on when you were . . . remember, this was over a period of twenty years, and it varied quite widely. Originally, we had the one computer. It was only for the chemical engineering department. And remember, Leland was the only theoretician on it, so he was the only one. So he was, sort of, in charge of who could do what when. Really, there wasn't that much competition for it because there weren't that many people using it. I mean, I used it and I guess Jim Leach did . . . did he? Somebody . . . there must have been other people, but it was . . . . We were . . . barely knew what we were doing with computers in those days. Later on, before we got The Rice Computer, we got an IBM 1620, and it used, we had to share that with the entire campus. And you would . . . it used Hollerith cards. The first computer used paper tape for feed. The second computer was the IBM. It used the Hollerith cards. Do you know what a Hollerith card is?

[00:33:18]
SCHNEIDER: If you could give a short explanation that would help.

[00:33:20]
CHAPPELEAR: It's a card about four inches by seven inches, and it has one corner cut off of it, and you punch holes in it, and it goes through a reader that reads those holes and then transfer—translates that into some type of information. That's basically a Hollerith card. And you had to punch your own Hollerith cards in the university, you didn't have somebody else to do it for you.

[00:33:48]
GIBSON: And one card was like a line of code?

[00:33:52]
CHAPPELEAR: Usually, yeah. One card was a line of code, yeah. So it was very hard to keep your stack correct, to not drop it. That would be a . . . . And, of course, being a university, there was a limited supply of Hollerith cards. So I snuck a whole box and hid it in my office so I wouldn't run out of cards. Ah, universities are great places to work. But those had to go over to the . . . this computer was so important. You go. They're like, "Oh, no." You had to turn in your cards for the operators to run your program and then get your result back. That was that. Then when The Rice Computer came, the Genie, I never had any problem, you know, being able to

use it. I was able to get in without having to sign up three days in advance and stuff like that. That's what you're talking about?

[00:34:46]
SCHNEIDER: [Yes].

[00:34:46]
CHAPPELEAR: It was quite different. Did we record my husband's computer story? We did that?

[00:34:52]
SCHNEIDER: I don't think so.

[00:34:54]
CHAPPELEAR: Oh, okay. Well, the computer is very, very interesting. Had a huge impact on me and all the rest of the world. When John went to work for Shell in 1955, he started using a computer in his work, and they used the Hollerith cards for input. But he was in company research, and they knew how to take care of people's time and everything. So they had special people to punch the cards. He would write it out in his handwriting, and they would read his handwriting, somehow or other, and punch the cards. And then another person would punch the cards and they would compare the cards to be sure they agreed. [. . .] "Okay, this really is what he wanted." And then they would pack that up and ship it off by special courier to the airport and put it on an airplane and fly it to New York City, where Shell had their computer, naturally. 1955 to 1960.

[00:36:00]
And they would run it. The programmers—the operators of the Shell big computer would run his program. I don't know what they had, but it was bigger than what I had at Rice from 1960. And then they would send the result back by airplane and the output was in continuous . . . if you haven't seen it, imagine a piece of paper the size of your newspaper that just goes on and on and on, and it folds every eighteen inches or so, has an automatic folding process. And so your output from your . . . comes out as a computer-printed output that is a continuous, long piece of paper. And you have to go through until you find what you want and look at it. But that was the output. So that would be put on an airplane and flown back to Houston and taken by courier from the airport to his laboratory in West Houston. That was the state of the art of computing.

[00:37:00]
And then I went to Rice in 1960, and I get the introduction, and then we get the introduction to the . . . . When our children were growing up and everybody would sit at the table and we'd be talking about computers and stuff, and the other kids would come in and they wouldn't know

what was going on and would be very amazed. And then our son, first of all, our, one of our daughters, went and studied computing at University of Houston. And then our youngest was a son [Jack Emerson Chappelear]. And he comes along and he studies computing at the University of Houston. And one summer he gets a summer job working on the Cray computer. I don't believe you ever heard of the Cray or not, but it was one of the first of the super, supercomputers. So Jack worked on that. And then after he finished at . . . . Oh, then he got a job part-time working and then worked for them immediately after his graduation on the genome project. I mean, computers throughout our life, my family life, have been very significant.

[00:38:08]
Jack ended up having a very distinguished career as a computer consultant. He could go in to a company that was having—you're having problems with your computing in your office, and you're not getting the results as soon as you want so he can go in and—or he could, he's now deceased—he could go in and go around and talk to people. And by the end of the week, he would tell you, "You need to buy this, this, and this. You're going to have this, this, and this, and you need to institute this, this, and this." Make a complete analysis of what was needed by the company to make their computer operations be fruitful. He was a brilliant . . . and he was an expert on . . . . And he ended up, some of his final clients were some of the biggest names on Wall Street.

[00:38:55]
GIBSON: So you have four kids?

[00:38:57]
CHAPPELEAR: I had four children.

[00:38:59]
GIBSON: And a couple of them were in STEM fields, it sounds like.

[00:39:05]
CHAPPELEAR: Well, let's see. June became an engineer. Janice was first a professional musician at age sixteen, but then she did . . . . She was going to major in music. She was a brilliant jazz saxophonist, but realized nobody was making a living just playing the saxophone in Houston. And so then she went into computer . . . and she did, majored in computers. And Juliet did major in music to begin with and then became a CPA [Certified Public Accountant]. And then our son majored in computer engineering. So three of the four went into the STEM field directly.

[00:39:44]
SCHNEIDER: And, you know, you were talking about . . . you had the computers early on at home.

[00:39:50]
CHAPPELEAR: Yes.

[00:39:50]
SCHNEIDER: In addition to the children's exposure to computers through the home, to what extent were they going to, you know, Rice or to your other workplaces, either yours or your husband's, and seeing what you did there?

[00:40:05]
CHAPPELEAR: Oh. Well. I don't think they ever went to Shell. But I actually . . . in my work at Rice, I had a lot of proofreading to do. We did a lot of publications. I was showing you my stack of publications. And every time you do a publication, you have to do a final proofing of what you get, and you have to proof along the way on all sorts of things. They did a lot of hard work proofing stories, but there were times when I would have things . . . they had tables of numbers and numbers and numbers, and I would bring them home and I would get my children to proofread the numbers. And they can remember doing that when they were quite young. So they learned.

[00:40:58]
We tried to raise our children to be very independent. First, I started when they could barely crawl up to the kitchen countertop and I would be making biscuits, and they would help by cutting out the biscuits. So they all learned how to make biscuits and do the basic things so that they could do something about. It turned out to be a good thing. They learned how to cook, and it was good at various things that happened in life. They all knew the basics of how to take care of their own clothes and to use the washing machine and how to run the lawn mower. Everybody knew how to run the lawn mower. Everybody learned how to change a tire on a car. It was . . . they just learned to be independent. I think it was a good way to raise my children. They were all fairly, well, independent.

[00:41:50]
My daughters were . . . I guess because I had always wanted to play an instrument. I had, growing up, you know, the conditions we were in going back and forth. I had studied guitar when we were in Big Spring for a year and a half. And then finally, after we got our home, when I was in the ninth grade, my parents bought a piano and I got to have piano lessons for two years, my freshman and sophomore years in high school. So I had had some music, formal music training, and I liked it very much and everything. So I wanted my children to have that opportunity.

[00:42:31]
When my oldest was [about] seven years old, she could start to . . . she, you know, was at this age, her dexterity had developed to the point and her, able to read and everything, well enough to start learning music. And so we rented a . . . maybe we did it before then, Jack was two years old. '62, she would have been ten years old. Was it that late for her? I don't remember. At any rate, we had the upright piano, and she started taking music lessons. And her two sisters after her did the same thing. When Jack came along, Jack had to be induced prematurely, and as a result, had some brain damage and had learning problems. So and his physical dexterity did not develop well at all. But he tried piano and he just couldn't cope with it.

[00:43:32]
But the girls did study piano. And when they [were in] elementary school ready to go into junior high—the junior high music director was a very, very driven man, very much. And he came over when they were in the fifth grade to get them to start a horn so that they could play in the orchestra. Well, the oldest girl ended up with oboe. My second daughter wanted to do the harp, and we took and let her have a trial with the harp teacher, who was, of course, the harpist at the symphony. And she sat down and she told her what the strings were and everything. And Janice proceeded to play the theme from *The Sound of Music*. So she . . . all of my daughters had quite a bit of musical talent. Janice had a tremendous amount.

[00:44:27]
Well, then we found out that to play the harp, the harp itself, in those days, cost 10,000 dollars. And you had to have a truck to transport the harp, the big harps, you know, you're talking about, of course, there's little harps you can play. So we persuaded her to not play the harp. And so she first tried the French horn and she didn't like it. And she went to the saxophone and loved it and did her career in saxophone. And then Juliet came along. Lo and behold, she took up the bassoon. So they all three play musical instruments.

[00:45:04]
And when June was finishing junior high and getting ready to go to high school, Ruth Denney finally persuaded the Houston School Board to form a special school for the performing and visual arts that became the High School for the Performing and Visual Arts [HSPVA]. And the very first year, my oldest daughter was a—it was a three-year high school at that time—sophomore. So she was the beginning. So she started there.

[00:45:37]
I formed my second Parent Teacher Association. The first one . . . or maybe it was the third. I've forgotten. Anyway, I had formed . . . in our first . . . when we first bought our home, I had helped form the PTA association there for that school because it was . . . I didn't have any kids in the school yet, but I helped form it and organize it. And then I formed one for HSPVA—I thought I did three, maybe it was only two. At any rate, HSPVA, we formed the Parent Teacher Association. The parents were the producers and the teachers were the directors. So instead of the Parent Teacher [Association] it was the Producers and Directors Association. But they all

three went to HSPVA and did their music training there. And the middle girl, when she was sixteen years old, started playing with a lot of the Latin bands professionally and became a member of the union at age sixteen.

[00:46:40]
GIBSON: These are amazing, accomplished kids, and I'm thinking about, sort of, today's time when often women, but now both parents, will struggle to keep down jobs at the same time as raising kids.

[00:46:53]
CHAPPELEAR: Oh, my husband thought I was Superwoman. He often called me . . . I was a Supermother. I was a room mother, I organized PTAs, I was a Scout leader. I had a child with special needs, had lots of special problems with. If there was a drive to walk down and knock on the doors and bring, you know, the March of Dimes, where you ask for donations . . . I've forgotten what they all were. I would always do that. And I liked to sew. So periodically, I would do things when . . . when the girls were in junior high and they formed a little band and they all wanted to have the same jacket. And I made a jacket for everybody in the group to make it.

[00:47:50]
GIBSON: So people today struggle to "balance" all that. How . . . what tips would you give people for how you did all that?

[00:47:58]
CHAPPELEAR: You do what you want to do, and like what you want to do. If you . . . . John liked to read to the kids. I can remember and I have pictures of him even holding our grandchildren and great-grandchildren sitting in a big Pullman chair, that had been his grandfather's chair, and they would crawl up and he would read to them every night. And he would take them to the library to get their books, and they would come out with this huge stack of books and everything. We both were very much involved with our children in what they did and encouraged them.

[00:48:40]
SCHNEIDER: And how did you coordinate your schedules with your husband and with your children?

[00:48:46]
CHAPPELEAR: Well, you just tried to plan everything. When we . . . . Well, John and I both

were active professionally, of course, and had to travel away from the home. And we always had to check with each other before we could go anyplace. I remember one time when I was at the university and I was working for the National Science Foundation has a review process before they make awards, and I was one of the reviewers for the Presidential Young Investigators Award. And the other reviewers came from whatever cities they were. I was in the middle location, so they came to Houston. And rather than meeting at a hotel, we met in my home because you have a tremendous number of papers, like, we would need this room, and we would have them spread out all over these tables in order to review the material and all.

[00:49:40]
And I was investigating and working on that and about one o'clock in the afternoon, the phone rang and I answered it, and it was my husband. And he said he had just been offered the opportunity to be Shell's exchange scientist with their laboratory in Holland. And I said, "Well, that sounds fine, dear. We'll have to . . . I can't really take time away from what we're doing. We'll have to discuss it tonight." That was probably the ultimate discussion. We'd had many more discussions before about this meeting and that meeting and not both being gone at the same time. But that was the ultimate discussion, and that led to our year abroad.

[00:50:20]
But raising the kids, it was a joint effort. I don't see how anybody is a single parent, male or female. How in the world can you manage? But, of course, my grandmother did it. My mother did it. But in today's society? Well, my best friend forever down the street from me, she has no children. And so she tried having an exchange student live with her two years ago, and at the end of the year she was just exhausted. She's a . . . well, her degree is recreational therapy. And as part of that, she also does massage therapy. And so she goes to people's homes and the very severely disabled have to have massage therapy two to three days [a week]. And the mentally challenged people have to be taught how to go out and eat in a restaurant. That's the recreational therapy aspect of it. Well, that's just one of the simple things that she tries to teach them. And so she had her career, and then she had this high school student that suddenly has to be . . . go to and from high school and to take care of all the high school [activities]. And she managed it for a year. And at the end of the year, she . . . you know, I talk to her every week when I'm having my massage. It's truly amazing. How in the world can a single parent ever survive? It's a very difficult situation.

[00:51:58]
SCHNEIDER: I have a small question, which is . . . what . . . was there any reasoning behind naming all your children with the J names?

[00:52:05]
CHAPPELEAR: Well, my husband's name is John Emerson. So then we started having children and I wanted to name the daughter June, because that was my roommate at Rice, was very, you know, I really like that name. And Elizabeth just seemed to go with it and it turned out

that was J.E. And so we, kind of, said, well, we'll keep with that. And so then we did Janice and Elaine, and then Juliet Eve. And it turns out that there's one syllable in June and two in Janice and three in Juliet. So we, finally, with my fourth pregnancy, we were going to have the name be George. And John decided before we had, he was born, that no, we need to keep J.E. And so it became [Jack]. And the Emerson, which John Emerson and Jack Emerson, my husband's father was named Emerson Burns Chappelear. So that came along. And so many years later when Juliet adopted her children and had to give them names, one of her sons has Emerson as his middle name. So we've kept it going in the family.

[00:53:29]
SCHNEIDER: Very nice.

[00:53:37]
GIBSON: So during your time at Rice, I'm, kind of, reflecting on the 1960s. So there's the moon landing. And you live here in Houston. There was . . . what . . . ? Didn't JFK [John F. Kennedy] make that famous speech at Rice?

[00:53:52]
CHAPPELEAR: Made a famous speech at Rice, yes.

[00:53:53]
GIBSON: What's your memory or involvement in any of those . . . ?

[00:53:55]
CHAPPELEAR: I don't remember the speech. I remember the landing on the moon. In fact, when I did my genealogy training in Provo, [Utah] and there was a young student assistant who was in his senior year of college and . . . it was a small group of people. I said, "What's the most significant thing that happened in your lifetime?" And to me, the landing on the moon was the most exciting. And this young man says, "That happened the year before I was born." And that, to me . . . impressed me with what age is and what happens. To me, it was like it was yesterday, and yet he hadn't been born. It's . . . .

[00:54:41]
GIBSON: So talk about that, I mean . . . .

[00:54:43]
CHAPPELEAR: What is time? Time is such a difficult concept to understand. In so many

different ways. But so much of our concept of time is relevant to ourselves. You see it in the small child, waiting for Christmas or waiting for my birthday. And when you're small, "I'm two and three quarters. I'm almost three!" Right? Well, you, kind of, revert to that when you get to my end of the spectrum, too. And the . . . it's just very interesting how your inner concept of time is related to how old you are. And yet, time is a very important concept.

[00:55:41]
GIBSON: So the most significant scientific achievement in your lifetime, you would still say, is landing on the moon? What would you say today?

[00:55:49]
CHAPPELEAR: Oh, what would I say at this stage in life? Yes, I think that is the most significant thing. Now, the computer development is huge, tremendously important, and I'm not belittling any of the other accomplishments that have happened.

[00:56:12]
GIBSON: So landing on the moon, how is that significant for science? How did you relate to that? I mean, you had kids by then too, right?

[00:56:22]
CHAPPELEAR: Oh, yes. I had all my children by then. Yes. You said it's . . . I think it's the most significant—did you say scientific accomplishment or . . . ? Yes, I think it was . . . well, it was more than scientific. That's why it's the most important. Because philosophically, humankind has been released from the boundaries of being on Earth by landing on the moon. And the more that I know, philosophically and religiously and scientifically, the more important that event becomes.

[00:57:12]
SCHNEIDER: Do you remember, like, watching it or hearing news about it? What was that like?

[00:57:17]
CHAPPELEAR: Oh, yes, I remember watching it vividly, vividly sitting there. The vivid memories in my . . . I remember December the 7, [1941, the attack on Pearl Harbor]. I remember watching that event. Of the events that were worldwide, you know. And I remember 9/11 [attacks on September 11, 2001].

[00:57:41]
SCHNEIDER: And so what . . . do you remember what you were thinking at the time when you were seeing it happen, the moon landing?

[00:57:50]
CHAPPELEAR: When I saw the moon landing? Elation. We finally did it. Humans have finally broken free from being tied to the earth. It felt tremendously human. I guess . . . it was . . . . Freedom. Freedom.

[00:58:32]
GIBSON: Which is a different kind of memory than these others, which were, sort of, seared in memory.

[00:58:37]
CHAPPELEAR: The others were pretty awful. They were very, very tragic and frightening. Now, this was not frightening. This was . . . . It was beautiful. I mean, it was . . . . And it wasn't just one individual. I mean, it was an accomplishment of humankind.

[00:59:08]
GIBSON: Having been in science and engineering, did you feel that was, kind of, a special moment versus others or . . . ? The humanizing aspect sounds like it's a universality.

[00:59:25]
CHAPPELEAR: Well, from an engineering standpoint, I had a tremendous desire to do some of my experiments in a zero-gravity condition. In fact, we tried to get some of our stuff on a [space project], and we never could get it accomplished. No, no, from an engineering standpoint, of course, you have the, "Oh, what can we do next? Oh, look, here's a new toy for me to . . . . " You know, these computer junkies. I have a friend, and she always had to have the latest and greatest in the computer toys. Whatever happened, she was on it. She was a brilliant woman. There are people that are history junkies or news junkies or something, and they really have to have it. Of course, she . . . that was it. The idea of trying something new out is just . . . . A cook always wants to try out a new recipe, right? A real chef. A real chef is challenged by creating something new. I think that's, sort of, a basic human urge to tinker with things and make them a little different.

[01:00:32]
GIBSON: So other things going on, maybe in the later sixties after the moon landing was, I

guess, something called women's lib [women's liberation movement]. What was your, kind of, reflection on that period of time?

[01:00:45]
CHAPPELEAR: Well. I guess my reaction was, it's high time, baby. I didn't ever participate in any things [protests, et cetera]. I think I felt like that simply, quietly, being myself and doing and accomplishing what I could do was enough. And we had, at the same time, that was the same time that we had all of the racial problems. Houston was unusual in its reaction to the race problem. And we had a, and still have, certain people who are very influential in the city. And it's not well known, but at the time, the Black influential people, leaders, met with the White influential people and they said, our city isn't going to have any riots, and we did not. details of that are documented elsewhere, but it's . . . . It really happened. And today, Houston is the most integrated cosmopolitan area in the United States. We have more of every different type here than any place else in the greater Houston area, and yet, we still have tremendous prejudice—areas of very high prejudice and intolerance. Very challenging. From a sociological standpoint, it's a real . . . a lot of very interesting things have gone on in my lifetime.

[01:02:36]
GIBSON: Kind of an international city, but yet not in a way.

[01:02:39]
CHAPPELEAR: No, it is international. It's tremendously international.

[01:02:43]
GIBSON: Were you involved with something with the Society of Women Engineers (SWE)?

[01:02:46]
CHAPPELEAR: Yes, I told you that. Yeah, we had the first . . . well, maybe it wasn't the first. We had one of the earliest national conventions here in [1957]. Our society had to . . . . Well, I've been active in organizing professional meetings throughout my entire career. That was one of the smallest [conventions] that I was active in [during the course of my career], and [so the nine of us (members of the Texas chapter of SWE) had to do all of the preparation for the convention]. We had about sixty registered women engineers from all over the United States, or people who call themselves engineers, come. And a lot of them brought their spouses with them. So for the party, the official banquet we had one hundred people attend it.

[01:03:44]
We had one Black female. And whatever her name is, [Yvonne Young "Y.Y."] Clark, something or other—I've got it—came. And the meeting was at the Shamrock Hilton Hotel.

And, of course, she could not stay at the Shamrock Hilton. She couldn't even come in as a delegate without an official guide, host, caretaker of her. And so accommodations were found for her by one of the Black leaders—one of the Black pastors here in town who's extremely well known—for her. And they brought her each day to the meetings, and we met her at the front. And this was when the Shamrock Hilton was a fancy hotel, and you had the chief bellhop guy out there, the fancy uniform and all that kind of stuff. And we had to meet, be there and meet her and conduct her throughout every meeting to all of the rooms. And when she went to the restroom, she had to be escorted and everything. We weren't going to have one of our guests be treated as a second-class citizen. And she attended all the meetings, went to all of the events that we had, and we made sure she participated in everything.

[01:05:12]
GIBSON: And she was an engineer?

[01:05:13]
CHAPPELEAR: She's a civil engineer. Furthermore, she told me she worked for . . . in Tennessee, I think, for the state or something. The only time—she told me a story, it's hilarious. The only time she ever supervised a concrete pour, she was eight months pregnant. I thought that was really funny.

[01:05:35]
SCHNEIDER: Did you have any other engagement at this point with other Black engineers? Or as time progressed, did things become more integrated?

[01:05:47]
CHAPPELEAR: I never had any more interaction with Black engineers during that time. It was only towards the end of my career, in the late seventies and early eighties, that I began to see Black engineers at AIChE meetings. And subsequent to that time, there've been a lot more Blacks. We had no Blacks at Rice, of course, during that time.

[01:06:32]
I did have, deal with a very large number of international students from . . . well, some from Europe, some from Mexico. None from South America. I had a woman from the Philippines. I showed you her picture earlier. We had a woman—no, the one I showed you—the picture of the one from the Philippines—we also had the one from Japan, which one did I show you? Anyway, we had two women—those were both women. And had one from India. He was interesting. With the caste system and all, and this is something we had to learn, your social background makes a difference in how you look at things. And he had to learn that Ray Martin, the machinist, was a very important man and you didn't look down on him because he worked with his hands. See, he was from a society where it would have been unthinkable for him to change

his own tire. And, you know, to me, that's . . . change a tire, I know how to change a tire. May not be strong enough to do it anymore, but I sure know how. It was different.

[01:07:49]
And I also found, and I don't know whether other people have found this, I dealt with a lot of people who were from the Orient, Koreans and Japanese and Chinese and Philippines, and their native language was an Oriental-based language. And the man from . . . where was he from? One of the Middle Eastern countries. Their language structure is different from the language structure of English and because of their language structure, sometimes their analysis process is different from our analysis process. I had to learn how to communicate with them and try to understand the way that they were looking at things.

[01:08:44]
And at the same time, trying to learn . . . for them to learn how to communicate in English. That's when I fell back on my training in diagramming that I had gotten the first time I was in the ninth grade. And it was tremendously helpful in doing that. But I found it very interesting, to me, the organization of how to do things, and I can best illustrate it by using cooking, to make a cake. Do you both cook? Have you cooked? You made a cake?

[01:09:17]
SCHNEIDER: [Yes].

[01:09:17]
GIBSON: [Yes].

[01:09:17]
CHAPPELEAR: Okay. And what's the first thing that you do when you make a cake? You put all your ingredients out. You turn on your oven, you prepare your pans, you take your bowl and you put your stuff in, and you do all the mixing. You put it in the thing and you cook it. That's our description of how to do things. Now, the Oriental description of how to: I'm going to bake a cake. I'm going to put pink icing on it and use these decorations and serve it with these forks and spoons. I'll mix it. Be sure to beat the egg whites first. I'll bake it at so and so. And they'll have— the whole order of things is completely different from what we would organize the way of going about making a cake. If that makes any sense, that changes—if that is the structure of your language—and it's not an exact analogy, but if your language is structured like that, then the way that you analyze things is quite different. And that probably was one of the biggest challenges in all the years that I was working there. Communications.

[01:10:33]
GIBSON: So we're talking about this whole period from Rice. And you mentioned—as we were talking about family—the move internationally.

[01:10:43]
CHAPPELEAR: Oh. Okay. Well, Rice was my . . . from 1960 to 1975, that was my career. During that period of time, as I said, I did . . . participated in lots of different research efforts. We periodically would have consulting jobs like the one for the hydrate formation of the . . . for the natural gas pipelines in Alaska that would make a lot of money. I had my children. I want to go back and do a little bit more research what you're talking about so I get my chronology straight. In 1962, we were doing a major consulting job, and I was working in Dr. Leland's office. At that time, I still had my own office, but whatever I was doing for the consulting job I was doing in his office, and it was a joint contract that we had for some big thing. I was working like forty hours a week at that time. Normally, I did not work—I was normally on "half time," but I actually worked longer hours than that. And when we'd have a consulting job, I'd work very long hours.

[01:11:58]
But, at any rate, I was having . . . I was pregnant with my son, six months pregnant, and I had a grand mal seizure. And I woke, there were the medics hanging over me and my husband and Tom. So I was out for quite a bit of time. Of course, they took me to the hospital, and I spent the night in the hospital, and they did what they could do in those days. They could check your blood pressure and take an X-ray of your head. You go in six months pregnant to have an X-ray done, and the technician turns white, as white as this blanket. And she drapes me up with all of this lead stuff and did X-ray the head. And they did an electroencephalogram. The electrodes on your head were the measurers, what they could do with that.

[01:13:01]
That was all they could do to find out what was wrong inside your head in 1962. And so from those results—oh, and they could look into your eyes. That's the other exam that they did. If you look into the eyes with a—like this—and you probably have had an eye exam like this now where they look and they're looking at your blood vessel development. They actually do it with a machine nowadays—they go "poof!" and take your picture. But back in those days, they peered at you. And if they're doing a neurological evaluation, they peer for a long, long time. And if your neurologist smokes a pipe or a cigar, it is very, very uncomfortable, speaks the voice of experience. [makes a disgusted noise] I can still remember it.

[01:13:43]
But at any rate, they determined—I was six months pregnant—I could probably go ahead and have my child okay, but I would have to, you know, they would have . . . . I probably had a brain tumor from what they could see. So I had to stop working. I had to stop driving a car. Stop raising my hands over my shoulders. I don't know what that had to do with it. Essentially, stop doing everything. And remember, this is in the middle of when I'm raising a family and all, and

I'm doing a consulting job, and I'm running around like crazy. And it was a very difficult time. And as we drove home from the hospital, John and I talked and we agreed that if it came to the choice of who should live, me or the baby, it would be me because we had three little girls to take care of. And it was a very difficult conversation to have. It's a very difficult concept to deal with. But we did and we did it together. And so I went ahead. And I told John, "John, I'm going to need a psychiatrist. This is more than I can deal with."

[01:14:52]
[And so I started going every week to see this doctor, this neurologist.] And it turned out the neurologist was also a psychiatrist, so I started counseling with him at that time. Well, after looking at me and continuing to be monitored by the obstetrician and all, and then finally the neurologist thought he could see changes in these eyegrounds. Now, I've never looked at the eyegrounds, but what little I've done on looking at some of the medical stuff, how they interpret anything from that is beyond my capabilities. But he thought it showed that the so-called tumor was growing and that they needed to do the surgery sooner than he thought.

[01:15:45]
So he wanted to induce, and the obstetrician delayed him for another week, and then Jack was induced three weeks early. And my children were large children, but Jack was induced three weeks early. He only weighed six pounds and six ounces. My other children were [seven pounds and eight ounces, eight pounds and eleven ounces, and eight pounds and thirteen ounces]. See, so Jack was premature at that weight. And the pediatrician came in and told us that he was having difficulty breathing, the same difficulty breathing that killed the Kennedy baby about the same time, just before this time. And he didn't know whether he was going to live or die. Well, he did live.

[01:16:45]
While, in the meantime, they could do more testing on me. They had another test that they could do called pneumoencephalography, where they put you in a chair like this and strap you down. And the chair is in a cage like a gerbil wheel. The little ones, the little . . . . And they spin this around, and as they spin it around and turn it around, you are displacing, they displaced the spinal fluid with some sort of something. I'm not sure what—a gas or something. And then they can displace it up into your head, and then they can take X-rays of the head and see other things inside your head. This test is no longer used now that we have MRI.

[01:17:32]
And you have this horrible headache afterwards. You literally, you have to be flat on your back for about two weeks for it to go away. So after they did it, they could see where all the blood vessels were and everything. And they decided that, no, they didn't see . . . . The evidence of a tumor was in my blood vessels on this side of my head, and the evidence was that the blood vessel was flat instead of being curved. But it was so small that if they did surgery, they would do more damage than if they left it in place and watched it.

[01:18:10]
So I then proceeded to live for the next several years, not knowing whether I had a brain tumor or not. And I continued under psychiatric care, and I had bouts of severe depression where I could not work, where I would contemplate suicide, get the razor blade and hold it in my hand, call my best friend, and she would talk me out of it. And somehow or other, I kept working, most of the time. And finally, I was able to have a brain scan and they couldn't find any tumor and I was discharged. But that took a huge part of . . . it was also going on, all this time I was [working] at Rice, see, in the sixties, which is why I stayed there as long as I did, partially, because of my medical condition. So I actually could not participate fully as I wanted to in a lot of things. And I never knew when this would . . . . And every six months I would be ready to go in and do this. And, of course, you would become very tense, and it's like you'd get all upset before you have your period. Only this was a little worse. So.

[01:19:20]
SCHNEIDER: And you mentioned that friend who was supportive. How did, if you were working with Riki or others, how were your colleagues around that time?

[01:19:28]
CHAPPELEAR: They were—whenever I had to leave, I left. And they were completely supporting. Yeah. I had complete, full support from them. Yeah. I mean, remember, Riki had had a brain tumor, too.

[01:19:40]
GIBSON: I was going to say, I mean, sometimes a lot of this wouldn't have been shared back then, right? Medical issues associated with pregnancy, postpartum depression, depression.

[01:19:50]
CHAPPELEAR: If you fell down and had a grand mal seizure right there.

[01:19:53]
GIBSON: Right in the office.

[01:19:55]
CHAPPELEAR: They know about it. Yeah. It was a difficult time. It really was. But Jack did survive. Now, I was traumatized to the extent—my mother, of course, came out to help take care of me and everything. She took me every day up to the . . . when I could, to the preemie ICU that he was in for two weeks. Took me up there to see him and everything, and I cannot remember ever going to see him. I have completely wiped that out of my mind. It's amazing

what the mind can do. It must have been very, very traumatic for me. But anyway, you were asking now about my . . . . So that was part of my . . . of why I did what I did during the sixties and seventies.

[01:20:55]
And in the meantime . . . you know, it was really interesting working and meeting all of these people and learning all of these things. I went to all the GPSA/GPA annual symposiums [. . .]. I was the only woman going to the meetings. And in those days, they would have the final Wednesday night party would be men only. And I didn't get to go to those. Stuff like that. And it's quite different nowadays. Quite different. There weren't any women in those days who were, you know, who owned and operated the gas companies. Nowadays, there are. It's a lot of difference, a lot of difference.

[01:21:39]
SCHNEIDER: So I wonder if maybe before we go to the living abroad, if we should talk about—more about some conferences?

[01:21:46]
CHAPPELEAR: Okay. Let's break.

[01:21:47]
SCHNEIDER: Should we stop?

[01:21:49]
CHAPPELEAR: That's a good thing. Let's break for a moment.

[01:21:49]
SCHNEIDER: Okay.

[END OF AUDIO, FILE 2.2]

[00:00:00]
CHAPPELEAR: [. . .]

[00:00:02]
SCHNEIDER: Okay. So last—so we're back on after having a lunch break. And we were

talking before about—you had mentioned conferences, attending conferences, and I would like to hear about that generally in terms of, you know, what kinds of conferences you were attending and your experiences, and in particular, you had mentioned in some of your writings the Van der Waals Centennial [Conference on Statistical Mechanics] celebration in Amsterdam, and I was wondering if you could share a little bit about that conference. What was involved in that and your experience there?

[00:00:34]
CHAPPELEAR: Okay. I participated in professional meetings or conferences in a lot of different ways. And you've asked about one specific one. It's customary for really important, really, really important people like van der Waals to celebrate . . . this was the centennial of his death, I think it was, whatever it was [it was the centennial of his 1873 thesis]. And so, actually, it all started at Easter time when my daughters participated in sunrise service, and I had everybody in MYF [Methodist Youth Fellowship] come to my house and served them breakfast afterwards. And I had pulled that table apart by myself. The next morning I couldn't get out of bed. I had injured my lower back, and I had to literally roll over and let my body fall off onto my knees, and my husband lifted me up. I ended up in the hospital in traction. I had a ruptured herniated disc, so I've had a bad back ever since. So I was in the hospital when we received the invitation to the van der Waals conference. That's the connection.

[00:01:49]
And Riki was . . . like me, he really appreciated the great names, and he was thrilled to death to be asked to participate. We were the only ones who gave two presentations from a single laboratory. And this was a special conference that they held in Amsterdam. And Riki and I and Norman Carnahan, who I definitely want to have included in my—he was a colleague of mine that I did a lot with—and we went. I did not present a paper, but I was coauthor of both papers, and Riki and Norman presented papers at that conference.

[00:02:30]
It was Amsterdam, which is different. And Riki always gets into trouble. And we were walking in the red-light district. The red-light indicates women of ill repute who are happy to engage with their body to earn money. And one of the funny things, they have a little kiosk over by the canals where the gentlemen can go and relieve themselves. But, of course, the ladies can't. Riki had to visit one of those. One of the funny things, I remember that. So that was a real honor to be asked to go and to be . . . . And then somehow or other he got the money, or maybe, I've forgotten whether I had to pay my own airfare or not. But anyway, we went to that. So that was an invited conference. It's the only one I ever got invited to. Riki [was] invited to the Gordon Conferences, and John was invited to Gordon Conferences at different times and things like that.

[00:03:41]
Most of the meetings that I went to and participated in were from the professional societies. AIChE was the biggest one of those. Numerous ones of those, and I participated as an attendee,

as a speaker, as a chair of a session, as a member of the membership committee, or the arrangements for this or that. I never was a program chairman for one of those. Those are . . . it's extremely complex, extremely complex. And anybody in AIChE whoever is a program chairman for one of the major meetings, those people need to be—thank you, thank you, thank you, thank you, thank you. I mean, it's really a tremendous service that they're doing, to do that. So that was that type of meetings. I went to the meetings of the Gas Processors Association, and those are meetings of a marketing or business aspect where people get together. And they had technical meetings because they'd sponsored a lot of technical research. And we were one of the ones that we had to give reports on what we were doing. And I did a lot of other work with them, too.

[00:05:01]
Then there was another thing. This was another technical group to work with, called the Cryogenic Engineering Group, and this was headed by . . . is his name Himmelblau? I should remember the man's name [Klaus D. Timmerhaus]. He was very prominent in cryogenic engineering, and he was at . . . [University of] Colorado [Boulder]? I think that's right. And all of the annual meetings that they had for about fifteen years had been in his home university, and he ran everything. That's a very . . . now, this is a very small specialty group of small attendees, less than one hundred, a small conference. Well, we . . . for some reason, Riki decided to volunteer to have it at Rice with me to help him put it on. And Rice, as far as I know, we'd never had one of these before.

[00:05:57]
And it was in the summertime to use the empty dormitory facilities for the people to come. Mostly—most of the participants were university professors who didn't have a lot of travel money and travel expense. And you have to really be careful how you spend your money, so you're willing to stay in a dormitory, et cetera, et cetera, to save money. Well, I had . . . you got to arrange everything else for the meeting, and I did it all with the help of the graduate students that we had there and postdocs.

[00:06:29]
When I say we did it all, that means you made the signs and went out and put them up with arrows pointing to tell people where to go in the campus. You made sure they had soap in their rooms to wash with. You made sure that they had the proper . . . to show your slides, to give your talks, and that the rooms were prepared and at the right temperature. That the programs were printed to be passed out. That the nametags were made. I mean, holding a technical meeting of any size more than of about three people, it gets complicated. Well, I was in charge of everything else. I didn't have to arrange the technical program. They did that part. But I had to be sure they had a room to sit in and that the room was ready for them. So I did that for that. So yeah, I attended lots of conferences and I did a little bit of everything.

[00:07:32]
In the same vein, John and I were very active in our church and have been and it's been a very important part of our lives. Done a lot of Bible study, especially since we retired. I've enjoyed

that very much. We were in a small church. No, not real small. A community church [called Westbury United Methodist Church] in the southwest part of Houston where we lived, called Westbury, for many, many years. And in the years that we were there, John and I, between us, held almost every position that you could hold in the church. We never were fixed Sunday school teachers, but I was a substitute Sunday school teacher. And when we—if we would get to Sunday school and for some reason the teacher had not been able to prepare or was ill—suddenly ill or something—and I would get up and I could get up and give the Sunday school lesson without any preparation.

[00:08:35]
One year, I decided that we should have a Bible reading, and for a couple of years I would take the Bible, let it fall open, and then read that verse. Many, many times afterwards, somebody would come to me and say, "That was what I needed to hear today." It happened over and over again. I did have a very deep religious experience at one time during those years. I was not particularly religious from the time that I went to Rice until this happened. Well, it's part about, you know, "How do you feel about yourself?" question that you asked earlier. I didn't feel like I was worthy of being loved by God. So, therefore, I didn't want to "believe in God" and to accept God. But I went through the motions of taking our children to church and everything. But I had that experience and I know what a religious—not everybody has an experience like this, and I appreciate that. But sometimes you do. It's like my . . . you asked about my husband and I. Yes, we fell in love at first sight.

[00:09:53]
Well, I had a religious experience and I knew that God loved me. And that "Jesus Loves Me," to me, is the greatest hymn of all, because it's the most important thing, is that—to the Christian, Jesus—to you as a Jew, Yahweh. But he loves you personally. And that is . . . it's just a tremendous feeling. But at any rate, while at the church, I organized the first ever garage sale they had, where we needed to raise money for some particular thing, and we raised three thousand dollars or something. It was a big, big deal.

[00:10:37]
I was on the . . . I was treasurer of the church for years and counted the money and took it over and put it in the . . . . I was on the board of trustees. John was on the board of trustees. I was on the pastor-parish committee. We were what was called the church lay leader. And the year that . . . usually, that's held by one person. But John and I, when they asked him to do it, he says, "No, I can't do it unless Patsy helps me." So we agreed to do it. And we personally attended every—at least one meeting of every subgroup in the church during that year. And this was a good-sized church, not an extra-large church, but a good size, and that was a lot of stuff. So we made a real commitment to that. So it was a . . . that was a big part of our lives there.

[00:11:31]
But the commonality—I was active in Scouts, I did the walking, I told you that. I did an awful lot of organizing and computer, another computer story. One year, the preacher asked me to do something about the membership and stuff, and I wanted to put the church on the computer.

This was in the days—this is how computers developed and in the history of computers, of course, you know, he didn't want to do that, "You can't keep those sacred records on the computer." So I learned to say no. Up to then I hadn't said no. I said, "Okay, I'm not going to do it then." So there. Well, three years later, we were on computers. The resistance to computers . . . anyone who is in a technical field at some point—I told you about my English teacher that blamed all of us freshmen for nuclear warfare and nuclear horrors—anybody in the scientific area at some time in their life runs into this sort of thing. And it's something we have to learn to deal with. It's very difficult to deal with, frankly. Does that [answer your question]? I, sort of, expanded a little bit. I wanted to get all that in.

[00:12:50]
SCHNEIDER: Yeah, that's great. And when you were talking, you were talking about the computers. Were you presenting about—when you were at conferences—were you and/or your colleagues presenting work that was done on computers, and how did people respond to that?

[00:13:08]
CHAPPELEAR: Well, let's see. I stopped presenting in the mid-seventies. The closest thing we did to presenting work done on computers was our correlation for corresponding states. And it is a complex set of calculations. You can do them without computers, but they are facilitated by using computers because they're very complex. As an aside, I think every chemical engineer should have to do one design by hand with using . . . I will let them use a calculator nowadays, using a slide rule in my days, and design a tower with just that, so that they will appreciate all the work that goes into these correlations that we have. All those ones that I helped develop for that book. Does that make any sense?

[00:14:03]
SCHNEIDER: [Yes].

[00:14:03]
CHAPPELEAR: [. . .] But no, as the use of computers developed in the profession, we definitely incorporated them as rapidly as we could. [. . .] John participated in a prediction for Shell of what the computers are going to do . . . I've forgotten which year this was, and they were supposed to be predicting over twenty years in advance. Well, they predicted this. [hand motions far apart] This is what happened [hands close together].

[00:14:35]
SCHNEIDER: And you're . . . why don't you describe what you're doing with your hands for the audio.

[00:14:38]
CHAPPELEAR: Well. Well, okay, now. Let me tell what . . . I just described, sort of, a mild rise in information. And then I did an exponential curve. What they predicted would happen in ten years happened in three years, and on and on, like—well, I don't know the precise numbers. But the idea is, we never really recognized—and he, I mean, John was a very smart man, and the other people on this committee were very smart committees—very smart people, technically-wise, but it was very difficult to predict how fast that would develop. In our recent history with Covid, how fast the vaccine was discovered is absolutely . . . I was amazed, I was amazed. And the people working in the field, if you read some of the things that they say, they were amazed that it happened as quickly as it did.

[00:15:35]
SCHNEIDER: Yeah. Because I was, sort of, wondering if early on when you . . . you all sounded like were pretty much at the forefront of using computer technology, if there was skepticism in the field otherwise about it or not so much?

[00:15:49]
CHAPPELEAR: No. I don't think we had any skepticism of the . . . we as an engineering community, learned very quickly about garbage in, garbage out. And we knew you had to watch and you had to confirm and test. And the further along that we got with all of the different things that happened, you had to worry about the security. And now, my . . . one of my daughters, her husband actually works for NASA [National Aeronautics and Space Administration]. And what he does is verification of the accuracy of what has been done of any development. And it includes some of the computer programs. The double checking, and we learned that all of this has to be done. So that is the skepticism that exists in our society today. I don't think that—I have a grandson who refuses to get vaccinated. You know, they don't work, bluh, bluh, bluh, bluh. Or all sorts of—it's complete nonsense. It's complete nonsense. And that does not exist in the technical community, in my opinion. Maybe I'm wrong. I don't think it exists. I don't think it ever did.

[00:17:18]
SCHNEIDER: Well, were there any other notable conferences or presentations you gave that you . . . that come to mind that you want to share?

[00:17:23]
CHAPPELEAR: Oh, conferences. Okay. Going overseas to speak and having speakers from overseas come here. Back in the days, when we . . . . Okay. I've seen developments from the manual typewriter to the electrical typewriter to the computer now that we have and the central word processing unit where they did this—all of this stuff. That's one thing. I've seen it in the

reproduction of multiple copies, the development, everything you could possibly think of. And computers and showing our slides, one of the things that we did at one time was use 35-millimeter slides. Do you know what they are?

[00:18:11]
SCHNEIDER: I think so, I'm picturing something.

[00:18:13]
CHAPPELEAR: Okay. The film, the 35-millimeter camera, took a picture and it was 35 millimeters for the little film. And you mounted this in a little—or it was mounted, you didn't do it individually, in a cardboard holder. And these cardboard holders were placed in a round carousel, and you had a projector that would shine a light through them and put them up to show. Well, the thickness of the cardboard was different for Europe than it was for the United States. And they would start trying to show their European slides and they would stick and not go forward. And you would have to change and have somebody go down there and put them through one at a time in order to show them. And then we would go to Europe, and our skinny slides would fall out of their carousels and not work. The same thing happened. This is a . . . . Did you know that railroads . . . the distance the rails are apart, determine the rail cars that fit on them, have to fit that. Did you know there are different ones?

[00:19:25]
SCHNEIDER: No.

[00:19:27]
CHAPPELEAR: Yeah. And so if you had some that worked in England, they wouldn't work on the continent because they . . . whatever they were, they had two different measurements that they used and they had to change the rail, the wheel part underneath, in order to run the trains over there. This is . . . so engineering as a profession sometimes does . . . it's like driving on the right side and the left side of the street for the cars. Sometimes you don't reach a mutual agreement worldwide and it comes back to bite us. It's, kind of, funny really thinking about it.

[00:20:05]
GIBSON: So I'm struck by that. One example is conversion to SI [International System of Units].

[00:20:11]
CHAPPELEAR: SI, yes.

[00:20:11]
GIBSON: In the United States at one point, we thought we'd go to the metric system, but . . . .

[00:20:16]
CHAPPELEAR: I was very, very active in that. Yes. At that time, I was on the editorial review—oh, I served on the editorial review board for . . . . As part of university academic activities, you review papers that are presented and give a written opinion, and the editor gives that to the person, and they revise their paper to accommodate, or do not revise, or say, "Go ahead and publish it." So whatever it is, it's part of the review process to get it accepted to be published. And the reviewers have to be from the peer group who know what's going on. And so I was asked to review and I reviewed many, many papers for many of the top chemical engineering journals.

[00:21:01]
And I finally got asked to be on the editorial review board by Elsevier Publishing Company for a new journal called *Fluid Phase Equilibria* that they published once—at that time—once a year. And it was the big advances in that field of papers. And so I was on their review board for a number of years. I was also, as part of working for Hudson [Engineering Corporation], on the editorial review board for the Natural Gas Processors Association *Engineering Data Book*, which, as I mentioned earlier, started out as just a small packet of graphs. Over the years, they developed a more comprehensive treatment, approaching that of this formal bound volume that I developed with Riki many, many years ago [*Handbook of Natural Gas Engineering*]. And that [the GPSA *Engineering Data Book*] was finished about 19 . . . the early 1970s, '73 or so.

[00:21:59]
And in '75 when I changed my position and went back, and, well, I ended up being hired by Hudson part-time and still worked part-time at Rice. And the first thing I did was do a major review of the *Engineering Data Book*.[3] That was in the English version. Later on, when I went to work for the company, I was appointed to be a full member of that review board. And then we [began work on the 10th edition of the *Engineering Data Book* and] were tasked with creating a metric version of the *Engineering Data Book*, and I served in that capacity for . . . it took us about six or seven years to do that.[4] I've forgotten exactly why.

[00:22:42]
I'll show you my plaques of recognition for that work. I think it's one of the biggest things that I did. That book is the reference book used all over the world. It's published in the hundreds of thousands of copies. So it's very important. And it's used by people who don't have English as

[3] Gas Processors Suppliers Association, *Engineering Data Book*, 9th ed., 3rd revision (Tulsa, Oklahoma, 1977).
[4] Gas Processors Suppliers Association, *Engineering Data Book*, 10th ed., vols. 1-2 (Tulsa, Oklahoma, 1987). [The tenth edition was issued in both SI and English units of measurement. In addition to computing all of the material in SI units, the entire textual information and organization was reviewed, rewritten, and expanded as needed.]

their native language. And we have "This is how you do it" in there. So it's very important that "This is how you do it" be written very correctly. And the people on the editorial review board were all, like myself, senior engineers with twenty or more years of experience in various aspects of the design and operation business. And we would sometimes discuss whether or not to put a comma in a sentence. I'm not lying.

[00:23:38]
But creating the SI book, when we first started, we were just going to take the English language book and put a conversion factor by the graphs and call that the SI version. And so we started off trying to do that, and we pretty soon discovered that we really couldn't do that, that it wouldn't work out. And one of the . . . so one of the interesting things along that time, one of the men—somebody goes off and he brings somebody new on—one of the guys they brought on was another Rice graduate. He was the president of Hudson Products, and we had our meeting in Tulsa.

[00:24:18]
We had meetings, like, four to six times—six times a year, perhaps. And these would be two-day meetings at some location. So, I mean, it was a major investment on the part of the companies that supplied the personnel to be the members of the board. And it was a major investment. Well, it was very . . . it's a very expensive book to produce and really, it was hard work. Well, we had one particular thing and I had . . . we finally end up, we were going to translate it all, the whole thing, and really do everything and do it all in SI units and do the graph in SI units, all that kind of stuff.

[00:24:58]
And so we formed a system where the members of the review board were assigned particular chapters of the book to be responsible for, and I had my chapter assigned to me, and one of them involved thermal conductivity, which is a physical property that's very essential in designing heat exchangers and other equipment. And I also had the gas . . . the water content. And these both involve four or five different units, measurements. Okay. To measure temperature, it's either Fahrenheit or Celsius, or the absolute. To measure pressure, we've got several different units for that. Then there's the standard condition, and those are different for the two different systems. And then there's the mass. That's what ordinary people call the weight that you get on. So you weigh so many pounds. You also weigh so many kilograms. And if you're in the British system, you also weigh so many stone, you know. But at any rate, all of these have to be converted correctly.

[00:26:19]
Well, I got the water contents chapter back. I've got two stories. I got the water content, and there were two different water content charts in a section. And I'm going along and I look, and it suddenly dawned on me, "That didn't look like the number I saw so many pages back." And I went back and looked. It was different. The same thing, and it had two different numbers. Okay. So we worked on that and we got that straightened out. See you had the subcommittee did it. They did all the review. Then it went to the person in charge of it to review it, and then it went

to the whole board, and the whole board reviewed it. I mean, we really . . . and it was a good thing we did.

[00:26:59]
Well, this . . . so later on then, we're working along and I got this new guy assigned and we're meeting in Tulsa. And I had some particular thing, and the same thing had happened with thermal conductivity units as it happened on the water units. And I had sat down and worked with them, and worked with them, and worked with them, and I could get both results. So I worked some more. I finally decided on one I was pretty sure was right. And then, you know, when you've worked with it this long, well, I'm sure. So I went to the office and we had about twenty process engineers. I went to everybody down the hallway, gave them the problem, and I forgot the amount—eighteen to one or . . . . Anyway, the vast majority got one thing, so. Well, I'm pretty sure this is right.

[00:27:48]
So then when I presented it to the board, I tell them this story and give them the numbers. So this new guy, that's the new member of the group— this is just to show how intense we were about our work—we come back the next day after having a big dinner and everything, and he comes in bleary-eyed, "Patsy, I was up till midnight working on that. And you're right." But we really took it very, very seriously, doing that. And I think that that's the type of thing that, generally, engineers try to do. And that's why I'll always say, "Safety, safety, safety." [. . .] I remember the last time I was talking to them, I pointed my finger at all these young kids. I said, "You could kill somebody with what you do." And it's true.

[00:28:48]
SCHNEIDER: Wow. So I'm wondering if there's anything else from your time working with Riki Kobayashi in this period from—

[00:28:57]
CHAPPELEAR: And Tom Leland.

[00:28:59]
SCHNEIDER: Yes. From this time, that's the 1960 period onward, if there are any major research projects or consulting projects that we haven't talked about that you wanted to mention?

[00:29:13]
CHAPPELEAR: Let's see, have we talked about the hydrate conditions? Okay. Yes. The other colleague that I mentioned, I think you should talk about him a little bit. Norman Carnahan did his doctorate at University of Oklahoma, and he was a theoretical chemical engineer. He did the

hard sphere equation of state, a brilliant piece of work. Absolutely brilliant. His wife has just been elected a fellow of AIChE, by the way. Norman is still very active in AIChE. I am not, but he is. But Norman never was recognized in the United States for his work, unfortunately. But at any rate, he and I, he worked with Riki on a lot of different things, and he was one of the people that Riki would call up and talk to in the middle of the night a lot. He had a lot of stories about that.

[00:30:12]
But we got this . . . Riki got this contract for the gas hydrates in the Alaska Pipeline for the Prudhoe Bay [85% methane] and Mackenzie [94% methane] productions. And we needed to know what would be the hydrate conditions for those particular compositions of gases that were expected from these fields. And using the van der Waals plateau solution theory equations and the theoretical information that we had, we did—Norman Carnahan and I—did the calculations and we prepared the charts I've shown you earlier today, that were then used to operate those pipelines.

[00:30:55]
I then used the . . . those specific points to do a generalized thing that was put onto the Gas Processors Association water content chart to warn of hydrate conditions. What that does is you treat the gas that has the water in it to take the gas . . . the amount of water has to reach a certain relative amount for any particular gas composition, for the expected temperature and pressure range of where it will be operating for these hydrates to form. If it's not that composition, or it doesn't have that much water in it, it won't form a hydrate. So the thing is you take out as much water as you have to, but you don't want to take out—you cannot take out—all of the water, generally speaking, from a commercial standpoint. So you want to treat it just enough so that it's safe, but enough to be sure that it's safe. That's, sort of, a general design principle no matter what you're making. So it's very important to know those.

[00:32:04]
GIBSON: Were there other things you worked with Carnahan on?

[00:32:07]
CHAPPELEAR: Yes, but I can't remember what they all were.

[00:32:09]
GIBSON: So he . . . you enjoyed working with him?

[00:32:12]
CHAPPELEAR: Oh, yes. We were both very active in some AIChE activities. He still is. He's been active in the management division. You may know him. You may have met him at . . . his

wife is from South America. And her field is . . . is she catalysis? I should know. I just read her resume and [. . .] well, I'm terrible at forgetting things, and names are one of my worst.

[00:32:51]
GIBSON: So I'd like to talk about—go back to—you talked about John getting this year abroad with Shell, and you all had quite a bit of discussion and decided to do it.

[00:33:02]
CHAPPELEAR: Well, that was exciting getting ready to do it. Our oldest daughter graduated from high school that year, and so she was going off to A&M to, you know, study. So she decided that we wanted to maximize what we could get. So she would go to summer school and the first semester and then join us for the spring semester. That was the plan. Okay. So now you have to pack up me and John and our other three children and their musical instruments for a year abroad. Jack was just at the age of twelve or thirteen, and the year we were there, he grew like this so that what fit one week didn't fit the next week. So that was a problem. But that was one of them. So we had to plan what to do. So we're also . . . see, this was February, I guess, when we found out about it and we were to leave on, around, July 1. And June was to graduate from high school the end of May, and to start living up, going to A&M and get her ready to go up there. So we had to get stuff ready for her to go there.

[00:34:18]
And what we were going to take with us could go with us in three different fashions. It could go on the plane with us. It could go as a sea shipment with us, see, or on the airplane, you could also ship stuff by air. So. And we were limited as to what we could put into each category. And then, of course, in your home, you have the precious things that you wouldn't dare put into ordinary storage. So those had to go to my mother's. And then you have the automobile, and it has to go to his parents to take care of up in Austin. And we got rid of the other automobiles and this. And then you have the piano. You don't put a piano into storage. Oh, no, that won't do. So it has to go to some friend's house.

[00:35:09]
And then I had my, a freezer and stove and refrigerator and washing machine. Now Carnahan in the meantime and his wife had just bought—happened to buy a house and didn't have any of the appliances, so our appliances went there. The silver and precious holdings went to mother's, the musical instruments that we left there, the piano, went to somebody else's house. The cat . . . oh, the cat is the other thing. The cat has to have a place to stay because you can't take . . . taking a cat for a year is not practical. And then you have the sea shipment and the air shipment and what you take with you. And then you have what's going up to A&M with June. And we had piles all over the house and lists you cannot believe. But somehow or other we got it done and we went for the year in Europe.

[00:35:57]
And we got to Holland and they met us at the airport and took us and put us up in a real nice hotel there. I mean, the companies treat their expats really, really well. And they should, because it is a major . . . to live in a different country is a major shock. It always is. And it's interesting to do and all of that, but it is a shock and an emotional turmoil for everybody. Well, we lived in the hotel for a year—a month, pardon me. And during that month, I had to go around and find us a place to live. And that was an eye opener, too. I didn't know that unfurnished meant that it didn't have any light fixtures, but that's what it meant in Holland. But at any rate, we finally found a place that was furnished. It actually belonged to somebody else, Michelle, who was from England, and it was in Rijswijk, [Netherlands], and it was fairly close to the laboratory. And we had shipped over bicycles, and John rode a bicycle to and from our place where we lived to go to work. We did buy a car while we were there. So we had a car.

[00:37:13]
The children went to the American School of The Hague. So they had a place to do that. And to get there, they rode on the tram. They have a very good public transport system. It made me appreciate how horrible ours is. Generally speaking, in the United States we do not have good transportation. I mean, the whole . . . well, Europe is so much more crowded than we are, I guess that they . . . anyway, their transportation system was much better than ours. My son, being the kind of kid that he was, after he got, when he got in school, they had a pass where they could ride the trams, you know, just show your pass. So he proceeded to ride every tram line in the city, all the way out to the end of the line and back. Find out all about it.

[00:38:01]
You had to learn about the streets, the names . . . like so many places, wherever you live. And you have a street that starts off with one name and it goes for a while and changes to another name goes a while and [gets] changed to another name. And one time I was out driving in The Hague and I got turned around in my mind, and I thought East was West. And it took me the hardest time to get straightened out, and I finally did. It was fun. It was a challenge. And we enjoyed it, and we're glad we went.

[00:38:39]
I took a leave from the university, but Riki agreed that I should, you know, keep working and doing a little bit. Maybe I got a small stipend from them during that year. And I would get papers to review and budgets and drafts of proposals and send my comments in and do things like that. And then I took one particular person's work who had finished and had to return to their homeland. And I wrote the paper for that during that year. And then I joined the American Women's Club of The Hague. And they had a monthly trip and then a couple of longer trips, weekend trips, and I went on every one of the monthly trips and the long weekend trips. And then the family, every time we had a chance, would take a vacation and go places.

[00:39:32]
And then I went on professional trips. The first thing I did was, shortly after we arrived, I went to an international meeting. AIChE periodically has international meetings. I had previously

attended one in Mexico City, an AIChE. This one was in Germany, in Munich. And I went there and I'll refer back to that meeting later. So I went there and attended that meeting. It was very . . . . And their Museum of Science and History [Deutsches Museum] is absolutely fabulous. If you ever go there, you must see it. And also in Munich I visited there a library [Bavarian State Library], and it was a very old library, and it was a floor as big as this house, twice as big. It was gigantic. And it was all Bible research, all of these theses and things that, of course, are written in every language you can imagine. It was astonishing to see. So I tried to maximize everything I did. I did that meeting. I made two or three trips to England to speak, and then I went to, towards the end of the year, I went on a speaking tour, a week in Czechoslovakia and a week in Poland. And I finally ended up, at the end of the year, I personally had been traveling or something six months of the year.

[00:41:06]
SCHNEIDER: Wow.

[00:41:07]
CHAPPELEAR: Well, I wanted to do as much as I possibly could. And then I also, professionally, during that year had some consulting work in Holland and in England. I had a short consulting job with BP [British Petroleum Company], and I [had another short] consulting job with Shell. And then a little bit longer one with a pipeline company in The Hague. And it was so funny that it was . . . for me, it was like making a batch of cookies or something very simple to do. Just involved a couple of vapor liquid calculations to find out what they needed. And so they would give me something to do, and I would bring it back that afternoon and they would say, "Oh, I thought you'd be [longer]." We'll call you when we get the next one ready. And then three or four days later they would be ready with the next one, and I'd do it immediately.

[00:42:08]
But I also spoke . . . I spoke about the research state in thermodynamics [at Rice]—as far as the general state of what it [is]—at several places in England. I spoke at Leeds University [University of Leeds], Imperial College [London]. I participated in a conference at [University of] Oxford, and I spoke at University of London. And I conferred with the . . . whatever our British counterpart of AIChE is, something they were doing. I conferred with them at that time.

[00:42:36]
And then I went to Czechoslovakia. I spoke at the Institute of Macromolecular Chemistry and at the laboratory where the man who had come and done postdoc—we'd had postdoc fellows from both places—that's why I went to those places. And the man who came from Czechoslovakia was named Ivan Wichterle. His father had been the one who developed contact lens on their kitchen stove, used colloidal chemistry, and he did it using a boiling pan of water on his kitchen stove. As a result, he was world-famous and they got all of this money from all of the patents for soft contact lens and formed the Institute of Macromolecular Chemistry. Then they had the

uprising in Czechoslovakia against the Russians. And Dr. Wichterle, who had been head of the laboratory, was relegated to a subbasement-next-to-the-furnace type office. And his children—he had three brilliant sons.

[00:43:47]
And to achieve those days, if your country was behind the Iron Curtain, which it was, you had to do your postdoc in Moscow, [Union of Soviet Socialist Republics]. Well, of course, they weren't considered eligible. But somehow or other, they could leave, one at a time, and be gone for only one year. And he had to return, you know, he couldn't get it extended one day. Nothing. And I remember the letter we got from him after he returned, "I am at home in my unhappy country." And it's the only sentence I remember of that letter.

[00:44:27]
There was a good story there, too. When I got off the plane, traveling alone to begin those two days speaking, there was this young kid who looked about half your age holding an Uzi under his arm, greeting people as they got off the airplane. I've never felt so vulnerable in all of my life. That was the beginning of it. Before that, when you went on . . . before that—you can't believe this, Sarah, you're too young—but I know that you [Gayle Gibson] can probably remember. You went out to get on a plane, and you just walked up and you got on the plane. You didn't have to be searched and wanded and have your baggage checked out and everything. No, no. But there was the Uzi, and it was a shock. Well, when I finished—this is before cell phones—my youngest daughter was to meet me in Poland.

[00:45:27]
She wanted to come and see, and she really wanted to go to Auschwitz, is where she wanted to do. But she wanted to come with me and find out. So, "Okay, you can do that." And so she left. I left Czechoslovakia to go to Poland. Well, I had a reservation on the airplane to go, and she was flying from Holland, at the same time, through Berlin, changed planes and then to Warsaw in Poland to meet me. Well, when we got out there for my plane, this was May the first, and on May the first, they change all of the flights and the timing of the flights, and the plane took off an hour before I got there. How we managed to not get . . . well, yes, this was the day before computers were common, remember? So you couldn't check your flight. Anyway. So the plane took off. So my host took me down and got me on a train.

[00:46:22]
And I went by train from Czechoslovakia to Poland. And during the night, you went across the borders and all. They have to come and check your papers and all this kind of stuff. And up come these burly people with their stuff. The stamp pad was taped to her wrist, so *woomf woomf* [hand motions], stamp it on there and then stamp it on your paper. And then she got my stack of slides and started holding up these 35-millimeter slides that had the drawings on them and looking at them. Well, I was terrified, of course, not knowing what to do because, you see, I had a slide in there that was a young lady in a rather . . . bikini outfit to use in case it was appropriate to have a little bit of a joke in the presentation. I never did use it, but I was prepared if it worked out that I really needed to. I was terrified that they would find it and then accuse me of

pornography or whatnot. And I finally found my letter of invitation to Poland and showed it and, "Oh, okay, okay." And she stopped looking at that.

[00:47:30]
Well, I finally get to Poland. It's May Day, everybody's on holiday, the laboratory is closed. Of course, my host doesn't know where I am. My daughter, in the meantime, had gone. They had waited at the airport for her until her plane got in and taken her to their home. So I went out with my letter, found a taxi and showed it to him, "And I want to go to this place." And so he took me there. Remember, I don't speak a word of Polish. Is that the right language? Yeah, I think it is. So they take me out to the laboratory. Well, everybody's on holiday for May Day, but there is a guard on this laboratory installation and he sees the signature of Dr. [Roman] Stryzek. And he calls him, and he comes and gets me. And then we get down and get put into our hotel room, and everything works out okay. Boy, that was a shocker.

[00:48:26]
But I got to speak. In Warsaw, I got to speak. I spoke at the Marie Curie Institute. You can touch my hand. I mean, that's exactly what it felt like. And then I got to the University of Krakow, and they treated me like visiting royalty. I was really amazed. It was graduation time, and they had a special ceremony. And I'm sitting in the back of the room with Juliet. And I was introduced as the "distinguished visitor from the United States." And all the professors come in and you've all seen the academic regalia, but have you ever seen them where they have a big gold medal about the size of a dinner plate hanging around their necks? That's what they had on.

[00:49:14]
Well, after that, they took us in, back to the hotel. The next morning, picked me up, and I was to go over to give my talk. And they tell me I'm going to be talking with an interpreter. And that was the only indication I had that I had an interpreter, you know, as we were driving from the hotel to the place where I gave my talk. Well, I start the talk and we're going along just fine. And he didn't interpret something correctly. How I knew it, I do not know because I don't know what the man said, but I knew it was wrong. And so I turned to him in English and told him, "I said so and so, and it meant this and this and this." [He'd say,] "Oh, yes." And I could see the light come in his eyes. And then he says [it in Polish], and everybody's eyes light up. "Oh." You could see their faces come. "Oh, now we know what she's talking about." And we finished that talk.

[00:50:05]
So then the next day they were going to take us and show us the beautiful sites and all. We got to go to a salt mine in Poland that dated from Roman times. Very old. And they had a very interesting thing. They had a hospital in the bottom of the mine. You can treat tuberculosis and other lung diseases with high pressure, greater than sea level pressure. And so they put the people down there and treated them in this, in this subbasement. And then there were beautiful carvings that the miners had made down in this out of salt, like the Pieta type thing. Very impressive. And after that, my daughter has extremely good friends who are Jewish, and so we

asked to go to see Auschwitz, and we went to Auschwitz instead of seeing their mountains. And it was one of the most impressive things that happened in my life was going there. That was our year abroad.

[00:51:16]
And we came back and I realized from my interactions with the people in Europe that I was recognized and I discovered I was not recognized on the campus and would never be recognized because I did not have a doctorate. So that's when I decided to change and go into industry. NSF [National Science Foundation] wanted me to come and work for them, but that would have meant working in Washington, [DC], and I didn't want to work in Washington and have my husband working in Houston. And my family and all, that wasn't possible. And I talked to some other engineering companies, and they offered me opportunities to do what I'd essentially been doing already, be an information specialist. So I ended up deciding to go with Hudson Engineering Corporation.

[00:52:16]
SCHNEIDER: And before we get to that, there might be a few more things about your time in Europe. I don't know if Gayle, you had anything or if you want me to ask.

[00:52:24]
GIBSON: So some of the . . . so I understand the lectures, but for the, sort of, consulting work, did people find you or were you actively looking?

[00:52:33]
CHAPPELEAR: Oh, no, I didn't actively look. They found me.

[00:52:40]
GIBSON: And you described very well so many aspects of that year and what you were doing. Like a year later . . . what was your, kind of, takeaway, your reflections on that time in Europe?

[00:53:00]
CHAPPELEAR: Well, I really did enjoy seeing so many of the things that . . . I've always liked fine art. And I got to see the Mona Lisa. I now know why the Mona Lisa is the best painting in the world. I don't like it. I don't like it, but it is the best. In fact, my . . . first time I went to Europe with my husband and I went to Prince Mauritshuis and I hadn't had much time to go to museums and things. But I was, you know, vacation. And I went in and they had a directory in English, and Mauritshuis was full of the seventeenth- and eighteenth-century Dutch masters, you know, people like Rembrandt. And they described one painting in each room in their little English book. So I'm sure it was the best painting in the room. And I say, what you

do when you go in a room and it's full of art—a new museum—look around, pick out the painting that you like the best, and pick out the painting that is the best in the room. And so I did that for that. In every case, the one I selected for the best was the one that was described in the book. And it really, I mean, I got to see a tremendous amount of art and we—the whole family liked that.

[00:54:23]
We were—we went to Italy at Christmastime and it would happen to be a Jubilee year. And we heard the Pope give the Jubilee address. He does this every twenty years or twenty-five years from the balcony of Saint Peter's [Basilica]. It was . . . to see and do the things of that year. But this is where so much of our country comes from, is from Europe. My particular background is very much tied there. So I mean, I enjoyed seeing how the people live and seeing . . . . It was just different. It was great.

[00:55:06]
And I really think if you get an opportunity to live abroad, you should. There's some people that . . . I don't think it's good . . . there were some families whose . . . as Americans, spent their entire life abroad with their children in the American schools. I think that is very bad because those children do not ever get an exposure to the American culture, if you spend your entire life abroad. And a disadvantage as an American abroad . . . I mean, we had more income per capita than what Mr.-Man-on-the-Street had. So you had to be careful. You had to be careful that your children did not get an impression that they were better than other people.

[00:56:01]
SCHNEIDER: And I was wondering about that with your children. Do you have a sense of what that experience was like for them being in a school in Europe and having chances to travel, if they traveled with you? It sounds like you did some family traveling.

[00:56:15]
CHAPPELEAR: We traveled at every opportunity that we had. The girls had a friend, for instance, who came over shortly after we were there and visited with them, and they . . . and we went . . . that's when we did one of our trips to England as a family, so that the girl could get that experience. They made friends of the people that . . . their classes had people from all over the world. My son made a very good friend whose father was a Japanese, and he was Japanese, and he was friends with him all of his life. My daughter made friends with a Dutch girl who . . . her parents sent her to that school for some particular enrichment program.

[00:56:51]
And at the end of our time there, we came back and spent vacation time at the end of the year, [two weeks] in England. And Juliet instead went with her Dutch friend, and the two girls went by themselves to Switzerland and stayed at hostels and stuff going down there. And then the Dutch family met them there and they came back to Holland. And then Juliet got on the airplane

and flew to London and took the train and everything, and came and met us in our hotel in London [for the second week]. She was sixteen years old at the time. I mean, they were my . . . they learned very early to deal with things. The school had special trips. Our son went on the school trips. One of them was to northern France and one was to the Alps. He learned to ski in the Austrian Alps. One of them had a trip to Russia, and her older sister had come by that time, and she went with her, and they went with the teacher from the school on a trip to Moscow. So they got to go to Moscow. They got to see and do a lot of things, too.

[00:58:07]
GIBSON: We talked about World War II yesterday, and there was this thing that's now called the Cold War. And you mentioned going to Poland and the Czech Republic—I guess it's called now, Czechoslovakia then. Did you have any impressions then of the Eastern Bloc and seeing it, I guess, up close and personal?

[00:58:29]
CHAPPELEAR: Yeah. The grocery store. If you want to know about a country, go in the grocery store. Visualize your local supermarket and you want to buy a box of washing soap. What do you see when you walk down the aisle? You see an aisle that is full of fifteen different brands of washing soap. And all the additions and all the other additives in the washing, the things to go in your dryer and all of this stuff. I would go in the grocery stores there, and I would go in that aisle and there would be three boxes of one kind of washing soap in the whole aisle. When we got to Poland and we were in the hotel, we looked out one morning and there was this little store down beside, and all of a sudden there was a huge line of people outside the store. And I asked what had happened and all and found out they had just gotten a shipment of something. So all of these people were in line to buy a box of something. Whatever it was, it didn't matter. If they saw a line and they had the time, they got in it, because if they couldn't use it, their neighbor could.

[00:59:59]
When we adopted the—well, my children did the adoption, of course—but I went to help adopt my grandchildren. And that was in Romania, and they were just recovering from having killed the guy [Nicolae Ceaușescu] and all that kind of stuff. And we needed diapers when we went back for the little boys. And my son-in-law was with me. And he went out shopping for diapers, and he shopped all morning and he came back with a package of diapers that was the size of a small box of Kotex. I don't know whether you've looked at diapers in our . . . but if you pick up diapers in our stores, the package is like two feet by three feet by two feet. You don't buy them in little teacup-sized containers. That impression of the difference between behind the Iron Curtain and not. And yet another trip made in later life to Russia with my daughter and her son, who had just gotten his degree from Rice. This is in recent years. Drabness, darkness, black clothing, unhappy looks on people's faces, and no smiles. And if you spoke to somebody, they were afraid to speak back to you. Those were my impressions of behind [the Iron Curtain].

[01:01:49]
GIBSON: So after this wonderful year in Europe with all this new sort of exposure, stimulation, interaction, even professional recognition, was it hard to adapt to life back in Texas?

[01:02:05]
CHAPPELEAR: Well, you didn't have the opportunity to be planning another trip for where you're going to go next and this sort of thing. That was the thing. Of course, when we got back, it was the middle of the summertime, and getting the kids back and all of the preparations for them to go back to school and everything. No. You're busy changing and unpacking and putting things back in order and getting your things out of storage and retrieving what's stored where. You're too busy to reflect very much. Is that [the audio recorder] still working?

[01:02:45]
SCHNEIDER: Yes, it is. I was just making sure.

[01:02:48]
GIBSON: And you said you were . . . you realized you were recognized in Europe.

[01:02:52]
CHAPPELEAR: Yes.

[01:02:53]
GIBSON: But then at Rice, you heard you'd never be recognized without a PhD. Is this a sense you got, or did someone just tell you that, or . . . ?

[01:03:01]
CHAPPELEAR: When I was at the [University College London] and I was speaking with Professor [Niall] McGlashan, and he asked me, why didn't I have a doctorate? And he was shocked to learn that Rice had never awarded an honorary doctorate. Then when I returned and started back working with Kobayashi and Leland, I did something that I probably should not have. Looking back, I should have talked to Riki, tell him what I was going to be doing, but I didn't. I thought I understood him better than that, and he understood what I did better than that.

[01:03:43]
And I tried to . . . I had a lot of graduate—new people that had come during the year to me, and then we had a new crop coming in. And I had a lot of people to meet. And so I asked them all to

come to meet with me so that they could meet me, and I could meet them, and I could tell them all the general information that everybody needed to do. And he canceled my meeting. And that showed to me that he didn't have confidence in my ability, I felt, or whatever it was. And at that time, I . . . so the first thing I did was to start working part-time for Hudson Engineering, because I was theoretically part-time at Rice, although I had never strictly enforced that. So I decided, okay, I'm going to . . . I gradually changed my mind. It wasn't an instantaneous decision at all. And so I decided to . . . okay, I'm going to see what I can do.

[01:04:41]
And Warren [White] asked me to come out to work with him on the . . . since he had been on the GPSA *Engineering Data Book*, where they had written their big version of it. And he had me go through it, and I went through it and found all—it had an errata packet and everything, very big. And rewrote a major section of it. Did a major revision, in other words. And so that took . . . . During that time, I also was a resource for all the people who had data problems when they were—whatever design project they had. And I could tell them what data to use or where to find the data they needed. So I was a resource person for them. In other words, acting, sort of, like a consultant, in-house consultant. And so then I decided, okay, I . . . it's just an atmosphere. I didn't feel good in the atmosphere anymore [at Rice]. And so I decided, okay, I'm going to go and work in "real industry," do real engineering. And so I started looking around for engineering companies because I didn't want to go with another oil company. And that was, you know . . . . So I—

[01:06:05]
SCHNEIDER: And why was that? Was it just you weren't interested in that field or you . . . ?

[01:06:08]
CHAPPELEAR: My husband worked for Shell.

[01:06:10]
SCHNEIDER: Oh, I see, so you—

[01:06:11]
CHAPPELEAR: I didn't want a [conflict of interest].

[01:06:12]
SCHNEIDER: Okay.

[01:06:13]
CHAPPELEAR: I didn't want a conflict in my bed.

[01:06:14]
SCHNEIDER: I see.

[01:06:18]
CHAPPELEAR: So at any rate, I . . . . And I . . . like I didn't want the NSF job because I would be in . . . . And I actively pursued, you know, where should I go to work? Warren White, the head of, he was the vice president of Hudson Engineering, and he offered me a job to come and work there as a process engineer. And so I decided to take that job.

[01:06:44]
GIBSON: That seems like a pretty good, what we'd call these days, a pivot, because you had done more research, right? You had done some design, but that's a—

[01:06:56]
CHAPPELEAR: Minor amount of design at that time.

[01:06:58]
GIBSON: Okay. So now it's, like, full-time, maybe going back to your first job at Shell, but full-time design, full-time project—

[01:07:07]
CHAPPELEAR: Oh, Shell was allegedly research, but it really wasn't. Shell was really operations, actually trying to learn how to operate and really run a plant.

[01:07:16]
GIBSON: I mean, this is, you could say mid-career.

[01:07:19]
CHAPPELEAR: This was a mid-career . . . .

[01:07:21]
GIBSON: And that's a jump.

[01:07:23]
CHAPPELEAR: In engineering, there's operating and running a plant, there's doing the research, there's doing the management, and there's doing the education. There's all of these aspects of engineering. And I've gotten to participate in just about every one of them, which is unusual.

[01:07:42]
GIBSON: What gave you the confidence? Some people wouldn't have that confidence to go, "Wow, this part of my career was doing this, and now I'm just going to take this leap to project and . . . . "

[01:07:51]
CHAPPELEAR: Why should it be any harder? I mean, I knew what to do. I mean, I know it. When I did project management, did project engineering, I went and took a course in project management. I knew everything the guy was trying to teach me before I ever took the course. So I really didn't need the training in project management. I used computers, I didn't need any training in how to do programming.

[01:08:17]
GIBSON: And you'd already been working with Hudson part-time, so.

[01:08:20]
CHAPPELEAR: Well, I'd been working with Hudson part-time, so I knew something about the atmosphere there. Why would you be afraid?

[01:08:30]
GIBSON: Some women today would not make that jump.

[01:08:38]
SCHNEIDER: Or even probably, you know, men, people of other genders, too.

[01:08:41]
GIBSON: Or men, yeah. They would just want to stay in maybe what you'd call a comfort zone or . . . . You have a thirst for new things that we're picking up.

[01:08:50]
CHAPPELEAR: Well. I don't know. I just never even thought about being afraid to try and go in some different direction. Being afraid, yes, and cautious of certain things, like the guy with the Uzi and all. That, kind of, shook me. But as far as me personally being afraid to tackle anything, no.

[01:09:24]
GIBSON: Some would also say that's a big change from, sort of, in essence, a job in industry versus a job more academic oriented.

[01:09:31]
CHAPPELEAR: Oh, there's a huge difference. Huge difference.

[01:09:33]
GIBSON: And can you say a couple of what you saw as the differences?

[01:09:36]
CHAPPELEAR: The dollar sign.

[01:09:44]
GIBSON: Being higher in industry, or . . . ?

[01:09:47]
CHAPPELEAR: No, the dollar sign is very important in any place. To me, the dollar sign represents so much an attitude about what you're interested in. And yet, as an engineer, no matter what part of engineering you're doing, you'd better be aware of that dollar sign, because you have to have the dollar sign to accomplish anything. And in order to have anything be recognized, you've got to have the dollar sign. It all comes back to the dollar. I mean, it's a very—

[01:10:23]
GIBSON: Got to know the business value of what you're . . . .

[01:10:25]
CHAPPELEAR: No, not the business value. Well, I, like the work I told you about, the man

that did the discovery [at Shell Refinery, lube oils research]. When you finally left him alone for just a few weeks, he could do, really do something. I mean, it's different working for a . . . . And depending on the size of the company, and the company philosophy, and . . . . And then companies—institutions, I'll use the word instead of companies, institution covers education as well—they change. They do change. And that's what you were asking about at Rice today. What do we know about where we went to school today? We really don't. We're not there.

[01:11:12]
SCHNEIDER: And so, you know, what was . . . how would you describe the environment working at Hudson? What was the work environment like there?

[01:11:22]
CHAPPELEAR: Very high integrity. Pride in what we did. The company had some really good practices, I think, as far as process design goes. You had a . . . you were assigned a particular plant to design and get going. As a process engineer, you had to do the process diagram and design the plant and then work with the instrument people to pick out the instruments to be used and work with the piping people to make sure that they did it right and all. But you started out with your process flow diagram, which is the master guideline, and you developed it to a certain point, and then your mechanical flow diagrams had even more.

[01:12:17]
But we had two stages. Your process flow diagram goes up. Everybody in the process design department, everyone, including the vice president who's a process [engineer]—former from that background—spent at least an hour reviewing that diagram to see if they had any comments to put on it. And then when you did your mechanical flow diagrams, they did the same thing. The mechanical flow diagrams have a lot more information than the process flow diagram. And they personally come in and spend time and you put your big drawings up in a display room and have it up there for a week for everybody to come in and put their comments on. And then you have to gather up all those comments and work on them, and try to make sure that you resolve all the issues that have been raised. And not all companies do that. And I think that's . . . . Because it was a small company, they could do that.

[01:13:12]
It was . . . . The company started with a man named [Edward Joseph "Ed"] Hudson. Unusual. When he started, when my friends that had been there for many years had started, they worked on Saturday morning also. But he [Mr. Hudson] would talk [over coffee]. In the early days of the gas processing industry, you get a production and you own this field and all, and you want to have it developed. And he would make a deal with people to do it, and they would put the details on the back of a piece of an envelope and they would shake hands. And that was the contract. And they would go out and build a King Ranch facility type thing from it. I think King Ranch was actually built in that way. That's one of the biggest gas processing facilities in the world. In South Texas.

[END OF AUDIO, FILE 2.3]

[00:00:02]
SCHNEIDER: All right. So we were just starting to talk about your work at Hudson Engineering Corporation and your work as a process engineer there. And so what were some of the projects, types of projects, and maybe if you have specific ones that come to mind, that you worked on in that role?

[00:00:25]
CHAPPELEAR: Okay, I was going into process design engineering twenty years after I had earned my engineering degree, having spent the previous time in basic research. I had been taught all of the theory of what to do, but I had very little practical experience in that field. So I first started out, I had a—as an engineering design company, you sometimes get projects for a short study of, the feasibility study of a certain thing. And so you do a study of that. So I was assigned, my first assignment was that type of a short-term study. And I did my study and I wrote up . . . .

[00:01:16]
It's, kind of, funny, before I got a permanent place to sit, "You sit in this chair, this office, while you work." The office they put me in was the guy who was the head of the process engineering department [Robert L. "Bob" McKee]. He was off at a startup, running the startup, because he'd been the process engineer on that job. So he was responsible. He comes back, "What are you doing in my chair?" He turns out to be my immediate boss then. But at any rate, I wrote this report up, and after twenty years in academia, I was more accustomed to writing in the academic style. So he looked and he decided, you know, "Patsy, this isn't any good. This doesn't sound like a business report. Sounds like a publication, an AIChE journal. *Rrr*." "Okay," I said, and so I went home that night and I rewrote it and gave it to him the next day. He was—I constantly amazed people at how quickly I could work. And so I rewrote it and it was fine.

[00:02:17]
So then I did a little bit more of that type of thing, and then I was assigned . . . . Well, next thing I did was go out to the startup, participated in a startup for the first time in the field over in Louisiana. And we had a blasted idiot for a . . . pardon me, I lowered my voice because I don't like to be so negative about someone. We had a younger engineer who was representing our client as their on-site process engineer. And the gentleman unfortunately had poor judgment safety-wise.

[00:03:02]
When I arrived, the first night, we had a meeting because this man, the previous day, had . . . the instrument man had tagged off the line. That means you put a big sign on it, "Don't touch this,

I'm working on the line," you know, type of thing. And he was sitting cross-legged, unscrewing the instrument air from the instrument that he was getting ready to replace, when this idiot opens up the valve and pressures in the instrument air. And this is, you've got pressure and you go, *pff*. It comes in. It blew the valve off. Fortunately, he was sitting cross-legged with his legs far enough apart that it went between his knees and into the ground and disappeared. He could have been castrated. So that night we decided . . . no, no, the next day. That happened.

[00:03:56]
The first day I was there, I went out to observe and we had a fired heater in this process, a fired heater is a great big furnace. This one was so big it had ten different pilot lights to get it going. So you have a . . . the master gas valve is sufficiently far away [for safety]. So it had been locked off and the guy who's the process engineer in charge of things goes around and lights all of these ten [pilots]. He finishes number ten and starts stepping away. And it's his job—the lighter of the pilot—to go and turn on the gas [at the master gas valve]. Mr. Client opened it up. Fortunately, our man was not hurt.

[00:04:41]
That was the night that we had the meeting, and we had a new assignment for our group. And what they did, they sent the process engineer and whatever other process engineers he could gather—he or she could gather—and instrument engineers and other engineers to go and start the . . . we actually started operating the plant when we built something, we made sure it worked. So from that point on, we had one person watching this man to make sure he did not kill anybody. It was scary.

[00:05:16]
The difference between the scale of things that you work with [basic research, pilot plant, and industry]. There was one particular [vessel] on that job, or there was this . . . so I've forgotten what it was, but underneath it was a connection and it had this gigantic nut, like you screw onto a—and you have to have a big wrench to turn it. And the wrench was so big, and in the position it [the nut] was in, and we had to have all of us guys who were working on this job in a big circle around lying down on our stomachs. And when you would push it, your little arc of this big circle . . . . I mean, it was, like a ten-foot length on [the wrench], and we pushed it around with enough to put gradually more [pressure], tighten it up or loosen it up, whatever it was that we did. No, it was an interesting thing to do. And after having spent time in the laboratory, essentially, for so many years, it was a big change.

[00:06:18]
So I did that. And then I came back and then I got assigned my own project, the South Pass project. I designed it and we built it and I went to the . . . we actually built it in our yard in Port Arthur, [Texas] or someplace like that. And I got to go to the yard and see it being constructed, and they were doing it in two pieces. This was an offshore platform. And, you know, they would fit together like this, like your fingers fitting together. Unfortunately, instead of doing it in that type of alignment in the field, they did it with both hands pointing in the same direction instead of pointing towards each other where the fingers would mesh up. So when they got offshore and

tried to meet the two together, one was about two feet above the other. So we had to modify [the attachment] in the field offshore, and all of the decks and all of the piping had to have this gradation of this difference in—whatever the difference was, I don't remember—four inches, whatever it was, you had that gradation in all of the piping and all of the flooring offshore.

[00:07:33]
So then I got to go offshore to do the startup of actual operation of a plant. An interesting thing, I got to take with me a young engineer [Paul Glaves] who had just graduated from Rice, who happened to be a classmate of my oldest daughter's in junior high [and in Sunday School]. So it was somebody, I knew his parents and everything. Well he was my gofer, and I'm really glad I had him.

[00:08:01]
So we got offshore. Well, naturally, as a woman, you got to do everything that the guys do. So I went out on the flare boom. And if you've ever been offshore on a platform that is well-elevated above the water, and then you have this gigantic flare boom that's fifty feet long, that's out at an angle over the ocean. Well, you see me sitting in the chair. Okay, there's the ocean floor is the floor, and where my knees are is where the platform level was. And this is the flare boom sticking out, my arm sticking out. And you stick it out there. It's pretty scary. Especially since the steps going out on this flare boom are only about three inches wide and you can barely fit on them. And there's just, kind of, a piece of chain rope to hold onto getting out there. Well I went out there one time. Subsequently, when I wanted to have a picture made of the platform, I sent my gofer out there to get it.

[00:08:57]
GIBSON: So sometimes there's a rite of passage you go through on these things.

[00:09:00]
CHAPPELEAR: A rite of passage. I had to prove to them I could do it.

[00:09:01]
GIBSON: Were you out on that flare boom for some reason, or just . . . ?

[00:09:04]
CHAPPELEAR: Oh, yeah. I went out to inspect something or other that we had. I mean, I showed them I could do it, but then after that, I had Paul do it. Why should I do it again?

[00:09:13]
GIBSON: Now I think you told us earlier you never learned to swim.

[00:09:18]
CHAPPELEAR: No, I didn't.

[00:09:19]
GIBSON: Were you, like, petrified to go out on this flare boom, or . . . ?

[00:09:21]
CHAPPELEAR: Yes. Scared silly.

[00:09:24]
GIBSON: But yet you did it.

[00:09:25]
CHAPPELEAR: Yet I did it. Yeah. Now, part of what you have to do when you do a startup situation, like there, is you follow your mechanical flow diagram that has all your pipes on it, and you follow and make sure that every pipe is where it's supposed to be and has every valve in it. That's part of what you do to check out a new installation. Did you ever do this? You did this too. Okay. Well she's [Gayle Gibson's] nodding too, so. But it's a very tedious process and it's very . . . and sometimes they are in very . . . places where you can't imagine you can get to them. Well luckily, I had Paul to crawl into those places. Paul, fortunately, was a rather small man, and I'm glad that he was, because he could get in, reach behind, and look and see where things were supposed to be. But I was on the floor checking off stuff as they did it. Oh, we had to . . . . Anyway, we got that platform going. Maybe I did another design or two, I don't remember.

[00:10:28]
GIBSON: So talk a little bit more about this startup. So this was not your original project. So you just got named to a startup crew?

[00:10:35]
CHAPPELEAR: Oh, the original startup I went to, I was named to it. Yeah. He got ready to do a startup, and I was a new engineer at the company. You need that training. Go.

[00:10:44]
GIBSON: So did they train you what to do? Or you just figured it out?

[00:10:46]
CHAPPELEAR: You got there and you did it. I mean, what . . . I mean, you were a trained engineer, so you knew how to do.

[00:10:53]
GIBSON: Were there, like, process hazard reviews that took place or . . . ?

[00:10:57]
CHAPPELEAR: No. Except for our client. Yeah, that was the hazard that we had to discuss. No, you were just expected to know.

[00:11:09]
GIBSON: Now how did you get out to this offshore platform?

[00:11:11]
CHAPPELEAR: Oh, the offshore . . . the first experience was onshore. My offshore . . . oh, that one . . . I think that was the one . . . . Well, I went offshore three or four times. One time I went off in a helicopter and landed on the helipad. And the helipad is a flat landing place at the very tip-top level of the platform, and there is an opening in the helipad with a staircase leading down to the next deck. There is not a handrail, anything to hold on to until you step down into these steps. And you have to do this with your luggage. Your personal luggage is in a duffel bag over your shoulder. And you have to do this that way. And that's very difficult and very scary.

[00:12:09]
Another time I went out in a crew boat, and those you get on board at the dock of the wharf, and then you go bobbing, bump, bump out in the Gulf [of Mexico] until you reach the platform. The platform is built with a landing at the sea level, where the sea level is with respect to the platform. And then you have to climb up a long bunch of stairs to get up to the first level of the deck. The first deck is twenty-five to fifty feet above sea level. And most platforms are multi-decks. Three levels is typical. And each deck is . . . I'm using, kind of, general . . . fifteen to twenty feet in depth or more. Depends upon, depends on what type of platform it is and what you're doing and all. So there's a lot of climbing up and down of stairs involved on platforms.

[00:13:08]
The third way of getting on board—of course, you have to get off board the same way too—involves going out in a boat, and instead of docking on the platform, you stop off, and there is an operating crane. A crane is a piece of mechanical equipment that can lift, has a hook on it

that can lift things and move it around and set them down. So it has a hook on it, and it goes over and sets down on your boat a big inner tube-like thing.

[00:13:49]
And the big inner tube thing is maybe twelve feet to the outer diameter. And so it has a—or maybe even bigger than that—anyway, it's a great big inner tube, and in the center of which is a netting to the inner tube. And then around, supporting the inner tube, are ropes that you can hold on to. So you put your duffle, your luggage, in the center of the inner tube thing, and you stand on this inner tube thing and hold on to the ropes, and the crane has to pick up with respect to the waves that are going up and down on your boat. And it has to put it down at the right time and put it, and you have to jump on and get ready to go real fast. And then it has to pick it up at the right time and go over and set it down on the platform. And when it sets down on the platform, or in the reverse condition, you have to be prepared to flex your knees as it goes so that you won't break your knees. And you're taught this just before the first time that you have to go this way. And so I had in the years of going off to, you know, like I said, several different times that I went offshore, and I went all three ways. It's . . . it was very interesting.

[00:15:01]
SCHNEIDER: And how long did you usually spend offshore when you went?

[00:15:04]
CHAPPELEAR: It depends on what it was for. If it was for the startup, I was offshore about ten days. But it takes about ten days to check out a plant and get it running. Ten [days] to two weeks, something like that. When I . . . other times I went out to . . . I did not spend time offshore. I just went out for a day and came back for going out to look at something, to see about changing it or whatever it was. I've forgotten the details.

[00:15:35]
GIBSON: And this was in the early eighties, late seventies?

[00:15:39]
CHAPPELEAR: I went to work for Hudson in '76. The early seventies was the first time I went offshore—late seventies, pardon me, late seventies.

[00:15:47]
GIBSON: How many other women were, kind of, doing this kind of work offshore? Did you see anybody, or . . . ?

[00:15:52]
CHAPPELEAR: I don't remember seeing anybody.

[00:15:56]
GIBSON: How did the men treat you offshore?

[00:15:58]
CHAPPELEAR: Very politely. I mean, I was . . . how is it? The head engineer. They treated me the way you're supposed to treat your head engineer. The frightening thing I had was on one of the offshore trips, which will remain unnamed, and they were not enforcing the safety rules. And their fire pumps were not operational for fighting fires. That's rather scary.

[00:16:49]
SCHNEIDER: I believe you had some projects that you were involved with at Hudson that were in different places abroad, like Japan. And so I'm wondering if you ever traveled to those sites or how long you spent abroad for that kind of work?

[00:17:05]
CHAPPELEAR: Okay. I did both process and project engineering. In fact, I started project engineering fairly early in my career. I guess it was because of the experience that I had over the years and being a rather senior person, I wasn't straight out of school. So some of those were that type and the . . . depending on what the project was, you did or did not need to go to the site. I never had to actually go and do any startup overseas.

[00:17:40]
There's some very interesting stories about different aspects of those startups. All of the startups I participated in were here in the United States. I did mine, I did Pat's [Pat Campbell], I did something in New Mexico. I only went to startups maybe three or four times total, because I almost immediately went into project engineering. And the overseas ones . . . let's see. Well, [I did work overseas in London on a project as a process engineer]. I went overseas to work in London, but I didn't go offshore in the North Sea [where the project was located. So I worked overseas for six weeks, but not on startup].

[00:18:48]
SCHNEIDER: Yes.

[00:18:48]
CHAPPELEAR: The African project, I was the lead project engineer. That was a really

interesting project. I did not go overseas for that. [. . .] I'm glad I didn't. Our guys that had to go told some horror stories about the guys coming out of the jungle and fighting them on shore and running and being . . . having their truck, or whatever they were [driving] going from one place to the other, being stopped by armed guerrillas. At least they all came back safely.

[00:19:21]
The Japanese was a joint venture design thing, and I was . . . I was project engineer for that one. And I knew all of the technical information. We decided that we really needed to have a joint meeting with the Japanese company. And this was decided on Monday and they applied for our—maybe they decided on Friday that they were going to do this and applied for the things—and we got the papers on Monday that we could go and on Tuesday we flew to Japan, to Tokyo.

[00:20:07]
And the head of the engineering department was named [Douglas] Clower at that time. And he went on it. And the salesman—Hudson had a bunch of people were essentially the salesmen, and they did all sorts of sales and deals, and I'll talk about them later too—to get these jobs. And so he went and they had a representative of Hudson or Hudson McDermott, it was McDermott Hudson at that time, whichever, whatever the name was—in Japan. Also, they'd been working on developing this [project]. So we met with the—Doug Clower had been a prisoner of the Japanese in World War II. So on the way over, he gave me instructions about how I was supposed to behave as a woman and everything, and I, "Okay."

[00:20:59]
And so then we went in and we started—we got to Japan and we had enough time to accommodate and change our—the time change was radical. And then we met with the company and we started our meeting with everybody was in there, including all their design engineers, as well as all of their business people. We started talking about the project and about every second question they had to turn to me to get the answer. And very shortly, the business people decided they would—we would separate and the business people would go do the business aspect of the discussion, and we would do the technical part, and left me with all of the design people. And I answered all of their questions. At the end of the day, they took us out to dinner. We went to a very fancy restaurant, and I was given the seat of honor, the head of the table. I was in the one with the great big chair, with the big thing around it. I mean, that was the seat of honor, and I got it. You know, they sit here. And I was treated very . . . .

[00:22:10]
And then the Japanese host invited us to his home for coffee or whatever, you know, to come there. And we went to his home, and you took your shoes off at the door and put on the—I had heard of this custom, never seen it practiced before—and changed our shoes and everything, and got to meet his wife and have whatever it was. And on the way back to the hotel, our representative, who was living there permanently and had been there for two years at the time, commented he had never been invited into a Japanese home before. So that was pretty interesting. Well, it so happens that in talking with the technical people, I mentioned casually that, "Oh yes, I had known a lot of Japanese engineers."

[00:22:59]
And we had this man who came and did a postdoc with us [Shigehiko Masukawa], a very interesting man, and dropped his name, and he just happened to be the president of Kobe Steel at the time, yes. And he was one of the ones . . . the way of thinking . . . apparently, there's something in the culture that made it very difficult for him to envision, very limiting behavior of . . . you have the solid and the gas reacts with the solid. And as the solid becomes less and less, the reaction goes down and down until finally the limitation is the solid is no more. But yet the attraction still exists. This is a complete abstract idea, and it was essential for the work that he was doing in chromatography to understand what . . . I mean, he was doing a brilliant piece of work. But this particular concept of limiting behavior was very, very difficult for him to grasp. And I think it was language. And like I say, I mean, the guy ended up president of a major steel company. I mean, he's plenty smart. It was interesting. That was very interesting.

[00:24:11]
And the taxi drivers all wore white gloves. So we finished our meeting and the men that were with me, the two men flew back to the United States. But I said, "No, if I'm flying this far, I'm staying for another day to be a tourist." And so I spent one day being a tourist in Tokyo by myself and flew back the next day.

[00:24:38]
SCHNEIDER: And so you mentioned, you know, thinking about being a woman in Japanese society. What was it like in other countries, whether it was England, or other places you went around the world, did you encounter other women engineers or how were you received?

[00:24:52]
CHAPPELEAR: Yes. I met other women engineers in other countries. I don't think I met any in England when I was there working as an engineer. I'm trying to think. I don't think I met any there at that time. I may have met some later, but I don't remember any. I definitely met women engineers when we went to adopt our children in Romania.

[00:25:21]
GIBSON: So you made the distinction of process engineer versus project engineer.

[00:25:28]
CHAPPELEAR: Yes.

[00:25:30]
GIBSON: Did you have certain things you liked about those two things, or how were they different, for kids that are trying to understand what they might want to pursue these fields?

[00:25:39]
CHAPPELEAR: Process engineering is actually working with the basic principles of chemical engineering to get something done. Project engineering is integrating that process engineering with all of the accompanying, supporting engineering efforts to get something done. And you have to understand the process, but you don't have—and you really have to understand the process to do that. And you have to also understand something, something, but not everything, about all the others. And you have to appreciate they have to all work together in order to accomplish something. One of my overseas projects, which I did—we never did build the project, which was very, very interesting. [phone rings] Excuse me. [. . .] [recorder is turned off and turned back on] That was early 1980s or something like that. That was a huge project. I probably employed 80 percent of the staff on that.

[00:26:55]
GIBSON: Is this Saudi Aramco?

[00:26:56]
CHAPPELEAR: Saudi Aramco. Yanbu. Have you heard of that? It was the Yanbu project. And we were one of the people who . . . the engineering companies that were willing to bid on it, they wanted a no-exception bid. That means for six thousand dollars, I will build you this exact thing that you have said in your drawings. That's what a no-exception bid means. Well, when we got to working on this, to do it, if we were going to bid—a bid that way, it was going to be two hundred dollars or two hundred billion dollars, whatever the numbers were, I'm trying to do order of magnitude here. Is we're going to be 200. Whereas if we applied general accepted engineering practices instead of 200, it would be sixty. Okay.

[00:27:54]
So they wanted a no-exceptions bid and they sent out their specifications. Have you ever seen Aramco specifications? Their general specifications—not the ones for the project, their general specifications—on how you're going to do things are in little notebooks, you know, notebook, notebook, notebook. And the notebooks start at this end of the house and go all the way to the other end of my house. And then there's another set of notebooks that were for this particular project. And then there were the drawings that had all been—all the preliminary engineering had been done, you see. And then there were all of the drawings that—the preliminary drawings—and there were how many rolls? Five? Five rolls of drawings, and each roll of drawing was a good fourteen inches in diameter, fourteen inches of diameter of drawing size. And a drawing is four feet by three feet, roughly. And they're all rolled up into a giant roll.

[00:28:57]
So there [was] lots and lots of stuff to do. So when I was appointed to be the project engineer for this, I sat down and looked through all of the drawings and read through all of the books. Took me about a week. And I saw that in order to do a no-exception bid, I would need everybody to really know what was in all of those things. So I reserved our major conference room for a week, and my—had been appointed a lead engineer in each one of the major disciplines, and I told them that they had, you know, they were working for me on this project. And I get all of your time for my project. You're going to meet with me next week and we're going through the specifications. You never heard such howls of dismay in all of your life.

[00:29:51]
And we started doing it. And we're going merrily along, and there is a specification in the . . . whatever it was—fire protection section—that affects how much steel you have to put into that platform. And when you do an offshore project, that steel structure that you stick in the ground that really doesn't do anything is a huge percentage of . . . and I've forgotten the exact percentages. Say it's 30 percent of the cost of the facility. So instead of this . . . and so that 30 percent, instead of being thirty dollars, is now going to be fifty dollars because of the fire specification that's in the fire section, not in the steel section. That sort of thing was throughout these documents, where there would be something in one section that really affected—the instrument guy was affected by something was in the electrical section or vice versa, whatever it was.

[00:30:56]
And we went through that thing. So by the end of the job, we had this long list—into that week—we had this long list of, "This is what they said they want, but really we don't think that's practical. We ought to do something else." So we did two bids. One was meeting the no-[exception] thing. And then we handed our management the second bid. This is really what you ought to try and negotiate. And we were the only company to turn in a bid with no [exceptions], and our management told me they'd be happy to discuss and they wouldn't even discuss it with them. Bunch of egotistical maniacs. Pardon me. But they were.

[00:31:40]
Eventually, the company—we never bid on the other Aramco project. But I saved the company from going bankrupt on that. I think that was one of my major accomplishments. It's . . . you just really . . . sometimes you really have to bite the bullet and say, "We can't do this." And they were very . . . . Somehow the Aramco management finally managed to find somebody to do the job. And they eventually . . . it was—the number—when you're talking—what's trillions of dollars, or . . . ? I mean, the numbers get so big that they really don't make any sense to you anymore. That's why I was using numbers I can handle, 200 and sixty. I can really know what those numbers are, but you could, need to put a lot of zeros under—by those numbers. I don't even remember the dollar magnitude that we had. But it was huge.

[00:32:39]
GIBSON: It's a good example of when saying no makes sense.

[00:32:43]
CHAPPELEAR: [Yes].

[00:32:45]
GIBSON: Were you afraid to, kind of, bring that forward? I guess by having the two bids for management to review you were giving them options.

[00:32:50]
CHAPPELEAR: Oh, no, I took it up with them early on after that first, after we did the review, I talked to our management, "What should we do?" And they made the decision, "Let's go ahead and bid it." But I ended up having everybody—almost everybody—in the company working on that. And I worked extremely long hours on it. And one Monday morning I went in and I met Johnny and, "Are you working on my project?" "Patsy, I worked fifty hours on it last week." "Oh." As project manager, I was responsible for managing all the hours of everybody. So I walked into the secretary and said, "I'm going home." This was about ten o'clock in the morning. And I went home and I went to sleep, and I didn't wake up till 6:00 p.m.

[00:33:37]
When we finally got the bid documents ready to go—of course, the bid documents were gigantic too—and our printing department had printed off all the copies. And so we put them together. And then we had to be sure that every copy was—you had to do fourteen copies or whatever it was, or thirty copies—whatever the number was—you wanted to make sure that every copy was perfect. And so you sit there with the master copy and you say page so and so, blah, blah, blah. Fourteen people out there with fourteen copies are going this way to make sure your copy is right. And everybody in the company would come down, including the vice president, and spend an hour or two working on that because, I mean, it was a huge hunk of our investment time. It took us six or eight hours to prepare that—just that going through and checking that all the papers were in order. That step alone.

[00:34:31]
GIBSON: Well, it's a great example because we started this section on Hudson talking about you like their integrity.

[00:34:38]
CHAPPELEAR: Yes.

[00:34:39]
GIBSON: Because in some cases there'd be pressure for sales. So let's do a bid knowing it might be a little lower and we'll just escalate from there. It was a different approach for the time, too.

[00:34:49]
CHAPPELEAR: This was a different approach. I liked the approach that they had at the Hudson Company. The influence of McDermott, I did not like that came in. Hudson maintained some of its original quality for a long, long time. During the time I was there, it was there for sure.

[00:35:08]
GIBSON: And sometimes engineers can find themselves in, sort of, we could call it an ethical dilemma, if they're getting pressure to figure out how to meet both these constraints.

[00:35:20]
CHAPPELEAR: I had an interaction sometime along the way and I don't remember when it was, but the young female engineer who worked for one of the . . . it may have been Dow Chemical Company, and there was something that she felt was—or knew—was not a safe thing to do. And she consulted [with me] because she was worried that she would lose her job if she said anything. And I told her she had to go ahead and say something. And she did. And she did not lose her job.

[00:35:50]
No, I had that—that this is an ethical dilemma of when do you insist. I had a project and I've forgotten which one it was, which client. It was an offshore project. And by that time we had developed through API, the American Petroleum Institute, the API RP [14C] American Petroleum Institute recommended practice, and it's for the safety of design of offshore facilities. The criterion that is in there was developed by industry for industry and govern industry. It's now the legal law. At that time it was not legal law. It was simply best practice. And the client insisted that we not—tried to—pardon me—tried to insist that we would not utilize that. And as lead project—as the project engineer, I had to sign off on all the drawings before they could—and I refused to sign off.

[00:36:54]
GIBSON: Those are some great examples.

[00:36:58]
CHAPPELEAR: Well. We eventually did sign off because they did eventually agree with [API RP] 14C.

[00:37:04]
GIBSON: Okay, okay. So talking about signing off drawings in some other engineering fields, there's something called professional engineer.

[00:37:13]
CHAPPELEAR: Yes.

[00:37:14]
GIBSON: Did you pursue that, or . . . ?

[00:37:15]
CHAPPELEAR: Yes. When I went to work for Hudson, they requested that I become a professional engineer. And so I prepared my papers and was registered in Texas, and I went in under the grandfather clause. I did not have to have an examination. By that time, I had my application. I went and got all of the papers that . . . see that stack of papers there? And I went through and made my long list of what I had done and what my contributions were for each one of these. It took a long time just to prepare the application. So I became a registered professional engineer in Texas. Later on, working for Hudson, getting ready to do some—somebody wanted Alaska Bay project there. And so we didn't have anybody registered in Alaska, and they asked me to submit. So I submitted one, including the information that I had done the design for the, two of their major pipelines. And they wanted me to take an exam and to come up for an interview. And I told them, "Shove it."

[00:38:22]
GIBSON: Was there continuing education required for professionals, engineers?

[00:38:27]
CHAPPELEAR: Not at that time, no. Well, I had participated in the first ever continuing education course at Rice in preparing for it. So it was, sort of, like computing. I mean, I did it before it existed. It was, sort of, like the high school where the kids went to school before it existed, we did. I don't know, it's . . . .

[00:38:57]
SCHNEIDER: And in your project-based work, were you ever working on multiple projects at once or was it mostly focused . . . ?

[00:39:03]
CHAPPELEAR: No, you only work on one project.

[00:39:05]
SCHNEIDER: One at a time.

[00:39:05]
CHAPPELEAR: It is very intensive work. You have to do the—along with the process engineer—you do the first analysis of it and try to establish a timeline of what could be done when and how much would be taken and how much resources you're going to need. And depending on the project, it's . . . . Some of the projects, like the one in Gulf Cabinda in Africa, to understand that project, first of all, I did a drawing. And this is what I was trying to tell you about earlier. That project involved an onshore facility and three different offshore facilities and pipelines joining them, and an offshore loading facility. And so I did a drawing of showing these things to show how they related together so that people could grasp what we were talking about. The same thing was true of Yanbu, which was gigantic and I reduced it to one, you know, this huge thing to one single drawing that told everything that was—not everything—told the . . . how everything that was in all of those documents was connected. And those documents were . . . everybody told me they were very, very useful to understand what was going on.

[00:40:30]
GIBSON: Let me ask you to maybe articulate and it may build on that point. So as a project engineer, you were a lead project engineer. You're a team leader.

[00:40:39]
CHAPPELEAR: Right.

[00:40:40]
GIBSON: What kind of tenets of leadership did you feel you found over your career really worked the best?

[00:40:49]
CHAPPELEAR: Keeping good records. Sending out . . . after a meeting, sending out the

meeting minutes of what happened. This is what I think we agreed. Did we agree to this? Yes, we did. Being understanding when people had a problem and needed additional help. Making sure they got that help. That was important. And saying thank you. I guess those were normal to me. I, kind of, just did them all automatically. And then I pulled a real boo-boo. Everybody does that. You make mistakes.

[00:41:34]
SCHNEIDER: Do you want to say more about what you mean by that?

[00:41:37]
CHAPPELEAR: Oh, that. I'll save that for my other talks.

[00:41:39]
SCHNEIDER: Okay, okay.

[00:41:41]
CHAPPELEAR: [. . .] What I found fascinating about working for Hudson was the different projects that I did. You know, I did the feasibility study of one particular thing for one particular company. I did the great big Yanbu project that used everybody in the company. And then I did another one where I was the project engineer for our first contract that we got with the government. And the company had never done a project working for Uncle Sam before. And this was for the helium plant that's up in Amarillo, [Texas]. Do you all know that Texas is the site of helium for the world?

[00:42:28]
SCHNEIDER: No.

[00:42:29]
CHAPPELEAR: Yeah. It's in, the plant is up in Amarillo, and that's where the field is and everything. And it's a very old plant. It was built in the twenties or tens or something like—a long, long time ago. So we get this to modify it and to add a new type of processing unit to their processing called pressure swing absorption, where you run the . . . you have a big tower and you put some stuff in it that the . . . put the gas through and it absorbs on there and gets purified by going through this tower. And then you release the pressure on the tower and the bad stuff goes off. That's basically what happens.

[00:43:12]
Well, we were dealing with helium. [. . .] Whereas most gas plants deal in millions of standard

cubic feet per day, the production there was very, very small. I've forgotten what the numbers were, maybe sixty standard cubic feet per day. Very different scale. The Yanbu project had pipelines for the flare that were big enough to drive a Mack truck through. You've seen those big Mack trucks pull up behind you on the highway? Just imagine a pipe big enough for them to drive. This project had major flow lines that carried a production flow of what we're doing that were not as big as my little finger. Okay.

[00:44:07]
So and it was then this existing antique facility and all of the original drawings, of course, had not been kept up with all of the field modifications that had occurred over the years. So we went up there in February, and Amarillo is in the panhandle of Texas, and just north of it is Alaska. And the winds come down from Alaska and blow over the Panhandle, and it's colder than you could ever imagine. And I am there bundled up, gloves, and scarf, and hat, and hard hat. And trying to take notes. And my lead piper is down trying to find out where the pipes are that we have to connect to, and the pipe trenches are down in the ground, and he's crawling in and out of the trenches, and I'm making notes. And that's how we did our notes, to get . . . . And he literally had to go in and make drawings in the field of what was there to know how to do our piping, to get it into this thing.

[00:45:09]
So we come back and we get the design done and do all the spool drawings and everything, and start buying all of the—this was an engineering and construction job. So our construction part of the company was involved too. So we buy all of the material for it, and instead of shipping it up to the job site, we ship it to our Hudson Products Company, which makes the fans, and we have a setup there and gather all of these pieces. Now remember, we're making . . . it's not like making the piping to go on that kitchen sink with those big pipes. No, these are these little teeny-tiny pipes and little teeny-tiny valves. And so you sort them out and you make whatever goes in a particular spool of piping and all the little valves that go into a little burlap sack. And so you have a spool in a burlap sack.

[00:46:00]
Normally in a job, you would go to the supply place and you would go in, "I'm getting ready to do spool number six. I need two so-and-so valves and six of something else, blah, blah, blah." And you pick the valves, you know, because they're big things that's you gotta . . . . These are little teeny-tiny things. So we did all of the pre-assembly of that, got it up there, and they were able to do it and to get it going and to get it working. And this project was, like, a million dollars, which was a very small job. Even a million in those days was a lot of money to the ordinary person, but for a construction job, it was a small job. And we actually made a small profit on it. But that was one of the hardest things. And again, it was a no . . . it had to be no-exception type bid, and getting it that way was very difficult. But we did it and we managed to make money on it. And the company never did another government job.

[00:46:54]
SCHNEIDER: And was . . . why was that? And was . . . what was it about government work, government contracts that was different?

[00:47:01]
CHAPPELEAR: The insistence on no exceptions and no changes to the contract. If you're dealing with somebody that's not willing to change what's going on while it's going on, you never know when you're doing something, what's . . . . You go out and you start a project and you start digging in the ground and there's a great big tree root, and you've got to chop that tree root and take it out. That's, you know, you don't plan for what you can't see. Or instead of a tree root, it's a vein of an old concrete thing that has to be dynamited out. That's even worse than a tree root, see? How can you plan for . . . there may be a tree root or may be a concrete bunker under that. You have no way of knowing.

[00:47:49]
GIBSON: It's a heavily debated area because there's something called contingency we put into these estimates.

[00:47:54]
CHAPPELEAR: Yes. Yeah. Yeah, you do some contingency. But there are certain things that you really can't plan for.

[00:48:00]
GIBSON: Right.

[00:48:00]
CHAPPELEAR: That's why the business people have to do about all their negotiating and everything.

[00:48:09]
GIBSON: So during this time, you may not know, but I'm curious around pay. There's a lot about women's and equal pay, equal work. Do you have any idea?

[00:48:21]
CHAPPELEAR: I think I was being paid equally at Hudson.

[00:48:25]
GIBSON: Awesome.

[00:48:26]
CHAPPELEAR: I don't know that for a certainty, but I think I was.

[00:48:33]
SCHNEIDER: And I know something else you did . . . at one point, you started and you led a summer program for engineering interns?

[00:48:41]
CHAPPELEAR: Okay. While I was at Hudson, in the prosperous years, we decided that we should help train, try to get some more engineers. The company thought they would be expanding and needing more process engineers. We need more of them. Let's test getting some. And having an intern work for you for a summer gives you an idea. Do you really want to make an offer? And so we did that. And I was in charge of recruiting the interns. And we had the program for two years and had a good, a good group of people from all over, including from some of the northern schools. One of them was a young lady I remember from University of Michigan, I think. And most of them went . . . most of the people end up going back to where they came from. That's just people. People do like old hometown.

[00:49:37]
SCHNEIDER: And what . . . to what extent were they involved in the work? Like what kinds of work were they doing?

[00:49:42]
CHAPPELEAR: Okay. They happened to be the summer that we did the Yanbu project for, yeah, Yanbu for Aramco, the bid. So they worked on that bid. One of them I told, "I want you to equip the hospital emergency room." And so they had to go out and find out the cost of an ambulance and the cost of all of the exam tables to put people on and what you needed to have and the cabinets and all to furnish the . . . they didn't have to do, design the building for it. Somebody else in our architecture department had to design that building. I mean, that involved a grassroots town as well as everything else. And one of them got the job of finding out the drain field for the sewage treatment, and they had to design and find out what they're gonna do. One of them had to do the fire department. So I used them for all sorts of that. So they had to contact different companies and find out and get bids. And it was hilarious. They found out that, "I didn't know engineering was this." [laughter]

[00:51:00]
SCHNEIDER: And did you ever talk with them about, you know, your thoughts about the field or give them any advice?

[00:51:07]
CHAPPELEAR: Oh, yes, yes. I trained them to write a weekly report on what they had done and to have a goal and have little meetings and talk with each other. It was a training thing, too, but most of the time I had them working.

[00:51:22]
SCHNEIDER: Do you know if any of those interns ended up staying with the company?

[00:51:26]
CHAPPELEAR: I don't remember. I really don't remember.

[00:51:34]
GIBSON: So you worked for Hudson for, what, a dozen years, I guess.

[00:51:38]
CHAPPELEAR: I worked with them for almost ten years.

[00:51:40]
GIBSON: How did the use of computers, kind of, change the work, or did it during that time?

[00:51:44]
CHAPPELEAR: Okay, yes, tremendously. When I started at Hudson, they were very progressive. They had computers with the . . . that did the word processing. And they had these young ladies that did the *dinglinglingling* [typing noise] real fast. So you could write your report and you'd give it to them, and then they could whip it out. And then you could mark it up and give it back to them, paste it, and they knew how to take it and move and paste, move and paste like every one of us knows how to do nowadays. Not so in those days. You had specialists that knew how to do it, and you gave them a cut-up piece of paper that was taped all together that then they worked from that. So that's what it was when I moved in.

[00:52:25]
And shortly thereafter, maybe four or five years, yeah—I was doing project engineering—spreadsheets were developed. And I had a project that was located someplace overseas. And to

get the materials for the project, [there were] different places you would buy it in the United States, and then you had to get it all together and connect it and put it together and put it in a ship and ship it over. And there's varying routes about how you can do this. So there's different parameters that you could. So I made a spreadsheet of all the different parameters. And we could show that you could change the parameters, and then you could go through and figure out what it was. And this involved what materials you had and what materials . . . . And you need . . . . It was different processes, too. So different stuff that you needed.

[00:53:31]
And it would have taken our material takeoff people, like, six weeks to do one of these calculations. And I put in all the parameters and it could do the calculation in about six hours. You know, I wasn't afraid to try it out and to do it and got it going. Everybody of the management in the company came in and stood behind because I had to stay in there to be sure nobody messed with my computer, foul it up. But they all came and they stood and watched it do its thing, *blubbety blubbety blubbety bluh* until they finally converged.

[00:54:09]
And then we got the computer that we could use to do our design calculations towards the end. And after that they finally developed the ability to do these drawings that our pipers did on a computer. But that was after I had left Hudson. No, with Hudson it was, first of all, it was word processing. And then it was the spreadsheet. And that was used in essentially economic, I'd say economic analysis. And I guess they used it in the accounting department. Don't remember.

[00:54:53]
SCHNEIDER: So I know you had some . . . you were recognized with various things around this period. So you, as you mentioned, became the first female fellow of the American Institute of Chemical Engineers.

[00:55:07]
CHAPPELEAR: Right.

[00:55:07]
SCHNEIDER: And you also received a recognition award from the Gas Processors Suppliers Association.

[00:55:14]
CHAPPELEAR: Right.

[00:55:14]
SCHNEIDER: So how did it feel to receive those kinds of recognition?

[00:55:17]
CHAPPELEAR: I, kind of, big head. I mean, it was something. The female fellow, really, I mean, that really thrilled me. It really did.

[00:55:31]
GIBSON: Did you know the application was going in?

[00:55:34]
CHAPPELEAR: No.

[00:55:35]
GIBSON: Do you know who did the nomination?

[00:55:38]
CHAPPELEAR: I think I do, but I've never pursued trying to know. I guess, this is really the first recognition I ever had on my work was when Riki nominated me for Sigma Xi. And I am a full member of Sigma Xi. As far as I . . . I know of no other person who does not have a PhD who is a full member of Sigma Xi. There must be some. The Sigma Xi [is mostly awarded to] to PhD students. Most of them had that. And then after, if they go into academia and then continue to . . . then they are elected to full [membership]. And I was elected directly to full membership.

[00:56:27]
SCHNEIDER: Was there some kind of ceremony when . . . ?

[00:56:29]
CHAPPELEAR: No, there's no ceremony. Just a . . . you remember, that was it.

[00:56:36]
SCHNEIDER: And have you . . . is it something social, like, do you meet people through it, or no?

[00:56:40]
CHAPPELEAR: No, I don't. I've never participated in it. It's just one of those things that, you know, I was very honored to do it, but I have not participated in it.

[00:56:51]
SCHNEIDER: And I don't know if we got it on camera—or on the recording—yet, but you were telling us off recording a story about when you became a fellow and received your certificate. So I was wondering if you could share that story, if you haven't already.

[00:57:05]
CHAPPELEAR: [laughter] Well, I was elected a fellow and I was the first female, and so I received my certificate in the mail, I guess it was, I don't remember exactly. I don't think we had award ceremonies in those days. And lo and behold, it was an award to him and to his. And I laughed and put it in a frame and put it up on the wall. Well, a few years later, another woman was elected, and she protested, and I've forgotten who that was. Do you remember, or know?

[00:57:42]
GIBSON: Was it [Margaret] Rousseau? I don't remember.

[00:57:46]
CHAPPELEAR: It may have been Margaret.

[00:57:47]
GIBSON: It may have been Margaret. Yeah.

[00:57:48]
CHAPPELEAR: Yeah. She'd be one of the other early ones. She was another Rice graduate. So she objected. I bet it was her. And they mailed me another certificate with "her" in it. So I have a "his" and a "her" certificate. And those are going to go into the archives of the Society of Women Engineers. I've already promised them to them.

[00:58:17]
SCHNEIDER: So I think it might be good to hear some of your thoughts about changes in the oil industry around this time because I know it ended up affecting your employment. So I'm wondering if you could share a little bit about the context of the industry, how it was doing, and how that affected your work.

[00:58:36]
CHAPPELEAR: It's not just the oil industry, it's the economics of the United States. And you have to look at the overall . . . and if you do, you will find that there is a cycle of up and down. And if you examine the history of employment of engineers, of all disciplines, there are similar cycles. And when it goes down, everybody loses their job and they forget that they need engineers. And then they suddenly discover ten years later they don't have any engineers, and they desperately need more engineers. So more people go into engineering. And then you suddenly discover you don't need so many and so you don't . . . . So it goes up and down. And that's the history of it. In the oil industry, you need the energy and then you don't need the energy, and the same thing. It's just part of our . . . it's our overall economic cycling that goes on. We happened at, in the time of the late to mid-eighties, be at a down cycle.

[00:59:37]
And first of all, my husband was offered to take early retirement. He was very young at the time to do this. He was in his late fifties. And he was offered early retirement from Shell. Shell had tried to make John into an administrator and he tried it for six months and didn't . . . it didn't fit him at all, and he refused to do it. And so he was their highest-level researcher that you could have. He had—his parking spot at the laboratory with his name on it was immediately by the door. It was the best parking spot in the entire company. I mean, he was really something. John was consulted by a lot of other people. He was very highly respected. But, of course, he was paid very highly, too. So when you're cutting your expenses and who do you cut? If you cut your . . . you can cut one high guy for two lower paying guys. And so he was offered [early retirement]. And he got a very generous retirement package, you know, a full . . . I've forgotten the details, but, you know, maybe a full year's pay, and . . . whatever it was. And so he decided, and we decided, "Yeah, you might as well take it."

[01:00:58]
GIBSON: Was there a pension as well from Shell?

[01:01:00]
CHAPPELEAR: Oh, yes. Oh, yes, a pension. But he didn't start the pension. Did his pension start then? Maybe it did. I think maybe his pension started. We didn't have to take Social Security at that point. And you didn't have to take enough out of your IRA. Shell had a very generous program at the time I worked for them, which he had started with. Of course, I didn't work for them long enough to be affected. But they called it the Shell Provident Fund, and you could start contributing to it after you had been an employee for one year and you could contribute one percent of your salary, or something, and then when five years you could do five percent, and when there's ten years, you did ten percent. And then the company matched what you donated, and then those funds were invested.

[01:01:53]
And so when you retired, you got this total thing and this became your individual retirement account. Well, you could withdraw the funds that you personally put in at any time. So when it came time to educate our children, we withdrew from his contribution. And that's why we were able to support our children to the extent that they could all go to the college they wanted to and study what they wanted to. And they also worked all the time when they went and contributed to their own. I think that's important that you help to pay your own. But it did take essentially all of what we had contributed up to that time.

[01:02:34]
So then when he did retire from Shell and they gave us the check for . . . they planned the retirement, did all sorts of things to help you and what you're going to do and look at your economic, blah, blah, blah, blah. And they provided a continuation of your health insurance, which was very important. In fact, I'm still on it. And then we got this gigantic—gigantic to us—check of what had been accumulated in the provident fund and rushed down to our broker and, you know, immediately established the . . . his . . . of course, the way it is, it was in his name on the IRA.

[01:03:16]
In the meantime, we had already started IRAs and had put in whatever it was that you could contribute to your individual IRA. The laws had been changing on that all the time. We—the minute they started the IRA program, we started contributing to it. So I had a very small one and continued to contribute to it through the years. So I had a very small IRA, originally, but that one, we . . . and that became our major . . . . That happened to be at the beginning of a huge expansion in the stock market. And those funds significantly increased in size to the point that I really have no financial worries at all.

[01:03:57]
In fact, I can't possibly spend all of my required withdrawal from my IRA. I personally use my money to establish scholarships. I have an endowed scholarship for women in engineering at Rice University. This year, I established a new one at Houston Community College. I have a scholarship with [American Voices] for a young man. This is for music, and he is from Africa, a baritone, and it provides for his incidental expenses. He's finishing his senior year. I will continue to support him in incidental expenses as he goes to graduate school, I hope.

[01:04:43]
In addition, I support my church with a full tithe and . . . plus a lot of extra things. I have . . . in the past, have [given] personal scholarships awarded through no agency at all, to divinity students. It's very nice to have money to be able to give it away. And been able to help . . . some of my great-grandchildren have had learning disabilities that have required . . . one of them is autistic. And we were able to get her into a special school. And she's now in the second grade and the top one in her class and doing beautifully in school because she got early help. And I had the money to do that. It's really wonderful to be able to pay for something that's needed when it's needed.

[01:05:39]
GIBSON: So what year did John take the early retirement then? That was eighty . . . ?

[01:05:42]
CHAPPELEAR: ’84? Eighty . . . . It was just before I got laid off. Whatever those dates work out.

[01:05:52]
SCHNEIDER: You were laid off in 1986.

[01:05:56]
CHAPPELEAR: ’86? Well then he took it in . . . ’85, I guess it was.

[01:06:03]
GIBSON: So he was—

[01:06:04]
CHAPPELEAR: Go back. I have to go back.

[01:06:04]
GIBSON: You were still working when he was not working?

[01:06:07]
CHAPPELEAR: Yes.

[01:06:08]
GIBSON: For a little while.

[01:06:09]
CHAPPELEAR: For a little while. For a little while.

[01:06:10]
GIBSON: And then you got laid off.

[01:06:11]
CHAPPELEAR: And then I got laid off.

[01:06:13]
GIBSON: Was that welcome, or just . . . ?

[01:06:14]
CHAPPELEAR: No, I liked what I . . . I liked working, and I miss it. I mean, I miss the challenge and all. But at that time, working wasn't fun. I mean, we didn't have projects to work on. They had us engineers up working the accounting department, matching invoices with receipts and that sort of thing. Yuck. The atmosphere, you know, nobody was having any fun. So I got laid off and the company had, at that time, was supporting me to be a director of AIChE and they continued through that year. But they—I had to resign at the end of the year and not go into my third year because the company would not support me, and I didn't feel like I wanted to take my personal money and go off to the meetings three times a year. It just, to me, didn't seem like it was a very good idea.

[01:07:15]
But the company hired me back and about three or four months after I got laid off, [a McDermott] Vice President in Britain had to give a talk on enhanced oil recovery, I think it was. I found the notes on that last night in [my file cabinet]. So I had to be a ghostwriter. So I came back and wrote . . . did whatever research because that's not my field of expertise, but I did enough to look it up and to write a learned paper in that area so that he could get up and sound like he knew what he was talking about. [. . .]

[01:07:56]
And then when it came to be December, I think Hafez . . . Hafez Aghili was the head of engineering by this time, and he had done his doctorate at Rice, and I had actually helped him on his thesis. And working on his thesis at one time, I remember he asked me, "Patsy, does everybody have to satisfy you on their thesis?" And I told him, I said, "No, only those that end up having a good thesis." Well, he was head of engineering when I got laid off. And then he hires me back. I think they realized that I might bring a lawsuit against them.

[01:08:37]
So they hired me back to help critique a design that one of the engineers had done. [. . .] Well, it was a government job, but it was a different one. It was the strategic oil reserves that they put in the salt domes. And as they sit there and sit there and sit there, the vapor pressure increases and

it reaches a point that it's not safe, and so you have to go in and treat it. Well the company was hired to do these . . . design and install these facilities to reduce the vapor pressure.

[01:09:19]
And so, because it was a government job, I think they wanted to have somebody outside do a review. By this time, remember things, automation had come in and drawings could be done automated and all this kind of stuff. Well, they hired me to come in. It's a good thing they did. Because I came in, "Well, okay, I'm going to review it." And so I reviewed all of his drawings and everything. We went out to the plant site where they were building the thing and went around and looked at everything.

[01:09:48]
Lo and behold, it has a brand-new analytical instrument on it. And I came home and talked to John about it, and we, John and I looked at it and he got out his magic pencil and did the mathematics. And we proved that if we could make . . . meet the requirements, that this instrument said you were okay, but really was conservative. It really was overly conservative. So they . . . but they needed a verification that we can really meet specifications. So that was a part. Well I gave them that proof as, you know, part of my thing.

[01:10:23]
But then we went in the field. And there was the analytical room where the equipment was supposed to come in, and the pipes are coming out for this machine that is going to come in and be plugged up with it. Well the only problem was, when they had done their piping design work, they had failed to notice that this machine came in on wheels. And so its pipes came out. So here were the pipes on the wall. And here are the pipes on the machine, because it's got the wheels under it. So I found that.

[01:11:06]
And then I'm looking around and looking at the piping. And I discovered when you're doing something and you have to reach a certain condition before you say, "Okay, it's done enough that we can go and put this into production now," you have what's called an epiphany. So you have to have a sample of your product, of what you're sending to [storage]. And when that sample doesn't work, you cut it off. They were taking sample at the wrong point. So they would never be able to get it to work. Well, because I had gotten out all of his drawings and looked at stuff and found stuff, I knew what to look for. So, yeah.

[01:11:52]
So I worked for them for, like, I don't know, four or five weeks. And so that gave me . . . made my total time at the company to exceed ten years. So then they could start giving me a pension. And that's when they started paying me four hundred and . . . four hundred seventy-nine dollars a month? I've forgotten what the number is. I can go look it up. A month and they've been paying it to me ever since. And I'm glad I've lived a long time. [laughter]

[01:12:17]
GIBSON: Did you know that was coming, or . . . ?

[01:12:20]
CHAPPELEAR: Sort of, and not. I don't remember. That was a long time ago. I was very busy having grandchildren at the time.

[01:12:30]
SCHNEIDER: Could we take a break for a moment?

[01:12:33]
CHAPPELEAR: Sure.

[END OF AUDIO, FILE 2.4]

[00:00:02]
SCHNEIDER: Okay, we're back on after a break. And while we were off of the recording we were chatting a little bit and it came up that . . . you were talking about access to women's restrooms throughout your career. So I was wondering if you could share a little bit about your experience with that.

[00:00:19]
CHAPPELEAR: Well, when you're the only woman around, you really don't want to have to use the men's facilities and you don't want them using your facilities. So when I went offshore, they had to have a special restroom set aside for me. Another funny restroom story, when I went to Rice, the chemistry building was built with no restrooms at all, and so they converted an entire, big classroom—they had big classrooms in that building when it was built. And so they . . . it was the three-story building. So the first and third floor were the men's restroom, and the second floor was the women's restroom. I mean, it was big. It had a huge lounge, like my living area here with couches and everything, and then the stalls and all were in a little separate facility. And that's where we went to change into our blue jeans before we went to our labs. So that was my first experience with bathrooms for women and how different they were.

[00:01:23]
When I went to work at Shell, I don't recall exactly, but I think what we had was—the way the engineering group was designed to work there, that in the pilot plant, we did not have a restroom for women. I think there was one for men. But when I needed to use the restroom, I had to go across the street into the main building of the research group to find the women's restroom,

because they did have women in that building in a clerical capacity. I don't remember whether they had any elsewhere in the refinery as I wandered around, I guess I didn't need to use it or knew what not to do. It was . . . I just don't remember.

[00:02:12]
GIBSON: Like the offshore example, did they do that knowing you were coming or did you make some request?

[00:02:18]
CHAPPELEAR: Oh, they knew I was coming.

[00:02:19]
GIBSON: So they took care of that beforehand?

[00:02:21]
CHAPPELEAR: Oh, before I came. Yes. And when I went to the other offshore facilities, the other platforms, those were older platforms. Maybe . . . maybe they set one aside for my use during the day or something. Like I say, on most occasions, I was off just for a matter of the few hours that were necessary to do whatever we needed to do on those offshore locations. It's funny, I don't remember the details of it, but . . . there were so many different things that happened, it's hard to know.

[00:02:57]
GIBSON: Did you have to wear coveralls offshore? Fireproof clothing, special PPE [Personal Protective Equipment]?

[00:03:03]
CHAPPELEAR: No, no. No, there were no special. I didn't. In fact, if you had my pictures, I made my jumpsuit to wear for my startup and I actually sewed it myself. You couldn't find really good clothing for women. Did I . . . I had to buy, it seems to me, from the startup on the offshore platform, I did buy some sort of special shoe to wear, a safety shoe. I think I bought safety shoes for that project. Again, it's been a long time, and I don't remember the details. I know I did have a hard hat working for Hudson, and I took it when I went to startups. I wore my own hard hat. But I don't recall having one working at the university.

[00:03:56]
SCHNEIDER: And so you were talking about, you know, leaving Hudson in your retirement.

So I'm wondering if you can talk now about, I know you did some work as a consultant after that. So one thing that I saw listed amongst your consulting work was that you served as an expert witness, and I was really curious what that role was like.

[00:04:21]
CHAPPELEAR: There is a really funny story connected with that one. No, I didn't do very much consulting work. I did not actively seek consulting work. I did a small project for GPSA. I did this expert witness thing. It was really hilarious because I went to give the deposition at a building in the Galleria section of Houston. And I walked in, and the men were talking about seeing the cat on the top of the Transco Tower [Williams Tower]. And we have a building, a very tall building there, and the top of it, it just happens the way the angles are cut, if the light is coming at it and you're looking at it from any of the four corners, it looks like a cat with its tail sticking up the back. Like my black cat [door]stop [needlepoint] over there, sitting up with his ears pointed on the top and his tail coming up the back. And I had never seen it before, so we first—that was the first thing we talked about. Okay, that's nice.

[00:05:21]
But then we start the deposition. And they asked me who I am, and qualifications. And the guy, trying to discredit me, asked me, "Are you married?" "Yes." "Do you have children?" "Yes." I said, "Are you married? Do you have children?" Asked the question right back to him to let it be known from the deposition that I knew it was not an appropriate question. He was trying to find my qualifications, and that didn't have a thing to do with my qualifications. And I made sure that that went into the record. And that's the thing I remember about doing that particular deposition. I later did a pro bono consulting job, and we went to California and again had a deposition-type arrangement and all. It did not happen at that deposition at all.

[00:06:22]
SCHNEIDER: And so how were you using your scientific and engineering knowledge to . . . you know, in that deposition? What kinds of things were you . . . were you doing?

[00:06:38]
CHAPPELEAR: What was it? I can't even remember what the exact problem was on the first one. On the second one, I remember very vividly, it was a matter of a way of doing process—and frankly, I thought that the guy that wanted, that was suing for recognition, did not deserve recognition. And I tried to tell him that, but he wouldn't listen and insisted that, no, we needed to do this. You know, he paid my way for me to go out there, and I testified as to what I knew about it, but I did not come out and say, "No, he did not deserve it." It was a new way of doing this particular part of processing. And again, I don't remember the precise details, but was it patentable? I don't know, I'm not a patent law attorney. It was a new idea. Is every new idea worthy of a patent? It's not. You're saying no.

[00:07:37]
GIBSON: No.

[00:07:37]
CHAPPELEAR: Well, it's difficult, but I testified as to what I saw and what I knew, and I told him what I would do, and I did it.

[00:07:46]
But I had a very interesting experience in those days. When I retired, I signed up with the . . . some, something out of New York of retired . . . they called it retired technical executives or something. And you serve as technical advisors in third world countries when they have particular things. And they had an application for somebody to come help them with a type of gas processing in Morocco. And I was pretty well-recognized as an authority in that field at that time. And so they offered my services. And when they found out I was a woman, the Moroccans decided they didn't want me. So this free service never supplied them with anybody. And I've never been to Morocco since . . . before, and I'm not going now. Mark them off my list.

[00:08:54]
I did my last bit . . . must have been about 2001, is the last time I did anything like that. And my engineering today consists of working with my daughter at the Houston Community College, where I speak to the [students]. I've always been interested in career guidance and am very active in various aspects of it, and I consider that part of that work. I still think of myself as an engineer.

[00:09:26]
SCHNEIDER: And I know you were saying you do this pro bono judging for the engineering class. Are there any projects that you've seen that really stand out to you or students you've worked with there?

[00:09:41]
CHAPPELEAR: Oh, yes. Over the years, there have been . . . . Okay. The judging takes place at the end of each semester and the summer session. So it's three times a year, or four times a year if they have two summer sessions. And I do not only her classes, but other classes, it depends on what my personal schedule is and transportation has to be arranged, and all that sort of thing. And the students and their assignments differ from what they . . . sometimes they get to pick what they're doing, sometimes they're told what to do and all.

[00:10:11]
But in all the years of doing this thing, there have been about three occasions where they have come up with an idea that I have thought was worthy of considering for patents, and I've

considered—advised them that they need to go on. It's amazing what talents you can find in these totally new minds. New, blank minds that have opened to thinking. And I put it to the stimulus of the—when my daughter is the professor, and the other instructors that are participating with these students, that they are inspiring them to open up their minds and to let them think and to do things.

[00:10:58]
SCHNEIDER: And I know something else you're involved in is the Rice University Engineering Alumni organization. So I was wondering if you could talk a little bit about what that organization does. And you were . . . you served as director at one point. So if you could talk about also that.

[00:11:13]
CHAPPELEAR: Oh, that was a long time ago. I was . . . when I was more active. I've always . . . all Rice engineering alumni are automatically a "member." Whether you're an active member or not depends upon whether you do. So there's a lot of [members]. It's mainly an organization to promote engineers. And specifically, they work with the students that are there on campus and work at getting scholarship money for them. It has now evolved to supporting them in various ways. I guess originally it was to help, probably finding jobs for them. Back when I was the director, it was so long ago, I can't even remember what we did. But we did encourage the students.

[00:12:06]
And I know now we have an awards banquet. There are sufficient scholarships set up that are awarded that they have a . . . it's not a banquet. It's a barbecue thing, outside type of, or something like that, in the springtime. I did go to those. I mean, I'm now to the point where I do not drive on the freeway and I only drive—I cannot drive after dark. My optometrist has advised that my eyesight is getting too bad that it's better for me not to. I stopped driving on the freeway about five years ago, when I realized that my reaction time was getting to the point that I did not feel it was safe for me to continue being a driver in those conditions. And so I quit. It's just better to recognize your limitations and live with them.

[00:13:10]
But the engineering society, it provides scholarships, and they have, they've got another program now where they work with the students on career . . . design objectives. I'm not—they've got a lot of mentoring type activities going on with the students, I'll put it that way. I'm not real familiar with all the details. One can't keep up with all . . . . I know one thing that they do have on the Rice campus now is the [Oshman] Engineering Design Kitchen that was started and all . . . everybody, including the academic students, participate in those activities. And they have done some fantastic things, these . . . . I don't see how the kids have time, frankly, but some of the things that they have done that has really impressed me has been some of the medical things.

[00:14:13]
A centrifuge, for instance, is needed for certain things. And somebody observed, I guess it was one of the women, that the salad makers, if you have a commercial kitchen and you put your lettuce in and you put it in a . . . and whirl it around by hand to get the water off of the lettuce before you make your salads with it. And they took this idea and adapted it to making [. . .] a small, spinning, light thing that you could spin, that would do the centrifuge action and whatever is needed in blood analysis, whatever it is. And they developed—this was many years ago—that whatever that particular group of students did, developed all of the things that you need for a medical lab examination to fit into a backpack. This was to reach people like up in the Andes, in the mountains, where you go and you try to bring medical [care].

[00:15:08]
And then another group that has had a lot of publicity under Dr. [Rebecca Richards-Kortum]. And they have developed a very inexpensive incubator because a lot of the babies in Africa were dying because they didn't have incubators for the newborns, which they only needed the little bit of help to make that immediate transition after birth. And they've saved a lot of lives that way.

[00:15:42]
And they've done all sorts of other things. It was just, to me, fascinating. Oh, they did something with . . . for baseball, where that they could measure how fast the ball was going. For the baseball people it's very important to know how fast. And apparently they've got that where they developed the machinery to do that. It's amazing. Truly amazing. I think there's still a lot of stuff to be discovered and done. I mean, that's where we need to spend our time.

[00:16:15]
SCHNEIDER: And through the alumni organization, or otherwise, have you stayed in touch with other Rice alumni? Have you ever reconnected with somebody either through the organization, or . . . ?

[00:16:26]
CHAPPELEAR: Well, my . . . yes. Rice promotes alumni get-togethers, especially on the five year basis thing. I never did participate in anything until I was going to my twenty-fifth one. And it happened . . . instead, that happened to be right at the time that I was offshore with my South Pass project. So I didn't get to go to that one. And when it came to be my fiftieth, I was going to go to that, and I was doing part of the programming and everything. And my daughter had a very difficult time in her marriage in New Jersey, and instead I had to go to New Jersey and be with her.

[00:17:10]
But for fifty-five, I went to the fifty-fifth anniversary, and, lo and behold, I see there were about

six of us engineers that were there, I guess. And then there were maybe another, maybe ten other women. I got to see some of my fellow engineers that I hadn't seen in a long time, but now there's not very many. My very closest friends are Rice graduates, of course, and I have seen them through the years. And that was a group of about . . . let's see, there was George . . . . Oh, about ten of us. And we used to . . . this was back when my kids were growing up and all, and we would go out to dinner together and everything, and have kept track over the years with them. Now there's not very many of us left.

[00:18:12]
I did go—after you hit the golden fifty, they have a . . . and I went to the fifty-five. So after that, then every year they have a—at homecoming—they have a luncheon for fifty years and all of those that are beyond the fifty-year mark. And I went to that one year with my friend Jackie [Jack Lynn Darden Rundstein]. And I knew a few of the people that were there. There was people that were actually older than us that I knew. So yeah, I keep in touch as much as you can. It's . . . you can't keep in touch with everybody. But there's not very many left now at my age.

[00:18:53]
SCHNEIDER: And I also want to note that you were awarded the Outstanding Engineering Alumna from Rice University in 1998.

[00:19:01]
CHAPPELEAR: That's correct.

[00:19:03]
SCHNEIDER: And was there any ceremony involved in that award?

[00:19:05]
CHAPPELEAR: Oh, yes. Yes. At that time, that was the only outstanding award that they gave was the one. And I gave a talk, they have a convocation at the [annual] alumni fall reunion time of the university, and they have this at the same time. And I gave a talk and it was well attended, on what had happened in my career. And a picture in my hallway that I think I showed you all, of all of my grandchildren lined up in the stairway, that was taken at that talk. They were all there. And I had one of my grandsons with me, and as part of it, I got two tickets to the football game to sit in the super special box that they have for all the ex-football players. This place of honor.

[00:20:00]
And what happened—was that the one where the guy caught it and ran . . . caught the opposing team, threw the ball, and our guy caught it and ran, you know, ninety-nine yards down to the other end? And it was, oh, it was a really bitterly cold day. And we got to see that play. It was

very exciting that year. It was fun. Nowadays, they have two awards that they give, the Outstanding Engineering [Alumni Award] and the Outstanding Young [Engineering Alumni Award]. And they have, we've had, a number . . . I've gone to a number of those ceremonies. We've had some very outstanding people, some of the developers of the . . . the computer people, some of them are really outstanding. And different ones. It's been interesting to go to.

[00:20:48]
SCHNEIDER: So another thing you mentioned earlier was your service to the National Science Foundation in reviewing, you know, serving on different kinds of boards of review.

[00:21:00]
CHAPPELEAR: Right.

[00:21:01]
SCHNEIDER: And so I think you might have mentioned the Presidential Young Investigator Award program. I was wondering if you [would] talk a little bit more about what that program was and why you decided to be involved in that program.

[00:21:13]
CHAPPELEAR: Well, because they asked me. The Presidential Young Investigators program was started to help young professors starting out within their first, second, and third year when they don't have any support, and to provide seed money to begin their research. It was a really good program, and I don't know who thought about it in the government. Somebody did, maybe one of the presidents. So they . . . the young technical professors put in their bid to try to get it. And then they have a panel of people like me go over it and try to decide which are the best ideas to try to pursue, because, you know, they may have enough—I don't know the precise numbers now or what they were then—but they might have enough awards to give thirty awards and they might have sixty applicants, sort of thing. It's not as hard as it is, I'm sure nowadays, on the applications for universities where they have one position and they have . . . like Rice might have 5,000 openings and they might have 65,000 applicants for that. It's not six for one. It's more like one or two or one and a half. [. . .]

[00:22:29]
It was interesting work because you're looking at whatever's at that stage of development, where we're at. Supporting research is something that our government does need to do and we need . . . I think it's a good use of our tax money. And it's not just in our . . . they have, we also have in our government program—I know because my daughter's in music—they have a large support—and I've forgotten what that's called [Young Audiences]—that promotes the musicians going out and giving programs to the elementary school students so that they have [a real musical experience] and so that they can see things. My daughter participated in some of

those activities when she was playing the bassoon professionally. But I think it's a good use of our tax money.

[The government program for 501(c)(3) deserves our support. When my daughter started her professional music career, her Cimarron Wind Quintet did programs at elementary schools to provide education in music for the students. Young Audiences, supported by grants from many local and national philanthropic groups including the National Endowment for the Arts, provided the financial support for these programs. Education must prepare our young for the three R's (Reading, wRiting, and wRithmetic) and such things as the arts, physical development, ethics, computing, economics, etc.]

[00:23:22]
SCHNEIDER: And then you also served on the Advisory Committee to the Chemical, Biochemical, and Thermal Division through the National Science Foundation. And I was wondering if—

[00:23:33]
CHAPPELEAR: I did? [laughter] If they say so, I guess that's what I . . . I guess that was what I was doing that PYI investigation for.

[00:23:43]
SCHNEIDER: Oh.

[00:23:44]
CHAPPELEAR: I did not know I was . . . . Where did you find that, in the records someplace?

[00:23:47]
SCHNEIDER: It was saying—yeah—it was saying that the PYI program was 1984 when you were reviewing for that, and that in 1985 you served on this advisory committee.

[00:23:58]
CHAPPELEAR: Well I guess so.

[00:23:59]
SCHNEIDER: Okay. I was just wondering if you had any memories from that.

[00:24:02]
CHAPPELEAR: No. Whatever they asked me to do, I . . . . Oh, that must be the one where I went to Washington for the meeting. What year was this?

[00:24:11]
SCHNEIDER: 1985. There was also something in 1974, but I'm not sure what the '74 involvement with the NSF was.

[00:24:20]
CHAPPELEAR: I don't remember what it was. I'm sorry. I've done a lot of things that I don't remember the details of.

[00:24:27]
SCHNEIDER: Yeah, sure. So is there anything else from your . . . . So I still want to talk about some other things and some of your things you like to do outside of, you know, outside of your career, some of your interests. We've touched on that a little bit. But is there anything in terms of your professional service we haven't talked about that you wanted to mention?

[00:24:51]
CHAPPELEAR: Yeah, the mistakes I made. And the bad things. And I really think it's important to talk about the bad things. I guess I'll confess my personal ones first. I had a consulting job. I really screwed up. I used the wrong basis—it was an enthalpy calculation—and my H_0 term was wrong. And I had to redo the whole thing when it was caught. It was very embarrassing that I made such a stupid mistake. That can happen to anybody. This was a stage late in my consulting years.

[00:25:33]
But the other one, personal confession, is really, I really feel badly about. And that was in a management capability. I was the . . . on a particular management project, and I had an instrument engineer, and he hadn't done what he should do, and I chewed him out in front of a whole, the whole instrument group. And he called me down on it, said, Patsy, and told me that I should have done it privately. And he was correct. I should have criticized him privately. Yeah. So, you know, everybody makes mistakes. That's why I call them the black aspects. And that happens. I learned to be careful in my interpersonal interactions. I really still feel I want to apologize again and again to him for what happened that day.

[00:26:38]
Okay. The other thing is far more serious. And that was professional plagiarism. And I alluded a little bit to that earlier. I first ran into it when we were doing the work on gas hydrates, when I was working with Riki in the early sixties, mid-sixties, and ran into the fact that a very

prominent name had gone to this Illinois water works, where this man was working, who had figured out the hydrate lattice. And he returned to his university and appointed one of his graduate students to duplicate the work and attempted to publish it and steal the man's work. And you shouldn't have it happen at the level at which . . . and he was a top, at the very highest of our profession.

[00:27:47]
And then when I personally did some work, at two different times, I had people attempt to steal my work. The first was with the quantum gas [shape factors]. And again, it was a very prominent person that did it, and it was very, very . . . it's personally . . . . Why do you have to take credit for what I did, and why do you have to pretend you did it? That made me feel bad.

[00:28:23]
And the other time was when I attended the meeting in Munich and it just happened that the person I . . . been to very many meetings with him, you know, considered him a personal friend and everything. And he proceeded to get up—he did not know that I was sitting in the audience. And, of course, you wouldn't expect me to be in the audience. And I consider my personal discovery that afternoon with Gary Pope of figuring out how the Burnett experiment could be connected and to lead to [a more accurate third virial coefficient]. I think that was a tremendously important contribution.

[00:29:08]
And he gave a paper and cited that Mr. Burnett had found this back in New Hampshire, back in the olden days when he had done his experiment. And he covered that very point with one sentence in one of his papers that he published in the proceedings of the New Hampshire Society of Something-or-Other, a very obscure publication, which I had never heard of until that moment. And he did the entire thing without giving any acknowledgment to the work that we had done at Rice University. When he finished his presentation, I stood up, introduced myself, and called him by his first name, and told him that he had omitted that information. It just appalls me that people will try to take credit for what others have done, or try to ignore giving credit where it's needed.

[00:30:08]
GIBSON: So it wasn't just a misstatement or an error, it was intentional.

[00:30:12]
CHAPPELEAR: No, he knew what he was talking about.

[00:30:28]
GIBSON: So that troubles you.

[00:30:29]
CHAPPELEAR: That troubles me greatly. The other two people trouble me even more because they were, like I say, recognized at the very top level of our profession.

[00:30:39]
GIBSON: So here's prominent people, well established—

[00:30:42]
CHAPPELEAR: The man who tried to steal my work on the quantum gases . . . you know, I'm talking about people who [were major professors at departments of major chemical and chemical engineering departments] at major, major universities in the United States. I'm not talking about somebody that's down in Podunk Junction University. I'm talking about big, big names. And it really hurts me that these people did this.

[00:31:16]
GIBSON: Hurts you in what way? Is this diluting the profession or hurt you personally?

[00:31:19]
CHAPPELEAR: I think it's diluting the profession. It's unethical behavior. It's like mistreating a child. People should be more honest.

[00:31:36]
SCHNEIDER: Do you think being a woman played any role in that?

[00:31:39]
CHAPPELEAR: I don't—no. No, no. Don't forget the first instance, it didn't involve me at all. It was somebody else. The last two happened to be . . . . Because I was a woman that they tried to do it? No. No. They just wanted to try to take credit for something that I had done as part of the team there at Rice.

[00:31:56]
GIBSON: I'm curious if you've heard of this new sort of artificial intelligence, ChatGPT?

[00:32:02]
CHAPPELEAR: Yes, yes, I have.

[00:32:03]
GIBSON: You know that it's now writing papers and essays and . . . .

[00:32:07]
CHAPPELEAR: So allegedly, yes.

[00:32:09]
GIBSON: Well, yeah, but it's trained on knowledge that's out there, right?

[00:32:14]
CHAPPELEAR: Yeah.

[00:32:15]
GIBSON: So there is a lot of talk going on about increasing plagiarism.

[00:32:20]
CHAPPELEAR: Yes, yes.

[00:32:21]
GIBSON: And concern that these new tools—

[00:32:21]
CHAPPELEAR: Yes. And I have talked to my daughter extensively about this with respect to her students and the work that they're doing there at the university, even at the community college level. Yes, it's something that is a real problem. But no matter what you do and with the artificial intelligence to get an original idea out of something . . . it's very hard to do.

[00:32:56]
GIBSON: Meaning machines can learn and . . . .

[00:32:58]
CHAPPELEAR: They can only learn what they have put into them and what they have knowledge of. To write poetry, I mean, you can read it all and you can write it. And people have

tried . . . Sherlock Holmes is greatly admired. And there's all of these writers that try to write in the style of Sherlock Holmes. But none of them . . . that's not Sherlock Holmes, and you know it's not. And I don't think that anything that the machine language—you could give it all the Sherlock Holmes and they can produce something. You say this is written by Sherlock Holmes? Well, made it look like it, but it really isn't. I don't know. I'm glad I don't have to battle with that particular aspect of education.

[00:34:02]
SCHNEIDER: So you talked previously about your children's careers and what they've gone on to do. And one of your daughters, June, was trained as an engineer. And so I was wondering if you've . . . what your thoughts were when she decided to go into that. And also if you've seen, you know, thinking back on the field from when you started and thinking about what her experience was in school, how did those experiences—do you think—compare, did you see similarities or differences between when she started and when you had started in the field?

[00:34:42]
CHAPPELEAR: Well there were a lot more women going into engineering when she did it. That was for sure. Of course, she chose to go into—I said I've been involved in a lot of firsts—well, she's one of my firsts because she was my first daughter and she went into a field of ocean engineering in the first ever . . . she was a first student at their high school to graduate, and she graduated, and she was a first to study, and she was first . . . in the first undergraduate program.

[00:35:12]
The new disciplines in engineering that developed, in every case, the first development of them is at the advanced level as a subset of the basic engineering. And she chose to go into ocean engineering. And so I personally told her that she was doing the wrong thing because she should do one of the basic engineerings, but she didn't pay any attention to me. So that was all right. She did what she wanted to do. Yeah, she had a lot of different experiences than I did. And you'd have to, you know, talk to her to get it, her take. Likewise. Of course, ocean engineering is completely different. One of her required classes was scuba diving. And the funny thing, did I tell you the story about my . . . her being a student of the wave theory?

[00:36:13]
SCHNEIDER: I'm not sure.

[00:36:13]
GIBSON: Yeah. The Chappelear wave theory?

[00:36:14]
CHAPPELEAR: Did I tell that online or not? Oh, you don't know what I'm talking about.

[00:36:18]
SCHNEIDER: Oh, the professor?

[00:36:21]
CHAPPELEAR: The professor, yeah.

[00:36:21]
SCHNEIDER: I can't remember if that was recorded or not.

[00:36:24]
CHAPPELEAR: Well, my daughter studied ocean engineering, and she's taking a course, and the professor calls the roll and says, "June Chappelear. Do you know a John E. Chappelear?" "Yes, sir. He's my father." "I did my thesis work on him, on his wave theory." It was funny. It's just one of the things that happened.

[00:36:47]
SCHNEIDER: Okay. And then I'm wondering if you could share a little bit more about, in your retirement, the things you like to do. I know you mentioned earlier the game of bridge. Do you still play bridge? What kinds of things do you like to do?

[00:37:00]
CHAPPELEAR: No, I don't play bridge anymore. John and I, we played bridge, in fact, well, that's first when we got married there a picture of us before the big bridge tournament. Because to publicize it, you know, the young bridge couple and everything. And it became obvious very quickly that it would be better for our marriage if we did not play bridge together. And it took, to be a really good professional bridge player, you have to work very hard at it and you have to play several times a week. And I was never willing to put that kind of time into it.

[00:37:38]
And when John married me, he got the ultimate prize, so he didn't need to play bridge anymore. He continued to play throughout his life, some at Shell at noontime they would have games and occasionally they would have a Shell tournament, and we might play together in those. But we really stopped our professional playing at that time. When I retired, I liked the game . . . . And we played casually with friends on occasion, but John was so much in advance of everybody

else. Still, they enjoyed playing with him and we would swap around who played with whom and everything, but we didn't do it on a regular, meeting every week type thing.

[00:38:20]
But when we retired, I decided that bridge was a good intellectual outlet and that older people, like I'm now a member of the older generations, need some things to do. I think I need to teach people how to play bridge that don't know how. And so I took bridge—and I can give you a copy of it—I have two sheets of paper printed front and back. [See Appendix 2 for bridge materials] And you actually cut them in two so that you . . . well I have . . . I print them from two sheets. I print them front to back, cut them through the middle. So you have two half-sheets of paper printed front and back. That is the entire textbook on how to play bridge.

[00:39:07]
And it's a matrix organization of basic Goren Point Count. And it's a very holy system because it's based on the Holy Trinity. Because there are one in three. There are thirteen cards in each suit, and I have taught people who have never played cards before to play bridge with this. And there are four suits and there are four acts . . . four gospels. And then I go on and use this as a basis, which works for a lot of people to have . . . the Christians know about the Trinity and all. It's all a matter of having triggers. And a lot of the bids of the numbers are grouped in groups of three, and I use that through.

[00:40:06]
So there's this matrix like this that tells you how to bid. And then, of course, there's little stars on it, "Watch out for these special conditions." And that's on the back side. And the other piece of paper has an opening lead table that is from Mr. [Charles H.] Goren's work. If you got this particular holding and you're leading against a contract or leading against no trump, this is the card that you lead. When you don't have any other information to go by, that's . . . it's pretty good to have. And the other one tells you how to score. And those are the essentials to learning bridge.

[00:40:38]
And I started this—at that time we were living in our home in Houston, and we were in a church there, and I started a group and we met every week to play bridge. And I would have people come in and they would learn to play bridge and they learned. They weren't good bridge players. No, but they could sit down and enjoy the game. And I think it's really essential to be able to enjoy the game. I had a lot of fun with that. When we later moved into the high rise and moved to the different church, I again started a program there and did it for a number of years. So I actually taught bridge. Taught bridge for . . . gosh, I did it as long as we were there, ten, maybe thirty years that I used that. And I have passed my cards on to many people, if they want to do it someplace else. It's, sort of, fun to have done that. [See Appendix 2 for this system]

[00:41:35]
And then I took up, I started genealogy and that became a major endeavor for me. I've spent many, many hours over the last forty years or so. More at the beginning. First of all, I went out

to Provo, [Utah] and took a course from the Mormons and went back two weeks later and took an advanced course on Irish genealogy [in Salt Lake City]. And I had fantastic [results]. [. . .] Then I went out later and did a week's research.

[00:42:21]
In one of these later times, my very good friend's husband, all that he knew about his grandparents were that they had been Christian Science and had married in Saint Louis, Missouri, and he wanted me to see if I could get a copy of their marriage license. And so, sure enough, I was able to look up and get a copy of the marriage license. And I also looked up the name of the woman, you know, the female name that he was interested in there, over in the family history section. And found in the family history section there, the name . . . this female name, surname that he was looking for and the name of the person. And it said that they had married and hadn't had any children, but they had had children. His father—or his mother—his mother, his mother, that was it. His mother had had—whatever the male-female relationship, I'm confusing it. So I found it. So that was a major, ring the cowbell discovery.

[00:43:30]
That same week on Friday night, I went over to the family history section after looking up all those things I told you I wanted to look up. And I started reading and there were some Stallings. Turns out there were a bunch of Stallings who became Mormon, so a lot of them wrote the story. And then I found *Stallings Family Records*, this gigantic book, and made my first contact, found out somebody in that who lived just a few blocks from me in Houston actually had a copy of the book, and I tried very hard to buy a copy, but was never able to. So I finally borrowed her copy, made a copy of it, and then did a very extensive directory of that. So that was my [first publication in genealogy]. And then I kept on doing research after that.

[00:44:13]
And then I did, I started doing . . . what else did I do? I started doing private consulting. Did a little bit of it, not an awful lot. And I had nine grandchildren, and having the nine grandchildren took a lot of time. It's very complicated. The first one was born when I was still working for Hudson. My mother-in-law was living with us, and I had one of these meetings on the editorial review board in San Antonio, [Texas]. And we came home the next day and we pulled into the driveway and she came rushing out the door, down the hall—down the driveway, "Patsy, Patsy, you're a grandmother, you're a grandmother!"

[00:45:03]
And so I rushed up to the hospital, of course, to see. This was the first grandchild on both sides of the family. And outside, staring through the nursery window, with these looks of utter amazement on their face like nothing had ever happened like this before in life, were all of these men. My son-in-law, my husband, my son, my son-in-law's brothers, and his father. There were about eight of them and they were all just looking at this baby. And that's how you should greet the birth of a baby. It was something.

[00:45:43]
But we . . . having the kids, and different times. One time one of them was born and [had birth difficulties]. [. . .] Another time, he was supposed to come to my house and my friend was having surgery and was very ill, and I remember that one—[I sat at home waiting for a new baby and at the same time worrying about my friend in the hospital]. And then probably the most, most difficult—well, and then when one of them had her children and one was in Florida and one was in New Jersey, and I had to go for those.

[00:46:12]
But then my other daughter decided to adopt because she couldn't have children. And so they adopted from Romania. I went both times to Romania to help with the adoption. And adoption is the most difficult way to have children, or to have grandchildren, because you never know exactly what's going to happen. It was really interesting to go and to get them. And they got . . . the first time we went was in December, and we adopted two little girls that were not quite four years old. And the following May, my son-in-law and I returned to Romania and were able to adopt twin boys. They were not quite one year old. And those have been a real joy to everybody.

[00:47:05]
GIBSON: Well nine grandchildren, that's quite a feat. I'm curious, are any of them in STEM fields as they've grown up?

[00:47:11]
CHAPPELEAR: My oldest grandson went to Rice and majored in mathematics and computer science. Whichever one came first, I'm not sure. Got his master's in computer science there and is now working in Boston for . . . what's the big name in computing that's there? Google? [It is Google that he is working for.] But at any rate, he's working for one of the number one computing companies. They have a fantastic program there. He's just now a new father, and he's on paternity leave for, like, three months to help take care of the . . . he has four children now. Let's see. Jason is . . . just finished his . . . he went into medicine, a lot of them are in the medical field. He is an anesthesiology associate. His younger brother is still seeking closure. I don't know what he's going to do, but he also does computing.

[00:48:26]
And let's see then. My engineer daughter, her son is, he's in computing. He wanted to go into education and didn't end up successful at the secondary level. So he's at the university level and he teaches computer security [and AI] at the Houston Community College. So he's in STEM. His sister went into marine transportation, movement of goods and stuff. This is a very special field where they pack stuff and ship it here and there and all this kind of—I don't really understand it, but apparently very, very important and all. And that's what she does.

[00:49:20]
The twins, the oldest girl—they all had learning problems due to malnutrition and stuff—but the

oldest girl did . . . went into the Navy first when she got out. And she had health problems, and she finally got out and she went to one of the commercial things and got a so-called engineering degree and tried it for a while, but then got laid off and didn't like it and went back and got her. She is a certified medical technician, which is a technical field. And so she got her, a regular bachelor's degree from University of Houston with that. And that's what she works at. And her sister became certified in teaching and curriculum planning, and she is on the faculty of one of the high schools here.

[00:50:16]
The two brothers, one of the boys . . . . [phone ringing] [recording is turned off and turned back on] Okay. Okay. One of the boys is a, went into police work and trained at the junior college that's in Texas City, [Texas]. Had a very difficult time getting there because he has a lot of . . . he had a lot of . . . those boys had fetal alcohol syndrome problems. So they had problems learning math. But at any rate, he did complete it, and he is a guard, but now he's doing, with the UTMB [University of Texas Medical Branch] medical center. But instead of doing the guard duty, he is the dispatcher. He has progressed to that stage. And he's doing well. His brother is not, does not have any profession. Yeah, I've got some still [learning their path]. You never know what's going to happen.

[00:51:23]
The next generation though, I've got . . . how many do I have now? I have eight or nine. How many is it? Great-grandchildren.

[00:51:34]
GIBSON: Wow.

[00:51:35]
CHAPPELEAR: So they're all young. Interesting mélange of things, different kinds of problems and different kinds of things that happen. The oldest girl has Stargardt's disease, which is her eyesight, and she is . . . it basically means that she's going blind. But I have every confidence that in her lifetime, we are going to develop the ability to transplant eyes and that she will be able to have eyes and be able to see. That's why I have a lot of confidence that we're—our STEM activities, and that covers everything—can make our life here on planet Earth. And that's why, [to] me, it was so important that we land on the moon because that was showing we can get there, we can do things. And I have confidence that someday she's going to be able to see.

[00:52:41]
SCHNEIDER: Well, I think that's a really good segue. I was wondering what innovations in the future you hope to see, or what hopes you have for the future of chemical engineering, or engineering or the sciences more broadly.

[00:53:01]
CHAPPELEAR: Where I would really hope that we could make advances in—it's different from where I expect we'll make advances—what I really would hope is that we could learn how to live with each other and respect each other, and that's the soft sciences. Psychology and sociology.

[00:53:29]
Where we will have advances, I think we're going to have advances in our energy field, tremendously. I think we're going to have—we've seen in our—even in the last six months, three months, one year, whatever tiny period of time, tremendous advances in the medical field. I think those will continue. And that, of course, is all . . . who makes the medicines? Chemical engineers. That's the chemical engineering. We may discover new—in fact, we will, because in my lifetime, pressure swing adsorption didn't exist when I started. Cryogenic processing did not exist. Those were the developments in my—so, yes, there will be new processing of unknown whatevers that will happen.

[00:54:32]
We barely know now about extremely high pressure and extremely low pressure operations. And there's going to be a lot of work there. I was privileged to work with Bob [Robert Floyd] Curl [Jr.], who won with [Richard E.] Smalley the Nobel Prize for the development of nanotechnology. Discovery of the nano. I think I told you the story of how he spoke to the alumni, and I got to hold the Nobel Prize in my hand, and I actually held a Nobel Prize in my hand. I mean, that, and speaking at the Marie Curie Institute were probably the top thrill times of my experiences. So, yes, I think there's going to be more and more knowledge at the extreme conditions of operation.

[00:55:26]
And that's the real challenge, to be able to do things subsea. We hardly ever utilize the ocean. Of course, right now, we've got all of that . . . place where all the plastics accumulate. I mean, that's some of the bad stuff. Well, all right, we're going to solve the problem. Nuclear waste. We're going to solve that problem. I am . . . that doesn't bother me in the least that we're going to solve those problems. But if we need to solve problems, the first are man killing man.

[00:56:01]
I do, I'm very interested in so-called mission activities, and I have participated over the years in several different what we call mission trips in my church activities, where you go to an area where maybe there's been a natural disaster and you're helping build things back. One of them I went to was an Indian school thing in our western United States, where we're trying to help some of the Indian things and doing things at that school.

[00:56:35]
But recently, here in the last . . . about ten years, ten to fifteen years, I helped start a program in

our church that we call Sowing Seeds of Love. And we started off, the reason we started was the . . . somebody or other found out and the preacher asked this woman, who doesn't know how to sew, to head the project. And she organized it and got it going, and I was one of the first sewers. And we made bags to hold Bibles. We went around and asked people for money for Bibles. There was an African nation that was run out of their homeland, and they went into South Africa, and they were living on the stairs of the bishop's residence in Johannesburg. This whole village of people. And the kids didn't have, you know, they literally with their teachers, they had nothing. So we sent them these bags and the money to buy the Bibles, and that became their school books. And that was how it started.

[00:57:38]
And when I'd been at the other church before we came here, there was a woman who had, gosh, Jessie Casey. And she had started a program many years ago when she had gone to one of the charity hospitals in Houston and had seen all of the little kids with nothing to do and nothing to play with. And she started a program of making little stuffed animals. And made hundreds of thousands over the years of her life. She [headed] a program at that church. So we decided to start a program like that here at this church and got materials donated for the materials. And we buy the stuffing and buy ribbons and buy paint, and we make little animals about the size of your hand.

[00:58:28]
And then those go out on medical mission trips where they . . . we have a lot of different doctors participate in that. They get Doctors Without Borders and things. So they have something to give the kids to calm them down when they're trying to . . . and they use them that way. So they're used that way and then they're used locally on the fire trucks in this area have them and they have them in Galveston and the . . . they go to the fire and they give the little kid the animal and it calms them down. And they're used in battered women's shelters where the children come in and have no toys, so they get something.

[00:59:08]
And my program that I have participated in and have headed now for the last few years, we were making over a thousand [animals] a year, and COVID slowed us down, but we're now back in [full] production. And anytime there is a . . . we've—they've gone with other . . . they went with a group from, community college group went on a mission trip to Mexico, a group from a local Lutheran church went, that I happened to talk to somebody at my beauty shop and found out about it. So they took some animals on that trip. My grandson went on a medical group many years ago down to Haiti and took some there. Another woman I knew went with her church to India and took some to an orphanage there. And they've been many, many places in Africa. One lady went to China on a . . . a young woman, she used it to promote goodwill among the young Chinese people, not children, but older, so that . . . . It's trying to promote goodwill. And I hope it's a good program. And we meet every week and work on it. That's taking a lot of my time now. Anyway, I can't think of anything else, unless you do.

[01:00:37]
SCHNEIDER: Well, so looking back on your career, your life, I know you've highlighted some of your . . . the things you're proud of already in the interview, but is there anything else you wanted to share in terms of your reflections of what you're most proud of, or what you feel you've contributed throughout?

[01:01:02]
CHAPPELEAR: Well, like anybody who has progeny, I do know that I have something that will go on through that. For people who do not have children, you do not have that. I'm very fortunate to have that. I think that the discoveries in the field of chemical engineering that I participated in, well, I know from what . . . . I told you about names. Gibson, your first name is not Gibson.

[01:01:34]
GIBSON: Gayle.

[01:01:35]
CHAPPELEAR: Gayle.

[01:01:36]
GIBSON: That's okay.

[01:01:37]
CHAPPELEAR: Gayle said she studied what I helped discover. So I know that that is going to go on. And I hope that my wishes for the future will happen, but I think I've tried to make a mark on the—I think I've left something. Will I be remembered one hundred years from now? Probably not, because there will be, "Everybody knows that."

[01:02:14]
And you don't think . . . there's so many things that . . . I mean, I use the microwave. I have no idea who developed the microwave. And I take it for granted. I vaguely know I get on the airplane and it has all sorts of advantages, and I know that the Wright brothers were the first ones. A hundred years from now, I don't know whether anybody will remember the name of the Wright brothers, but yet they will take advantage of flying. We get in our automobiles and drive, and we don't remember who were the ones that invented automatic steering, and that's tremendously important. Makes it a lot easier to drive a car, right? So, no, people aren't going to remember you many years from now, but maybe what you did will live on, like the first guy that invented fire, well we don't know who it was, but we still use fire.

[01:03:29]
SCHNEIDER: Did you have anything else, Gayle, that you wanted to ask?

[01:03:32]
CHAPPELEAR: Well I certainly enjoyed talking to you and telling you, and I hope I've gotten a little bit of my philosophy across to you. But the most important thing in engineering is to remember, safety first. Safety is the most important part.

[01:03:48]
SCHNEIDER: Well, thank you so much. We really appreciate all the time you spent with us and sharing your story and experiences. And is there anything else you wanted to mention that we didn't cover?

[01:03:58]
CHAPPELEAR: I can't think of anything.

[01:04:02]
SCHNEIDER: Okay. Well, thank you so much. We really appreciate it.

[01:04:07]
CHAPPELEAR: Okay. Glad you did it.

[END OF AUDIO, FILE 2.5]

[END OF INTERVIEW]

PUBLICATION LIST

1. Toyama, A., P. S. Chappelear, T. W. Leland, and R. Kobayashi: "Vapor-Liquid Equilibria at Low Temperatures: The Carbon Monoxide-Methane System," *Advances in Cryogenic Engineering* 7, 125-136, (1962), https://doi.org/10.1007/978-1-4757-0531-7_15.

2. Leland, Thomas W. Jr., Patsy S. Chappelear, and Bernard W. Gamson: "Prediction of Vapor-Liquid Equilibria from the Corresponding States Principle," *AIChE J.* 8, 482-489 (1962), https://doi.org/10.1002/aic.690080412.

3. Leland, T. W., P. S. Chappelear, and J. W. Leach: "A New Procedure for Applying the Corresponding States Principle to Pure Components and Mixtures Having Structural Dissimilarities," report to U. S. Bureau of Mines, Research Contract No. 14-09-006-2672, April 1, 1965.

4. Leach, J. W., P. S. Chappelear, and T. W. Leland, Jr.: "Properties of Hydrocarbon and Quantum Gas Mixtures from the Corresponding-States Principle," *Proc. Am. Petrol. Inst. Sect. III (Division of Refining)* 46, 223-234 (1966).

5. Leach, J. W., P. S. Chappelear, and T. W. Leland: "Use of Molecular Shape Factors in Vapor-Liquid Equilibrium Calculations with the Corresponding States Principle," *AIChE J.* 14, 568-576 (1968), https://doi.org/10.1002/aic.690140407.

6. Kobayashi, Riki, Patsy S. Chappelear, and Harry L. Chang: "Comparison of the Experimental Phase Behavior of the Methane-N-Heptane, The Methane-Methylcyclohexane, and the Methane-Toluene Systems," *Proc. Nat. Gas Proc. Assn.* 46, 20-25 (1967).

7. Chappelear, P. S., J. W. Leach, and T. W. Leland: "Thermodynamic Calculation on Paraffin Hydrocarbon Systems Currently Possible by the Rice Corresponding States Principle," *Proc. Nat. Gas Proc. Assn.* 46, 28-31 (1967).

8. Chang, Harry L., Patsy S. Chappelear, and Riki Kobayashi: "The Correlation of Vapor-Liquid Equilibria of Methane in Paraffinic, Naphthenic, and Aromatic Solvents at Low Temperatures and High Pressures," *AIChE J.* 14, 318-324 (1968), https://doi.org/10.1002/aic.690140219.

9. Kobayashi, Riki, Patsy S. Chappelear, and Harry A. Deans: "Physico-Chemical Measurements by Gas Chromatography," *Ind. Eng. Chem.* 59, 63-82 (Oct. 1967), https://pubs.acs.org/doi/abs/10.1021/ie50694a011; K. C. Chao (Chairman), *Applied Thermodynamics*, ACS Publications, Washington, D.C., 1968, p. 225-244.

10. Leland, Thomas W. Jr., and Patsy S. Chappelear: "The Corresponding States Principle—A Review of Current Theory and Practice," *Ind. Eng. Chem.* 60, 15-43 (July 1968),

https://pubs.acs.org/doi/10.1021/ie50703a005; K. C. Chao (Chairman), *Applied Thermodynamics*, ACS Publications, Washington, D.C., 1968, p. 83-111.

11. Fisher, G. D., P. S. Chappelear, and T. W. Leland: "Some Results of Rice Corresponding States Computer Programs for K-Values and Thermodynamic Properties," *Proc. Nat. Gas Proc. Assn.* 47, 26-29 (1968).

12. Vennix, Alan J., Thomas W. Leland, Jr., Patsy S. Chappelear, and Riki Kobayashi: "Thermodynamic Information Obtainable from High Precision Isochoric P-V-T Data on Methane," *Proc. Nat. Gas Proc. Assn.* 47, 22-25 (1968).

13. Galloway, Travis J., Walter Ruska, Patsy S. Chappelear, and Riki Kobayashi: "Experimental Measurement of Hydrate Numbers for Methane and Ethane and Comparison with Theoretical Values," *Ind. Eng. Chem. Fundamentals* 9, 237-243 (1970), https://doi.org/10.1021/i160034a008.

14. Hu, Alexander T., Patsy S. Chappelear, and Riki Kobayashi: "Determination of a Single Set of Unlike Pair Potential Interaction Force Constants from Dilute Gas Thermodynamic and Transport Property Data," *AIChE J.* 16, 490-492 (1970), https://doi.org/10.1002/aic.690160330.

15. Wichterle, Ivan, Zevi W. Salsburg, Patsy S. Chappelear, and Riki Kobayashi: "Unexpected vapor-liquid equilibria behavior in the critical region and some theoretical implications of critical exponents," *Chem. Eng. Sci.* 26, 1141-1144 (1971), https://doi.org/10.1016/0009-2509(71)80033-7.

16. Chappelear, Patsy S., Koichi Asano, Tomoki Nakahara, and Riki Kobayashi: "Analysis and Recommendations for K-Values for Carbon Dioxide and Hydrogen Sulfide at Infinite Dilution in the Methane-N-Octane System," *Proc. Nat. Gas Proc. Assn.* 49, 23-26 (1970).

17. Chappelear, P. S., T. J. Galloway, R. Kobayashi, and W. Ruska: "Experimental Measurement of Hydrate Numbers for Methane and Ethane and Comparison with Theoretical Values," May 1, 1970, NASA Technical Reports Server (NTRS).

18. Wichterle, Ivan, Patsy S. Chappelear, and Riki Kobayashi: "Determination of Critical Exponents from Measurements of Binary Vapor-Liquid Equilibrium in the Neighborhood of the Critical Line," *J. Computational Phys.* 7, 606-619 (1971), https://doi.org/10.1016/0021-9991(71)90116-1.

19. Pope, G. A., P. S. Chappelear, and R. Kobayashi: "Analysis of Data Obtained by Isochorically Coupled Burnett Experiments," *Physica* 57, 127-132 (1972), https://doi.org/10.1016/0031-8914(72)90175-9.

20. Wichterle, Ivan, Riki Kobayashi, and Patsy S. Chappelear: "Caution! pinch point in Y-X curve!" *Hydrocarbon Proc.* 50, No. 11, 233-234 (Nov. 1971).

21. Chappelear, P. S., R. Stryjek, and R. Kobayashi: "Vapor Liquid Equilibrium of the Nitrogen-Methane and Nitrogen-Ethane Systems at Low Temperatures," Proc. 1972 Conference on Natural Gas Research and Technology, American Gas Association, Atlanta, Georgia, June 1972.

22. Stryjek, Roman, Patsy S. Chappelear, and Riki Kobayashi: *Low Temperature Vapor-Liquid Equilibria of the Nitrogen-Methane, Nitrogen-Ethane, and Nitrogen-Methane-Ethane Systems*, Monograph, Rice University, June 30, 1972.

23. Pope, Gary A., Patsy S. Chappelear, and Riki Kobayashi: "Virial coefficients of argon, methane, and ethane at low reduced temperatures," *J. Chem. Phvs.* 59, 423-434 (1973), https://doi.org/10.1063/1.1679822.

24. Chen, R. J. J., W. E. A. Ruska, P. S. Chappelear, and R. Kobayashi: "Development of a Method for Direct Determination of Dew Point Loci of Methane-Heavier Hydrocarbon Mixtures at Low Temperatures and Elevated Pressures," *Adv. Cryog. Eng.* 18, 202-207 (1972), https://doi.org/10.1007/978-1-4684-3111-7_24.

25. Chen, Roger J. J., Patsy S. Chappelear, and Riki Kobayashi: "Dew-Point Loci for Methane-n-Butane Binary System," *J. Chem. Eng. Data* 19, 53-58 (1974), https://doi.org/10.1021/je60060a009.

26. Chen, Roger J. J., Patsy S. Chappelear, and Riki Kobayashi: "Dew-Point Loci for Methane-n-Pentane Binary System," *J. Chem. Eng. Data* 19, 58-61 (1974), https://doi.org/10.1021/je60060a010.

27. Elliot, Douglas, G., Roger J. J. Chen, Patsy S. Chappelear, and Riki Kobayashi: "Vapor-Liquid Equilibrium of Methane-n-Butane System at Low Temperatures and High Pressures," *J. Chem. Eng. Data* 19, 71-77 (1974), https://doi.org/10.1021/je60060a015.

28. Carnahan, Norman, F., R. J. J. Chen, D. G. Elliot, Patsy S. Chappelear, and Riki Kobayashi: "Vapor-Liquid Equilibria in the Neighborhood of the Critical Point in Methane-n-Hydrocarbon Systems," paper presented at IUPAP van der Waals Centennial Conference on Statistical Mechanics, Amsterdam, The Netherlands, 27-31 August 1973.

29. Arai, Y., R. J. J. Chen, P. S. Chappelear, and R. Kobayashi: "Prediction of the Dew Point Locus in Methane-Light Hydrocarbon Binary Systems in the Neighborhood of the Methane Critical Point," *AIChE J.* 20, 399-401 (1974), https://doi.org/10.1002/aic.690200232.

30. Chappelear, Patsy S.: "Tentative K-Values from Chen's Dew Point Experiments for Methane-n-Hexane and Methane-n-Heptane," *Proc. Gas Proc. Assn.* 53, 26-28 (1974).

31. Arai, Yasuhiko, Patsy S. Chappelear, and Riki Kobayashi: "Application of BWR Equation to Infinite Dilution K-values for Carbon Dioxide and Hydrogen Sulfide in Methane-n-Octane System," *Bull. Japan Petroleum Inst.* 15, 156-160 (Nov. 1973), https://doi.org/10.1627/jpi1959.15.156.

32. Chen, Roger J. J., Patsy S. Chappelear, and Riki Kobayashi: "The Molecular Size-Shape Difference Effects on the Vapor-Liquid Equilibria of Methane-n-Alkane Systems at Low Temperatures," GVC/AIChE Joint Meeting, Preprints Vol. IV, paper F-6, September 17-20, 1974.

33. Chappelear, Patsy S.: "Low Temperature Data from Rice University for Vapor-Liquid and P-V-T Behavior," Technical Publication TP-4, Gas Processors Association, Tulsa, Oklahoma, April 1974.

34. Chu, T.-C., Patsy S. Chappelear, and Riki Kobayashi: "Diffusivity of Light Hydrocarbons into Hydrogen," *J. Chem. Eng. Data* 19, 299-303 (1974), https://doi.org/10.1021/je60063a010.

35. Stryjek, Roman, Patsy S. Chappelear, and Riki Kobayashi: "Low-Temperature Vapor-Liquid Equilibria of Nitrogen-Methane System," *J. Chem. Eng. Data* 19, 334-339 (1974), https://doi.org/10.1021/je60063a023.

36. Stryjek, Roman, Patsy S. Chappelear, and Riki Kobayashi: "Low-Temperature Vapor-Liquid Equilibria of Nitrogen-Ethane System," *J. Chem. Eng. Data* 19, 339-343 (1974), https://doi.org/10.1021/je60063a024.

37. Chu, T.-C., Patsy S. Chappelear, and Riki Kobayashi: "Unlike Pair Potential Interaction Force Constants for Hydrogen-Light Hydrocarbon Systems," *AIChE J.* 21, 173-175 (1975), https://doi.org/10.1002/aic.690210126.

38. Pope, Gary A., Patsy S. Chappelear, and Riki Kobayashi: "Compressibility Factors for the Hydrogen-Methane System," *AIChE J.* 22, 191-192 (1976), https://doi.org/10.1002/aic.690220125.

39. Chen, R. J. J., Patsy S. Chappelear, and Riki Kobayashi: "Dew-Point Loci for Methane-n-Hexane and Methane-n-Heptane Binary Systems," *J. Chem. Eng. Data* 21, 213-219 (1976), https://doi.org/10.1021/je60069a025.

40. Chu, T.-C., R. J. J. Chen, Patsy S. Chappelear, and Riki Kobayashi: "Vapor-Liquid Equilibrium of the Methane-n-Pentane System at Low Temperatures and High Pressures," *J. Chem. Eng. Data* 21, 41-43 (1976), https://doi.org/10.1021/je60068a012.

41. Hwang, S.-C., Ho-mu Lin, Patsy S. Chappelear, and Riki Kobayashi: "Dew Point Study in the Vapor-Liquid Region of the Methane-Carbon Dioxide System," *J. Chem. Eng. Data* 21, 493-497 (1976), https://doi.org/10.1021/je60071a019.

42. Chuang, Sheng-yi, Patsy S. Chappelear, and Riki Kobayashi: "Viscosity of Methane, Hydrogen, and Four Mixtures of Methane and Hydrogen from -100 °C to 0 °C at High Pressures," *J. Chem. Eng. Data* 21, 403-411 (1976), https://doi.org/10.1021/je60071a010.

43. Kwon, O'Dae, D. M. Kim, Patsy S. Chappelear, and Riki Kobayashi: "Gravity Effects on the Critical Equilibria of a Simple Mixture," *J. Chem. Phvs.* 66, 4925 (1977), https://doi.org/10.1063/1.433832.

44. Nakahara, Tomoko, Patsy S. Chappelear, and Riki Kobayashi: "Binary Infinite Dilution Vapor-Liquid Equilibrium from Adsorption Chromatography," *Ind. Eng. Chem. Fundamentals* 16, 220-226 (1977), https://doi.org/10.1021/i160062a008.

45. Chen, Roger J. J., Patsy S. Chappelear, and Riki Kobayashi: "Vapor Phase Data for the Binary Systems of Methane with n-Butane, n-Pentane, n-Hexane, and n-Heptane," GPA Research Report RR-19 (1976).

46. Elliot, D. G., Y. N. Lin, T. C. Chu, Patsy S. Chappelear, and Riki Kobayashi: "K-Values for the Methane-n-Butane, Methane-n-Pentane, and Methane-n-Hexane Systems," GPA Research Report RR-20 (1976).

47. Hwang, S. C., Ho-mu Lin, Patsy S. Chappelear, and Riki Kobayashi: "Dew-Point Values for the Methane-Carbon Dioxide System," GPA Research Report RR-21 (1976).

48. Elliot, D. G., P. S. Chappelear, R. J. J. Chen, and R. L. McKee: "Thermophysical Properties: Their Effect on Cryogenic Gas Processing," ACS Symposium Series No. 60, *Phase Equilibria and Fluid Properties in the Chemical Industry*, 289-308 (1977), https://pubs.acs.org/doi/10.1021/bk-1977-0060.ch015.

49. Lin, Yueh-Neu, Roger J. J. Chen. Patsy S. Chappelear, and Riki Kobayashi: "Vapor-Liquid Equilibrium of the Methane-n-Hexane System at Low Temperature," *J. Chem. Eng. Data* 22, 402-408 (1977), https://doi.org/10.1021/je60075a007.

50. Chappelear, Patsy S., Roger J. J. Chen, and Douglas G. Elliot: "An Evaluation of Thermophysical Property Correlations," *Proc. Gas Proc. Assn.* 56, 1-10 (1977).

51. Chappelear, Patsy S., Roger J. J. Chen, and Douglas G. Elliot: "Pick K correlations carefully," *Hydrocarbon Processing* 56, No. 9, 215-217 (Sept. 1977).

52. Campbell, Patrick R., and Patsy S. Chappelear: "Power cycle recovers lost energy," *Hydrocarbon Processing* 57, No. 4, 104-106 (April 1978).

53. Chappelear, P. S.: “Industry initiates SI conversion,” *Hydrocarbon Processing* 60, No. 4, 150-152 (April 1981).

54. Chappelear, Patsy S.: “Acentric Factor for Carbon Dioxide,” *Fluid Phase Equilibria* 9, 319-22 (1982), https://doi.org/10.1016/0378-3812(82)80027-7.

55. Curtis, R. E., H. K. Aghili, C. C. Chen, and Patsy S. Chappelear: “A Design Approach to Enhanced Oil and Gas Recovery,” Proceedings Symposium on Development of Enhanced Oil and Gas Recovery Systems, London, April 13, 1986.

56. Curtis, R. E., H. K. Aghili, C. C. Chen, and Patsy S. Chappelear: “A Design Approach to Enhanced Oil and Gas Recovery,” translated to Russian, presented at Babcock & Wilcox Symposium, Moscow, November 18, 1986.

57. Chappelear, Patsy S.: “Information Systems and Retrieval Methods,” *Encyclopedia of Chemical Processing and Design* Vol. 27, Ed. John J. McKetta, Marcel Dekker, Inc., 1987.

58. Chappelear, Patsy S.: “GPA Experimental Enthalpy Values Referred to Two Base Levels from Excess Enthalpy Data,” Technical Publication TP-18, Gas Processors Association, Tulsa, Oklahoma, October 1988.

59. Chappelear, Patsy Stallings: *Name Index for Stallings Family Records*, second edition, for the books by James Henry Stallings, Houston, Texas, January 3, 1995.

    NOTE: Unique adaptation made for the original individual chapters as books held at the National Library of the Daughters of the American Revolution Washington, District of Columbia.

60. Chappelear, Patsy S.: S*outhern Leverett Families from Virginia in Multiple Sections,* Gateway Press, Inc., Baltimore, Maryland, 2006. 803 pages. Indexed. Library of Congress Control Number 2006923409.

61. Chappelear, Patsy S.: A few articles in the magazines of local genealogical societies in Houston, Texas 2000-2024. Examples: “The Men in My Life” and “transcript of Texas Rural Teacher’s Roll Book from ca. 1920”

APPENDIX 1: Images

shellegram

SHELL OIL COMPANY
HOUSTON REFINERY

SHELL CHEMICAL CORP.
HOUSTON PLANT

Vol. 19 No. 7 HOUSTON, TEXAS July 1954

entitled to free tickets and they may request adult guest tickets at $3.00 each and children (12 years or under) tickets at $1.50 each.

Steaming hot barbecue will be served from noon to 6 p.m.

M. P. L. LOVE
. . . To London

Research Chemist and in 1943 he was made Director of Research here. Later that same year he moved to Wood River in the same capacity, remaining there until 1948 when he was transferred to Head Office.

Newcomers Include First Chemical Engineress:

Research Lab Enlists 17 Chemists, Engineers

Seventeen young Chemists and Engineers from 16 different universities including the laboratory's first Chemical Engineeress will bring the staff of the Houston Research Laboratory to an all time high in its 20 year history. In addition, seven budding scientists have joined the staff for the summer.

The new men have been attracted to Houston from all parts of the United States. For example, Dr. L. R. Snyder, a Physical Organic Chemist is from the University of California and R. P. Sallee is a Chemical Engineer from Brooklyn Polytechnical Institute. However, the majority are from southern colleges with only the University of Florida providing two men. All the new members of the laboratory's staff have completed their training in courses which have been accredited by their respective professional societies.

PAT STALLINGS

The lone girl Chemical Engineer, Pat Stallings, is a graduate of Houston's own Rice Institute. She makes her home in Pasadena and is one of 12 Chemical Engineers joining the staff. Seven of the new arrivals have earned their Doctor's degree. The other 10 have Bachelors' and Masters' degrees.

Newcomers to Research Lab are A. F. Rosenberg, Duke; W. R. Biles, Penn State; E. C. Jernigan, Alabama; L. P. Bosanquet, Florida; O. M. Shultz, Florida; D. E. Hayford, VPI; R. A. Tickner, Georgia Tech; P. A. Stallings, Rice.

R. P. Sallee, Brooklyn Poly Tech· M. L. Geiger, Purdue; J. W. Burdett, Texas A&M; F. N. Rowe, Jr., North Carolina State; J. E. Gwyn, Wisconsin; N. E. Duncan, Rensalear; L. R. Snyder, California; E. O. Kindschy, Montana State, and J. L. Ogilvie, Texas.

RIVERS

James C. Rivers, who retired on pension July 1, is enjoying a brief rest before going into the reclamation and salvage business, the same line of work in which he was engaged at Houston Refinery.

First employed by Shell in 1929 at Houston Refinery, he spent 20 years in the Automotive Department before transferring into the Stores Department as Salvage Foreman.

Mr. and Mrs. Rivers live at 8209 Bangle.

Shellegram Newspaper Header and Accompanying Front-Page Article, "Newcomers Include First Chemical Engineress: Research Lab Enlists 17 Chemists, Engineers," from Shellegram, Vol. 19, No. 7, July 1954, Viewable in the University of Houston Digital Collections: https://id.lib.uh.edu/ark:/84475/do9624jq16c

THE RICE INSTITUTE

Alumni Placement Service

HOUSTON 1, TEXAS

History and Qualification Record of **Patsy Ann Stallings**

who is to receive the degree of **Bachelor of Science**

with a major in **Chemical Engineering**

PERSONAL RECORD:

Present Address **1725 Albans, Houston 5, Texas** Telephone **JU-6055**

Permanent Address **218 W. Jackson, Pasadena, Texas** Telephone **GR2-4844**

Date of Birth **October 23, 1931** Place of Birth **Burnet, Texas**

Martial Status **Single** Number of Dependents **One (self)**

Citizenship **American** Military Status

Height **5'5½"** Weight **130** Physical Disabilities **None**

EDUCATIONAL RECORD:

Name of School	Location	Dates Attended
Pasadena High School	Pasadena, Texas	9/46 - 6/49
The Rice Institute	Houston, Texas	9/49 - 6/53 BA ChE
The Rice Institute	Houston, Texas	9/53 - 6/54 BS ChE

Campus Activities: Chaille Rice Literary Society (Parliamentarian, Publicity Chmn.); SAACS (Secy.); AIChE; Jr.Dance Committee; Rice Engineer (bus.staff, asst.layout editor); Duplicate Bridge Club (director).

Off Campus and Pre-Rice Activities:

Scholastic Distinctions: High school valedictorian, Pasadena Rotary Club Scholarship '49-'50; '51-'52 Franklin Scholar; June 1952 Dean's List

PREVIOUS EXPERIENCE:

Date	Company	Type of Work
Summers '49, '50, '51, '52	Champion Paper, Pasadena, Texas	Steno-clerk
9/51 - 6/52	C.E. Dept., Rice Institute	Lab. Asst. - Typist
6/53 - 9/53	Monsanto Chemical Co., Texas City, Texas	Process Research Worker
9/53 to Present	Ch.E.Dept., Rice Institute	Grader

EMPLOYMENT PREFERENCE: Chemical Engineering, Process Design and Research

PERSONAL REFERENCES: (Summary of which will be furnished by Alumni Placement Office upon Request.)

Mr. A. J. Hartsook, Chemical Engineering Dept., Rice Institute
Mr. Riki Kobayashi, Chemical Engineering Dept., Rice Institute
Dr. H. E. Bray, Mathematics Dept., Rice Institute

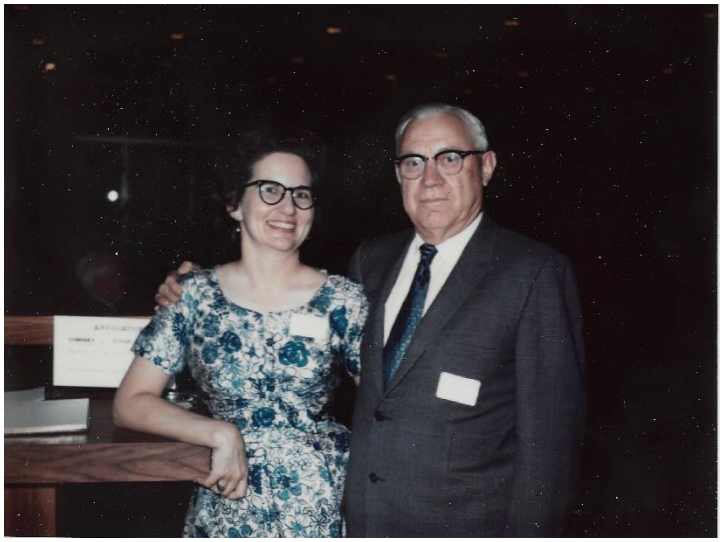
First Resume, 1954

Patsy S. Chappelear in Rice University Thermodynamics Lab, circa 1970

Patsy S. Chappelear with Gas Hydrate Models at Rice University, circa 1970

Membership Certificate, Rice University Chapter of The Society of the Sigma Xi, 9 April 1970

Hubert E. Bray (far left), Riki Kobayashi (second from the right), and Other Attendees at the Hartsook Banquet, 8 May 1970



Patsy S. Chappelear (left) and Another Attendee at the Hartsook Banquet, 8 May 1970

Patsy S. Chappelear (left) and Another Attendee of the National AIChE Meeting in New York City, November 1983

Ken W. Wood (left) and Patsy S. Chappelear (right) at the South Texas Meeting of the AIChE in Houston, TX, 1985

Appendix 2: Lesson Method for Teaching Easy Bridge

LESSON METHOD for Teaching Easy Bridge

The following four pages are intended to be printed front and back and then cut in two. You will have two sets of the minimum needed to start playing bridge.

Print Guidelines for Bidding with Bidding Hints

Print Lead Table (from Charles H. Goren) with Contract Bridge Scoring

Of course you will print as many copies as students! By the way I know there have been some changes to the official scoring since I composed this system to teach bridge. You may update if you wish.

Once upon a time I wrote out part of my starting talk. It went something like this:

This is a deck of cards. To play, they must be shuffled a minimum of 3 times. The four players sit on each side of the table. Opposite you is your partner. The other two are the enemy (Laughter). During play, the left-hand opponent of the dealer shuffles. The dealer picks up the shuffled deck and places it to his/her right for the right-hand opponent to cut….. *get the idea? Don't leave anything out!*

Then I talk about the magic numbers, 13, 4, and 3 as basics plus 30. You will see that the Guidelines for Bidding table has a lot of these. But I start with the card: 13 as the 12 Apostles and Jesus, 4 suits as the 4 Gospels, 3 as the Holy Trinity. So I call bridge the "Holy Game." Of course this is not suitable for non-Christian groups, but I developed it for members of my Christian church.

Make it fun. I did supervised play and arbitrarily would have changes of partners. When unusual hands come up, everyone would look at them and we would talk about some of the well-known statistics of bidding.

I did not use very many conventions. Keep it as simple as possible. Enjoy.

GUIDELINES FOR BIDDING

by Patsy Chappelear

Based on the Goren System and the number 3

High Card Points (**HCP**) evaluation: Ace 4 For evaluating your hand for opening,
NT = No Trump King 3 add 1 point for each 5 card suit
JS = Jump Shift Queen 2 and 2 points for each 6 card suit.
TOD = Take Out Double Jack 1
total 10 x 4 suits = 40 HCP in deck

Count of your hand: If you have these HCP:	and sit 1st chair or 2nd chair **Open** with	and sit 3rd chair **Open** with	and sit 4th chair **Open** with	**Respond** to Partner's Opening Bid of 1 in a suit (no other bids)	Make an **Overcall** (Opponent opened the bidding)	Make a **free bid** over an opponent
Less than 6	PASS	Pass	Pass	Pass	Pass	Pass
5 to 9;suit 7+	3 of suit	*Maybe* 3 of suit	Pass	Bid your suit	*Maybe jump*	*Maybe*,no jump
Over 9;suit 7+	1 of suit	1 of suit	Pass	Bid your suit	*Maybe jump*	Bid
6 to 10	Pass	Pass	Pass	1 NT or 1 suit	Pass	Pass
9 to 12	Pass	Pass	Pass		Bid a 5+suit	
11 to 12	Pass	**Open 3rd** o.k.	Pass	Yes, make bid	w/a good suit	Bid
13 to 15	1 suit	1 suit	1 suit*14HCP**min***	2 NT* o.k.	TOD or bid	Yes
16 to 18*	1 NT	1 NT	1 NT	3 NT* o.k.	TOD or 1 NT	Yes
19 to 21	1suit w/JS next	1 suit w/JS next	1 suit w/JS next	Jump Shift	TOD	Someone's fibbing!
22 to 24**	2 NT	2 NT	2 NT	Look for a slam	WITH THIS MANY POINTS IN	
25 to 27**	3 NT	3 NT	3 NT	Slam for sure	ONE HAND HOW MANY LEFT?	

GUIDELINES FOR BIDDING

by Patsy Chappelear

Based on the Goren System and the number 3

High Card Points (**HCP**) evaluation: Ace 4 For evaluating your hand for opening,
NT = No Trump King 3 add 1 point for each 5 card suit
JS = Jump Shift Queen 2 and 2 points for each 6 card suit.
TOD = Take Out Double Jack 1
total 10 x 4 suits = 40 HCP in deck

Count of your hand: If you have these HCP:	and sit 1st chair or 2nd chair **Open** with	and sit 3rd chair **Open** with	and sit 4th chair **Open** with	**Respond** to Partner's Opening Bid of 1 in a suit (no other bids)	Make an **Overcall** (Opponent opened the bidding)	Make a **free bid** over an opponent
Less than 6	PASS	Pass	Pass	Pass	Pass	Pass
5 to 9;suit 7+	3 of suit	*Maybe* 3 of suit	Pass	Bid your suit	*Maybe jump*	*Maybe*,no jump
Over 9;suit 7+	1 of suit	1 of suit	Pass	Bid your suit	*Maybe jump*	Bid
6 to 10	Pass	Pass	Pass	1 NT or 1 suit	Pass	Pass
9 to 12	Pass	Pass	Pass		Bid a 5+suit	
11 to 12	Pass	**Open 3rd** o.k.	Pass	Yes, make bid	w/a good suit	Bid
13 to 15	1 suit	1 suit	1 suit*14HCP**min***	2 NT* o.k.	TOD or bid	Yes
16 to 18*	1 NT	1 NT	1 NT	3 NT* o.k.	TOD or 1 NT	Yes
19 to 21	1suit w/JS next	1 suit w/JS next	1 suit w/JS next	Jump Shift	TOD	Someone's fibbing!
22 to 24**	2 NT	2 NT	2 NT	Look for a slam	WITH THIS MANY POINTS IN	
25 to 27**	3 NT	3 NT	3 NT	Slam for sure	ONE HAND HOW MANY LEFT?	

Bidding Hints:
Immediate raise of partner's suit ***only*** if you have 4+ of his trump suit.
3 NT contract needs 26 points in the combined two hands.
Make free bids only with good values.
The pre-emptive bid (7 or more cards in one suit) is used to interfere with the opponents.
Reverse bidding shows a GOOD hand. Reverse is bidding joining suits, lower first, then higher.
Opener's rebid: Jump in NT shows opening NT HCP but not NT distribution; and says unbid suits are stopped.

No Trump (NT) Bids marked with *or **:
Must be balanced distribution of 4 3 3 3 or 4 4 3 2
*For 1 NT opening, only 3 suits need to be stopped. *The 2 card suit does **not** have to have a stop.*
**For 2 or 3 NT openings, all 4 suits need to be stopped.

Control of hand for partnership:
The responder: Partner opens with 1, 2, or 3 N.T. or makes a Jump Shift (JS) use arithmetic to see what your partnership can make. Partner opens with a preempt, you know the total for the partnership.
The opener: If you get a Jump Shift or 1 NT, 2 NT, or 3 NT response, you will know the total for the partnership.

THE TAKE OUT DOUBLE!! (TOD)
1. Your partner opens, next person doubles: **Pass *unless--***
   You have 4+ of partner's suit, <8 HCP, **bid** 2 of partner's suit.
   You have 8+ good points, **redouble**. Do not bid a new suit at this point!!!! Your redouble causes your partner to pass; you make the next bid for the partnership.

2. Your partner makes a takeout double, next person ***passes***: You **MUST** bid!
   If you have 8+ HCP show your strength by a jump bid. Your bid is not a Jump Shift.

3. Your partner makes a takeout double, next person ***redoubles***: **Bid only** if you have a good 5+ suit AND some HCP's, say at least 6. If you use arithmetic to add to 40 here, something is fishy in Denmark.

Bidding Hints:
Immediate raise of partner's suit ***only*** if you have 4+ of his trump suit.
3 NT contract needs 26 points in the combined two hands.
Make free bids only with good values.
The pre-emptive bid (7 or more cards in one suit) is used to interfere with the opponents.
Reverse bidding shows a GOOD hand. Reverse is bidding joining suits, lower first, then higher.
Opener's rebid: Jump in NT shows opening NT HCP but not NT distribution; and says unbid suits are stopped.

No Trump (NT) Bids marked with *or **:
Must be balanced distribution of 4 3 3 3 or 4 4 3 2
*For 1 NT opening, only 3 suits need to be stopped. *The 2 card suit does **not** have to have a stop.*
**For 2 or 3 NT openings, all 4 suits need to be stopped.

Control of hand for partnership:
The responder: Partner opens with 1, 2, or 3 N.T. or makes a Jump Shift (JS) use arithmetic to see what your partnership can make. Partner opens with a preempt, you know the total for the partnership.
The opener: If you get a Jump Shift or 1 NT, 2 NT, or 3 NT response, you will know the total for the partnership.

THE TAKE OUT DOUBLE!! (TOD)
1. Your partner opens, next person doubles: **Pass *unless--***
   You have 4+ of partner's suit, <8 HCP, **bid** 2 of partner's suit.
   You have 8+ good points, **redouble**. Do not bid a new suit at this point!!!! Your redouble causes your partner to pass; you make the next bid for the partnership.

2. Your partner makes a takeout double, next person ***passes***: You **MUST** bid!
   If you have 8+ HCP show your strength by a jump bid. Your bid is not a Jump Shift.

3. Your partner makes a takeout double, next person ***redoubles***: **Bid only** if you have a good 5+ suit AND some HCP's, say at least 6. If you use arithmetic to add to 40 here, something is fishy in Denmark.

OPENING LEAD TABLE

HOLDING IN SUIT	AGAINST NO TRUMP	AGAINST TRUMP BIDS
A K Q J	A	K
A K Q x x x	A	K
A K Q x x	K	K
A K Q x	K	K
A K x	K	K
A K J 10	A	K
A K J x	K	K
A K J x x	x	K
A K J x x x x	x	K
A K x x x x	x	K
A K 10 9 x	10	K
A K 10 9 x x	10	K
A K x x x	x	K
A Q J x x	Q	A
K Q J x x	K	K
K Q 10 x x	K	K
K Q 7 4 2	4	K
Q J 10 x x	Q	Q
Q J 9 x x	Q	Q
Q J 7 4 2	4	4
J 10 9 x x	J	J
J 10 8 x x	J	J
J 10 7 4 2	4	4
10 9 8	10	10
10 9 7 4	4	10
A Q 10 9 x	10[1]	A
A Q 8 7 4 2	7	A
A J 10 8 2	J	A
A 10 9 7 2	10	A
K J 10 7 2	J	J
K 10 9 7 2	10	10
Q 10 9 7 2	10	10
A 7 4	4	A
K J 4	4[2]	4
K 7 4	4	4
Q 10 4	4	4
J 7 4	4	4
10 7 4	4	4
K 9 8 7	7[3]	7

[1]The queen is led when you suspect the king is in the dummy.
[2]Unattractive lead, but made necessary by the bidding.
[3]Do not treat the 9 8 7 as the top of an interior sequence, because partner may improperly read it as the top of nothing.

OPENING LEAD TABLE

HOLDING IN SUIT	AGAINST NO TRUMP	AGAINST TRUMP BIDS
A K Q J	A	K
A K Q x x x	A	K
A K Q x x	K	K
A K Q x	K	K
A K x	K	K
A K J 10	A	K
A K J x	K	K
A K J x x	x	K
A K J x x x x	x	K
A K x x x x	x	K
A K 10 9 x	10	K
A K 10 9 x x	10	K
A K x x x	x	K
A Q J x x	Q	A
K Q J x x	K	K
K Q 10 x x	K	K
K Q 7 4 2	4	K
Q J 10 x x	Q	Q
Q J 9 x x	Q	Q
Q J 7 4 2	4	4
J 10 9 x x	J	J
J 10 8 x x	J	J
J 10 7 4 2	4	4
10 9 8	10	10
10 9 7 4	4	10
A Q 10 9 x	10[1]	A
A Q 8 7 4 2	7	A
A J 10 8 2	J	A
A 10 9 7 2	10	A
K J 10 7 2	J	J
K 10 9 7 2	10	10
Q 10 9 7 2	10	10
A 7 4	4	A
K J 4	4[2]	4
K 7 4	4	4
Q 10 4	4	4
J 7 4	4	4
10 7 4	4	4
K 9 8 7	7[3]	7

[1]The queen is led when you suspect the king is in the dummy.
[2]Unattractive lead, but made necessary by the bidding.
[3]Do not treat the 9 8 7 as the top of an interior sequence, because partner may improperly read it as the top of nothing.

CONTRACT BRIDGE SCORING

HOW TO SCORE

SUIT VALUES PER TRICK	Undoubled	Doubled	Redoubled
Clubs or Diamonds	**20**	**40**	**80**
Hearts or Spades	**30**	**60**	**120**
No Trump First Trick	**40**	**80**	**160**
All Succeding Tricks	**30**	**60**	**120**

Tricks bid and made or scored in Trick Score of Declarer.

POINTS NEEDED FOR GAME..... **100**

A game must be bid to score, but need not be made in one hand.

HONORS-(Scored by side holding them)

Suit Bid-Four in one hand	**100**
Suit Bid-Five in one hand	**150**
No Trump-Four Aces in one hand	**150**

RUBBER BONUS

The side first winning two games wins a Rubber.

Two-game Rubber	**700**
Three game Rubber	**500**
Unfinished Rubber - one game	**300**
Part-score	**100**

VULNERABLE When a side wins a game it is Vulnerable.

SLAM BONUS-Slams must be bid and made	Not Vul.	Vulnerable
Small Slam **or** bid of six.....	**500**	**750**
Grand Slam **or,** bid of seven.....	**1000**	**1500**

PREMIUMS-Scored in Honor-Score

for making a Doubled **or** Redoubled Contract **100**

OVERTRICKS-each trick	Not Vul.	Vulnerable
Not Doubled	At trick value as shown above	
Doubled	**100**	**100**
Redoubled	**200**	**400**

UNDERTRICK PENALTY

Total points scored by Opponents when Declarer fails to make his Contract.

NOT VULNERABLE

Tricks Under Contract	Undoubled	Doubled	Redoubled
One	**50**	**100**	**200**
Two	**100**	**300**	**600**
Three	**150**	**500**	**1000**
Four	**200**	**800**	**1400**
Five	**250**	**1100**	**1800**
Six	**300**	**1400**	**2200**

VULNERABLE

One	**100**	**200**	**400**
Two	**200**	**500**	**1000**
Three	**300**	**800**	**1600**
Four	**400**	**1100**	**2200**
Five	**500**	**1400**	**2800**
Six	**600**	**1700**	**3400**

CONTRACT BRIDGE SCORING

HOW TO SCORE

SUIT VALUES PER TRICK	Undoubled	Doubled	Redoubled
Clubs or Diamonds	**20**	**40**	**80**
Hearts or Spades	**30**	**60**	**120**
No Trump First Trick	**40**	**80**	**160**
All Succeding Tricks	**30**	**60**	**120**

Tricks bid and made or scored in Trick Score of Declarer.

POINTS NEEDED FOR GAME..... **100**

A game must be bid to score, but need not be made in one hand.

HONORS-(Scored by side holding them)

Suit Bid-Four in one hand	**100**
Suit Bid-Five in one hand	**150**
No Trump-Four Aces in one hand	**150**

RUBBER BONUS

The side first winning two games wins a Rubber.

Two-game Rubber	**700**
Three game Rubber	**500**
Unfinished Rubber - one game	**300**
Part-score	**100**

VULNERABLE When a side wins a game it is Vulnerable.

SLAM BONUS-Slams must be bid and made	Not Vul.	Vulnerable
Small Slam **or** bid of six.....	**500**	**750**
Grand Slam **or,** bid of seven.....	**1000**	**1500**

PREMIUMS-Scored in Honor-Score

for making a Doubled **or** Redoubled Contract **100**

OVERTRICKS-each trick	Not Vul.	Vulnerable
Not Doubled	At trick value as shown above	
Doubled	**100**	**100**
Redoubled	**200**	**400**

UNDERTRICK PENALTY

Total points scored by Opponents when Declarer fails to make his Contract.

NOT VULNERABLE

Tricks Under Contract	Undoubled	Doubled	Redoubled
One	**50**	**100**	**200**
Two	**100**	**300**	**600**
Three	**150**	**500**	**1000**
Four	**200**	**800**	**1400**
Five	**250**	**1100**	**1800**
Six	**300**	**1400**	**2200**

VULNERABLE

One	**100**	**200**	**400**
Two	**200**	**500**	**1000**
Three	**300**	**800**	**1600**
Four	**400**	**1100**	**2200**
Five	**500**	**1400**	**2800**
Six	**600**	**1700**	**3400**